Jan. 6, 1953 G. L. MORRISON 2,624,700

PREPARATION OF PRINTING SURFACES FOR PHOTOGRAPHING

Filed April 10, 1948

Fig. 1

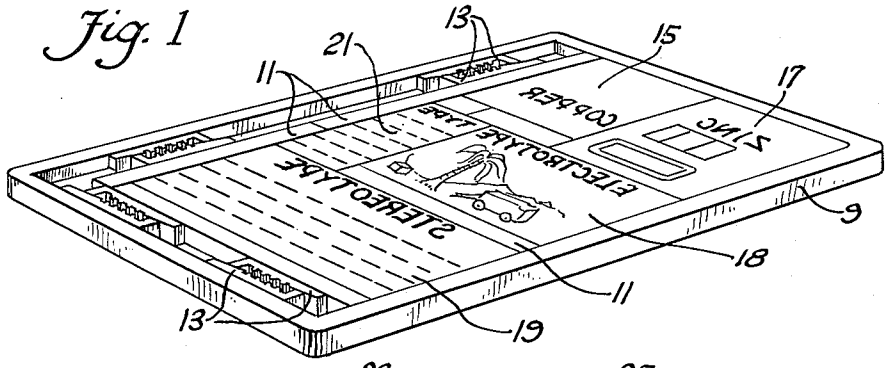


Fig. 2

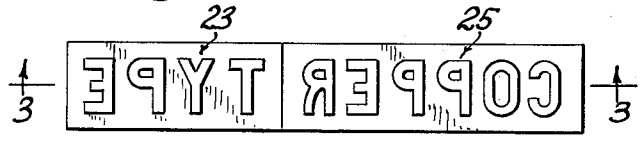


Fig. 3

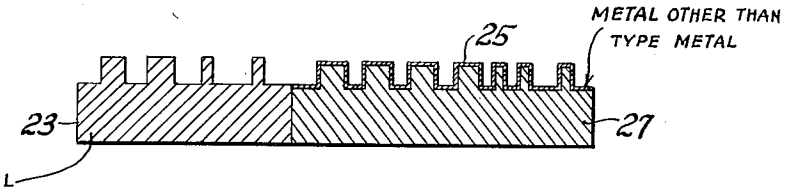


Fig. 4

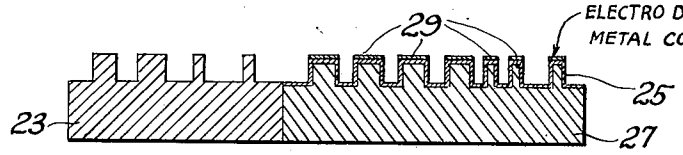


Fig. 5

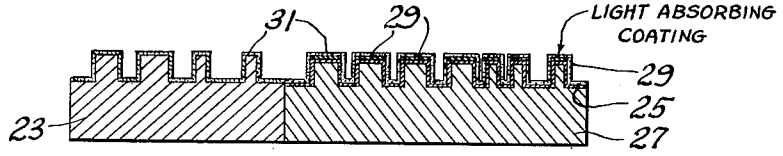
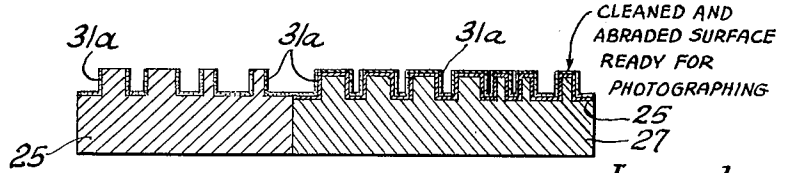


Fig. 6



Inventor:
George L. Morrison
By Soans, Pond & Anderson
Atty's

Patented Jan. 6, 1953

2,624,700

UNITED STATES PATENT OFFICE

2,624,700

PREPARATION OF PRINTING SURFACES FOR PHOTOGRAPHING

George L. Morrison, Evanston, Ill.

Application April 10, 1948, Serial No. 20,214

4 Claims. (Cl. 204—17)

1

The present invention relates to the art of printing and is particularly concerned with the preparation for photographing of printing forms containing raised or intaglio printing surfaces.

In the everyday production of certain types of gravure printing surfaces, for example, in the practice of the photogravure and rotagravure processes, the text and other material to be reproduced by the gravure printing surface are transferred to that surface by a process which requires the use of a photographically produced print or transparency of the material to be reproduced. In order to obtain such a print or transparency, it is the usual practice to set-up a printing form containing type and/or type-slugs, and the various other printing surfaces which are to be reproduced. This form is then inked, and an impression on paper is made therefrom. Finally, the inked imprint or impression is photographed, and the resulting print or transparency is used in the production of the gravure surface.

