May 5, 1931. R. I. DRAKE 1,803,548

PRINTING PRESS PLATE AND PROCESS OF MAKING THE SAME

Filed Dec. 23, 1929

Fig. 1.

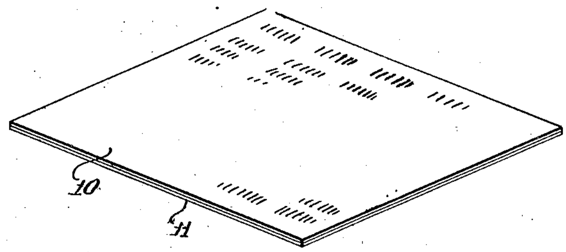


Fig. 2.

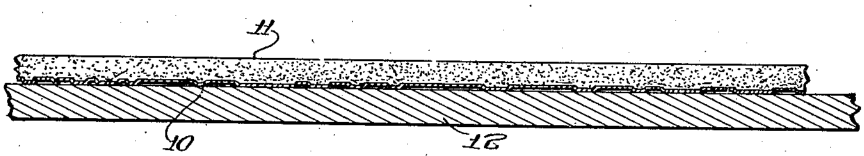
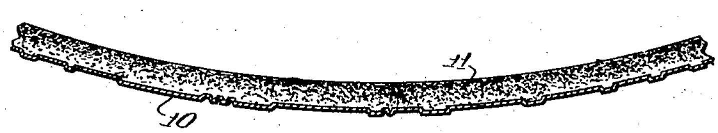


Fig. 3.



Witness.
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UNITED STATES PATENT OFFICE

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PRINTING-PRESS PLATE AND PROCESS OF MAKING THE SAME

Application filed December 23, 1929. Serial No. 415,955.

This invention relates to a printing press plate and process of making the same.

Heretofore, in making electroplates, (copper plates, nickel plates, chromium plates, and the like) for use in the letter press printing process, it has been necessary to build up the shell with suitable backup metal, usually an alloy of lead, tin and antimony, before the plate could be used in the press. The backup metal is usually cast upon the back of the shell, and afterwards the combination of shell and backup metal must be "finished" by expert workmen to obtain trueness in the printing surfaces of the plate to make it possible to print therefrom.

When a curved plate is desired for use on a rotary press, the plate is made up and then curved, and particularly when curved there is a large amount of work required to finish the plate and make the same ready for use on the press in addition to the "finishing" operation due to the shrinkage and other distortions from backing the shell with the molten metals. This is largely due to the fact that when the plate is curved to the desired extent the type characters and other images on its printing surface are very considerably distorted, primarily because of the difference between the cohesion of the molecules of the backup metal as compared with that of the shell, resulting in stretching of the shell to a larger size than the original from which it was reproduced and in the direction in which the curving was done, when the combined shell and backup metal (which comprise the present printing plate) are bent or curved.

As now made, plates of this character require the employment of great skill and labor in making the plates ready for use, and separate plates must be provided for use in connection with flat and cylindrical presses.

Even when the plates made up in the ordinary way are considered suitable for use, they are still very noticeably imperfect, due to the large difference in coefficients of expansion between the metals of the shell and the backing metal, and in order to obtain results which approximate requirements, expert pressmen must pack the impression cylinder to compensate for known imperfections in the plate.

One of the objects of the invention is to provide a printing plate which is capable of use either on a flat or cylindrical press, without distortion in changing the same from one to the other.

Another object of the invention is to provide a printing plate having a backing of material in which the cohesion of the molecules thereof is less than those of the shell, rendering it possible to curve the plate to fit a press cylinder or again flatten the same, all without disturbing or distorting the printing images on the surface of the printing plate.

Another object of the invention is to provide a process of making a printing plate having a suitable backing, wherein the latter may be applied directly to the finished shell at ordinary temperatures without any danger of distorting the plate through the use of molten metal and the like, and the plate is made ready for use without the necessity of performing the so-called "finishing" operations for trueing up the printing surfaces of the printing plate.

Still another object of the invention is to provide a process which involves the use of a substance for backing up the "shell", which is of the necessary consistency at ordinary temperatures and which may be dissolved by a suitable solvent to render a portion of the same liquid in form, and wherein the electroplate is initially coated upon its obverse face with the liquid, and a backing of the same undissolved substances, of the required thickness for the backing, applied to the coated surface, and the plate and backing subjected to pressure and temperature sufficient to evaporate the solvent and effect a strong and practically homogeneous bond with the plate.

Other and further objects of the invention will more clearly appear from the description and claims hereinafter following.

Referring to the drawings forming a part of this specification,—

Figure 1 is a perspective view of an electroplate disclosing the invention;

Fig. 2 is an enlarged, broken, side, elevational view of the plate, showing the application of my invention; and

Fig. 3 is a view similar to Fig. 2, showing the plate when curved.

The invention broadly contemplates the provision of a copper, nickel, chromium, or other electro-deposited shell 10, provided with a suitable backing 11, the latter being made up of a synthetic resin, hereinafter described, applied to the electroplate in a novel way, and wherein the plate may be expeditiously prepared and when finished have the property of being flexible without distortion of the printing characters of the plate, or injury to the form or substance of the backing, thereby enabling the plate to be used either in curved or flat form.

In carrying out the invention, the "shell" is formed in the usual way, but instead of applying molten backup metal to the shell, which badly distorts it, I employ a backing of synthetic resin of a peculiar character, which is affixed to the shell at ordinary temperatures without any distortion, the resin having peculiar properties residing in its ability to be compressed or deformed without crystallation, and at the same time providing sufficient incompressibilty to resist ordinary printing temperatures and pressures.