There are serious disadvantages to this procedure. Regardless of how well type, type-slugs, and printing plates are made, there is a substantial loss in the clarity of the outlines of the printing surface thereof during the inking and during the actual printing operation, and this loss is carried over in any photographic operation which involves photographing an inked impression made from such type or other printing surfaces. Also, the process requires careful make-ready of the form, the inking of the form, and the making of an impression on paper, all of which steps involve further time and require relatively skilled workmanship.

It is apparent that many of the difficulties inherent to the procedure described above and most of the disadvantages of that procedure could be avoided by the direct photographing of the printing form, and in the past, attempts have been made to do this. However, due at least in part to the fact that a printing form is commonly made up of elements having very uneven reflecting powers, varying from the high reflectance of new, cast type, or type-slugs, to the low-reflectance characteristic of, for example, an oxidized copper plate, very poor results have been obtained in all known direct photography procedures. In fact, the results are so unsatisfactory that the prior art has proceeded, for many years, on the theory that the direct photography of printing forms is impractical, if not impossible.

The present invention, as above indicated, is

2

concerned with the provision of a procedure whereby it is possible to directly photograph printing surfaces, and especially the printing surfaces contained in the usual printing form, which may include type of various kinds and varieties and printing plates made of various metals, so as to obtain a photographic negative or positive which can be used in the production of gravure and other printing surfaces by any of the known methods. The invention makes possible the obtaining of a much better photographic print or transparency of type and other printing surfaces than has been possible by any of the heretofore known procedures. The procedure of the invention can be carried out in a minimum amount of time and with a minimum of effort and equipment. Moreover, the practice of the invention does not impair the type or plates contained in the printing form and does not interfere with the prior or subsequent use of the form or its components for conventional purposes.

The features of the invention and the procedures which I prefer to follow in practicing the invention will be made apparent in the accompanying drawings and in the following description of certain illustrative examples thereof. In the drawings,

Figure 1 is a perspective view of a printing form containing various kinds of printing surfaces;

Figure 2 is a plan view of a portion of two different kinds of printing elements which may comprise a part of the printing form illustrated in Figure 1; and

Figures 3 to 6, inclusive, are sectional views, on the general line 3—3 of Figure 2, illustrating various of the steps in the preparation of a printing form for photographing in accordance with the invention.

The printing form illustrated in Figure 1 is of conventional type, and as such, it includes the usual heavy metal chase 9 for containing the various components of the form, furniture (i. e. spacers) 11, and the usual locking wedges or quoins 13 for holding the printing elements in place in the chase. As is well known in the art, the usual printing form may include newly cast type and/or type-slugs, slightly used type, old type that is dirty and oxidized, photo-engravings, stereotypes, and electrotypes and other printing plates having surfaces which may be made of copper, zinc, brass, steel, nickel, chrome, silver, etc. The type and/or type-slugs, and the stereotypes are all made of type metal, and these ele-

ments alone or in combination will usually comprise the major portion of the printing form. In the form illustrated in Figure 1, a copper printing plate is illustrated at 15, a zinc plate at 17, an electrotype section at 18, a stereotype section at 19, and a type section, which may be either single type and/or type-slugs, at 21.

The manner in which the various printing surfaces contained in the printing form are prepared for photographing, in accordance with the invention, is illustrated particularly in Figures 2 through 6. In Figure 2 there is shown a plan view of two, differing kinds of printing elements which might comprise a part of a printing form. One of these, the element 23, is made of type metal, and the other, the element 25, is a copper electro-plate which is backed with metal, or a combination of wood and metal back, as indicated at 27. In the practice of the invention, the process to be followed differs in one important respect, depending upon whether the printing surface to be prepared for photographing is of a metal having high light-reflectance characteristics, such as type metal, or of a metal having lower light-reflectance characteristics, such as the metals other than type metal in the usual type form. There are, however, only two variations in the process. All type metal and like, high-reflectance surfaces are treated alike, and all surfaces in the form having less inherent reflectance than the metal of highest-reflectance capabilities, which metal is normally type metal, are treated alike. Hence, the two elements 23 and 25, one having a type metal printing surface and the other having a printing surface of a metal other than type metal, can be used to illustrate both of the normal variations of the invention.

As the first step in the preparation of the lower inherent reflectance surfaces, which normally include all surfaces of metals other than type metal, a thin coating of a metal having high actinic reflection properties, at least when it is polished, is applied to all such printing surfaces. When these non-type metal printing surfaces constitute elements of a conventional printing form, this step is preferably carried out when the entire form is locked-up in the chase. This coating should be very thin, probably a coating of molecular thickness is sufficient, and it is most easily applied by an electro-deposition process. For example, the coating may be applied by connecting the negative side of a source of direct-current potential to the printing surface, and then rubbing the surface of the printing plate with an anode that is covered by a wick moistened with a suitable plating solution. The operation takes but a minute or two to accomplish, and the metallic coating is applied only to the actual printing surface as illustrated at 29 in Figure 4.

A number of metals can be used for the high reflectance coating which is applied to the printing surfaces, which are not of type metal. These include tin, cadmium, silver, and other of the white metal group, although the use of tin is particularly preferred since this metal seems to produce a much better surface than any of the other metals.

After the formation of this high-reflectance, metallic coating on all printing surfaces which are of a metal other than type metal, the process of the invention is the same for all of the components of the printing form. As the next step, the entire form is coated with a light-absorbing or non-actinic coating, preferably by spraying, although this coating can be applied in any other manner. This overall non-reflecting coating, as initially applied, is illustrated at 31 in Figure 5. Various materials can be used for the light-absorbing coating 31; the best coatings, however, are those which include a suitable light-absorbing pigment dispersed in a suitable liquid vehicle which contains a binder for the pigment. The sprayed coating should dry rapidly and should be readily removable from the printing surfaces, as is required in the next step of the preparation procedure; it should also be readily removable from all other parts of the printing form at the conclusion of the photographing operation. At the same time, the coating should not dust or crack, and it should not be toxic or difficult to use.

A particularly satisfactory coating is produced by the mixture of four parts of water, one part of liquid soap (desirably a slightly acid, cocoanut oil soap) and three parts of dry, drop-black pigment, all parts being by volume. This coating should be mixed daily; it is water soluble and hence is very easily removed from the type and printing plate surface. Also, the material does not dust; it is cheap, easy to handle, and non-cracking.

It will be understood, however, that other types of coatings can be used. The essential thing is the provision of a coating which will not reflect actinic light. For example, it is possible to employ an alcohol-base coating, a suitable formula including one part shellac, six parts dry, drop-black, and eight parts methanol, all by volume. This coating dries very fast, but in order to make possible convenient removal of the coating from the printing surfaces which are to be photographed, it is necessary to ink the printing form before the coating is applied, as will be hereinafter described. It is also possible to use coatings which comprise dispersions of pigments other than drop black, for example, red lead can be used quite successfully. Also, it is possible to spray the printing form with an optical black lacquer, but materials of this type are recommended, due to the difficulties experienced in cleaning the type and other components of the printing form.

After the non-reflecting coating which has been applied to the entire surface of the printing form has dried, that coating is removed from the printing surfaces only of the various printing elements making up the form. The non-reflecting coating which remains thus masks or covers the entire background of the printing form, as illustrated at 31*a* in Figure 6, at the same time the metallic printing surfaces are completely exposed.

The removal of the non-reflecting coating from the printing surfaces is conveniently accomplished by the use of a cloth-covered, rather firm, rubber block, or equivalent means. If the coating has been applied by the use of the water-soap-pigment mixture described above, the cloth-covered pad may be used dry and a few light strokes of the pad will effect adequate cleaning of the printing surfaces. If an alcohol type coating is used, the printing form should be inked preliminary to the application of the coating, and the coating can be removed by using a pad which has been moistened in naphtha, benzene or other ink solvent.

After the non-reflecting coating has been removed from the printing surfaces, those surfaces

are very clearly visible in the face of the form, the remaining coating providing a light-absorbing background which outlines the printing surfaces. However, it is not yet possible to satisfactorily photograph these surfaces, and as the final step in the preparation of printing surfaces in accordance with the invention, the printing surfaces constituting the form are subjected to an abrasive treatment which performs the dual function of cleaning the printing surfaces and converting those surfaces into a substantially uniform matte finish, which is a diffusively reflecting surface fine enough to permit a high percentage of incident light to obey the cosine law. The abrading can be accomplished in various ways, but particularly satisfactory results are had when the abrading is accomplished by the use of a block of rubber or rubber-like compound containing very fine abrasive material. An ordinary pencil eraser is an example of such material, although a larger block such as is commonly used in the jewelry and metal-polishing industries will be found more practical in commercial operations. The abrasive material contained in the block is preferably very fine, such as flour of emery, diatomaceous earth, and the like. The abrading removes dirt, ink, oxides and the like and converts the printing surfaces in the form to clean, matte surfaces having uniform light-diffusion properties, and for best results the abrasive-produced matte surface should not contain any lines large enough to be visible to the naked eye. A few light strokes of the abrasive-carrying block across the printing surfaces in the form are usually sufficient to produce the desired result. Thus the combination abrading and cleaning operation, similar to the other steps of the process, may be accomplished in a very short interval of time.