A resin having the proper characteristics is of the type produced by causing aliphatic vinyl esters to react chemically with saturated aliphatic aldehydes in quantities above one percent., the form of the material being more particularly set forth in British Patent, No. 28,246, dated December 20, 1928, granted to H. W. Matheson, et al. The synthetic product produced by the process above mentioned has the properties above referred to, namely, a molecular cohesion less than nickel or copper electroplates, and which has sufficient cohesion to resist compressibility tending to cause cold flowing in use, and further providing flexibility without crystalization. Other resins having similar properties may be used in lieu of the one above particularly referred to.

In preparing the press plate, the copper, nickel, chromium, or other electrodeposited shell, is laid upon a suitable support such as that indicated at 12, with its obverse or rear face disposed upwardly. A quantity of the synthetic resin above described is dissolved by any suitable solvent, such, for instance, as acetone, resulting in the formation of a fluid having strong adhesive properties. This fluid is then applied to the rear face of the plate, either by a brush or by being poured onto the plate, thereby filling all of the crevices or pits which result from the embossed character of the plate. The rear face of the plate, after this treatment, is smooth and flat and ready for the application of the undissolved backing member proper of the synthetic resin described.

The backing layer 11, prior to application, is cut to the required thickness and size, and is laid upon the coated or painted rear surface of the electroplate. The entire press plate, including the electroplate and the backing layer, are then submitted to pressure in a suitable press, and the solvent driven off by raising the temperature sufficiently to cause evaporation thereof. After the solvent is driven off, the coating interposed between the backing layer and the electroplate provides a strong and effective bond between the metal plate and the backing layer of resin. The printing plate is then ready for use.

The printing plate in its finished form includes only the accurately formed shell with its backing layer of resin, and the printing plate is characterized by its flexibility without distortion of the printing image, this being due to the more ready compressibility of the molecules of the backing layer than occurs in lead and the like, ordinarily used for backup material, and which results in stretching of the printing surface on the plate during the finishing operations and when it is formed in a curved shape to adapt it for application to a cylindrical press.

The backing material in question, by reason of its molecular structure, localizes the distortion due to a bending of the completed printing plate within itself, so that during the bending operation, the thin metal shell will not be stretched or distorted to an appreciable degree. In other words, the metal shell resists stretching when the plate is bent, so that the necessary distortion will be provided for in the backing, which is not the case where a plate having a metal backing is bent or flexed and the distortion is distributed throughout the shell as well as in the backing itself. At the same time, the backing remains flexible, but not elastic, at all ordinary temperatures, so that it may be curved to the desired degree without heating, or restored to a flat condition, and being practically incompressible, it will afford the necessary resistance required in performing its service as a printing plate.

The plate, therefore, is equally adaptable to the requirements of a flat bed press or a rotary press, and can be transferred from one type of press to the other without distortion of the printing surface. From a manufacturing standpoint, it possesses an advantage, in that the printing plates can be completed without straightening, roughening, finishing, or other operations ordinarily required in work of this character, so that the number of operations required in the production of a plate is reduced.

The plates produced in conformity with the requirements of the present invention possess greater accuracy and better quality than plates of the ordinary character, through the elimination of distortion and crystallization due to the limitations of the backup metal alloy commonly employed. These improvements in the printing plate result in corresponding improvements in the quality of the product, which may be more economically produced through the elimination of manufacturing operations.

The use of the plate of the present invention also results in economies due to the fact that a single plate may be used either for flat bed or cylinder presses without distortion of the printing image.

Additional advantages are due to the fact that in preparing the plate for use, the customary make-ready operations are reduced or eliminated by incorporating in the printing plate the pressure requirements for the various areas in the printing image; and a final advantage is due to the fact that the plate is lighter and may be more easily handled and transported than plates of the ordinary type.

Although the synthetic resin above referred to possesses in a marked degree the desirable properties which adapt it for use as a backing in conformity with the principles of the present invention, nevertheless, it is not the intention to limit the claims to a backing of this particular resin, and reference thereto is made primarily for the purpose of indicating a particular substance which conforms to the present requirements.

I claim:

1. A printing plate of the character described, comprising a relatively thin metallic printing shell having printing characters embossed thereon, and a relatively thick backing member of relatively incompressible material having the characteristics of flexibility without elasticity at ordinary temperatures, and distortability in greater degree than the metallic printing shell, to permit localization of distortion due to bending within the backing without appreciably stretching or otherwise distorting the metallic shell.

2. A press plate of the character described, comprising a metallic printing surface and a backing member of synthetic resin produced by chemical reaction between aliphatic vinyl esters and saturated aliphatic aldehydes.

3. A process of the character described, consisting in coating the rear face of an electroplate with dissolved synthetic resin, applying a backup member of synthetic resin to the coated surface, and driving off the solvent under heat to effect a bond between said backup member and said electroplate.

4. A process of the character described, consisting in dissolving synthetic resin, coating the rear face of the electroplate with the dissolved resin, and applying a backup member of undissolved synthetic resin to the coated surface of said electroplate.

5. A printing plate comprising a relatively thin metallic printing shell and a relatively thick backing member of relatively incompressible material having the characteristics of flexibility without elasticity at ordinary temperatures and distortability in greater degree than the metallic printing shell to permit localization of distortion due to bending within the backing without appreciably stretching or otherwise distorting the metallic shell.

In witness that I claim the foregoing I have hereunto subscribed my name this 11th day of December, 1929.

RONALD I. DRAKE.