Upon the completion of the abrasion operation the form is ready for photographing. This may be effected by the use of an ordinary photoengraving camera, or otherwise. As pointed out in my co-pending application, Serial No. 63,037, which was filed on December 2, 1948, certain specialized illumination procedures are of particular advantage in photographing printing forms and other printing surfaces which may have been prepared as above described. After the form has been photographed, the background coating should be removed as by washing with water or a solvent.

The form may then be used for printing or for making stereotypes in the usual manner, or the form may be disassembled.

In the foregoing there has been described a new and improved method for preparing printing surfaces for photographing, and especially for preparing for photographing the various relief printing surfaces contained in the usual printing form. In the practice of the invention, if the printing form contains printing surfaces of metals other than type metal, as is usual in the printing industry, those surfaces are first provided with a very thin coating of a white metal, preferably tin; next the entire form is sprayed with a non-reflecting coating and this coating is removed from the printing surfaces only by rubbing the form with a cloth covered pad or the like. Finally, a uniform, clean, diffusively reflecting surface is created on all of the printing surfaces in the form by the use of a very fine abrasive, or by an equivalent procedure; this matte surface can be photographed to provide a uniform density, sharp outline print or transparency of the printing surfaces contained in the form.

The practice of the invention does not in any way impair printing surfaces on which it is used or prevent the subsequent use of such surfaces in ordinary printing operations. The procedure of the invention can be carried out rapidly and economically. At the same time, however, it provides a much higher quality print or transparency than has heretofore been available in the printing art. Various of the features of the invention believed to be new are set forth in the appended claims.

I claim:

1. The method of preparing for photographing a printing form containing printing surfaces of type metal and printing surfaces of at least one metal other than type metal, which comprises the steps of electroplating onto the printing surfaces which are of a metal other than type metal, a very thin coating of a metal which when clean and polished has light reflecting properties approximately equal to clean, polished type metal, applying a light-absorbing coating to the entire surface of the printing form, removing said coating from the relief surfaces, while leaving the coating intact on the other surfaces of the form, and abrading said relief printing surfaces to produce thereon a clean, diffusively reflecting finish of sufficient fineness that the individual lines in the surface are not visible to the naked eye.

2. The method of preparing for photographing a printing form containing printing surfaces of type metal and printing surfaces of at least one metal other than type metal, which comprises the steps of electroplating a very thin coating of tin onto the printing surfaces which are of a metal other than type metal, coating the entire surface of said printing form with a light-absorbing coating, removing said coating from the relief printing surfaces, while leaving the coating intact on the other surfaces of the form, and abrading said relief surfaces to provide thereon a clean, diffusively reflecting finish of sufficient fineness that the individual lines in the surface are not visible to the naked eye.

3. The method of preparing for photographing a printing form containing printing surfaces of type metal and printing surfaces of at least one metal other that type metal, which comprises the steps of electroplating a thin coating of a metal which when clean and polished has light reflecting properties approximately equal to clean, polished type metal onto the printing surfaces which are of a metal other than type metal, applying a mixture of water, liquid soap and a light absorbing pigment to the entire surface of the printing form, thereby providing a non-dusting light-absorbing coating on the entire surface of the form, removing the coating so provided from the relief printing surface while leaving the coating intact on the other surfaces of the form, and finally treating said relief surfaces by the use of a resilient block containing an abrasive of such fineness that there is produced thereon a clean, diffusely reflecting finish of sufficient fineness that the individual lines in the surface are not visible to the naked eye.

4. The method of preparing for photographing a printing form containing printing surfaces of type metal and printing surfaces of at least one metal other than type metal, which comprises the steps of electroplating a very thin coating of high reflecting metal selected from the group in-

cluding tin, cadmium and silver onto the printing surfaces which are of a metal other than type metal, coating the entire surface of said printing form with a light-absorbing coating, removing said coating from the relief printing surfaces, while leaving the coating intact on the other surfaces of the form, and abrading said relief surfaces to provide thereon a clean, diffusively reflecting finish of sufficient fineness that the individual lines in the surface are not visible to the naked eye.

GEORGE L. MORRISON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,098,610	Aylsworth	June 2, 1914
1,382,613	Austin	June 28, 1921
1,434,798	Stafford	Nov. 7, 1922
1,669,821	Grass	May 15, 1928
1,922,031	De Goyer	Aug. 15, 1933
2,009,262	Hetherington	July 23, 1935
2,083,249	Thomson	June 8, 1937
2,126,017	Jenney et al.	Aug. 9, 1938
2,354,756	Keuffel et al.	Aug. 1, 1946
2,426,962	Witchger	Sept. 2, 1947
2,456,608	Alger	Dec. 21, 1948

FOREIGN PATENTS

Number	Country	Date
401,511	Great Britain	Nov. 16, 1933

OTHER REFERENCES

Clerc Ilford Manual, pub. by Ilford Lmtd., London, 1946, page 244.