

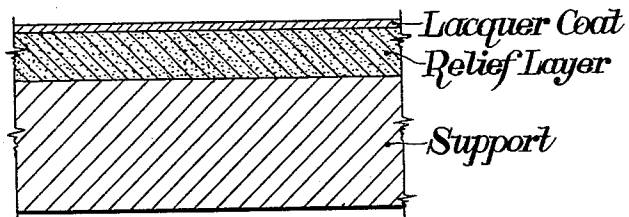
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A. MURRAY

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DEVELOPING GELATIN RELIEFS AND MAKING METAL CASTS THEREFROM

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Inventor:

*Alexander Murray,*

By

*Newton M. Perrin*

Attorney.

## UNITED STATES PATENT OFFICE

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DEVELOPING GELATIN RELIEFS AND  
MAKING METAL CASTS THEREFROMAlexander Murray, Rochester, N. Y., assignor to  
Eastman Kodak Company, Rochester, N. Y.,  
a corporation of New York

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5 Claims. (Cl. 95—5)

This invention relates to the making of metal castings from gelatin reliefs and particularly the type of relief which is developed by heat. This type of relief has been particularly described in the copending application Serial No. 496,341, filed November 17, 1930, by M. Martinez. A gelatin coating containing various ingredients is made on a suitable support and after printing to a light image the layer may then be developed in relief by subjecting it to heat. The action appears to be analogous to the baking of bread in that bubbles of gas are formed within the layer by the action of heat and then serve to expand the gelatin. The relief appears to consist of an under portion consisting of solidified foam and a tough surface skin or crust.

The present invention comprises more particularly the simultaneous development of these reliefs and the making of a metal cast therefrom. I have found that I may flow the surface of an exposed gelatin layer of the heat-developable type with a low melting point alloy and secure simultaneous development and casting. A suitable alloy is poured on the layer. The heat of the metal causes the layer to rise in relief and then by allowing the metal to cool while still in contact with the relief, a metal cast of the relief is obtained. Considerable difficulty is encountered when this is attempted by simply pouring metal at the correct temperature upon the relief print. This appears to be due to the fact that the metal prevents the formation of the tough surface skin or crust, which confines the gas when the print is developed in air, so that the gas escapes at the surface, producing pockets in the face of the metal and preventing proper contact between metal and matrix at the moment of chilling. This results in a cast which is pitted.

I have overcome this difficulty by coating the gelatin surface of the type described with a plastic varnish or lacquer. This may be done at any stage before developing and casting; that is, the lacquer may be applied before or after exposure to light or may be put on at the time of manufacture of the relief layer. Paper is preferably used as a support for such gelatin relief layers, and without being in any way limited thereby, I shall, therefore, hereafter refer to such a heat-developable light-sensitive element as "relief paper" for the sake of convenience.

The single figure of the drawing shows in cross section the structure of the relief paper completed for use. The support, which is usually of paper as indicated, is coated with a layer which

may be of the following composition, for example:

|                                  |           |    |
|----------------------------------|-----------|----|
| Gelatin.....                     | 30 grams  |    |
| Ferric ammonium oxalate.....     | 10 grams  | 60 |
| Sodium dihydrogen phosphate..... | 4 grams   |    |
| Ammonium nitrate.....            | 8 grams   |    |
| Water.....                       | 120 c. c. |    |

As stated in the specification referred to (Serial No. 496,341) this coating is applied at any temperature above the melting point of the solution. Drying is carried out in a darkened room and should be moderately rapid. The coating must be fairly thick if high relief is to be obtained. To this end it may be desirable to coat with the relief layer several times.

After the above gelatin composition or relief layer has thoroughly dried, the lacquer layer is applied in a thin coat over it, as shown in the drawing.

The type of varnish or lacquer which is particularly suitable for my purpose is a cellulosic plastic lacquer such, for example, as one containing cellulose nitrate and a plasticizer. Many such lacquers are well-known so that the single example given is to be considered as only illustrative of many others which are also useful. This example is the following:

|                          |          |    |
|--------------------------|----------|----|
| Cellulosic nitrate.....  | 4 grams  | 85 |
| Tricresyl phosphate..... | 1 gram   |    |
| Ethyl acetate.....       | 95 grams |    |

As stated, this lacquer may be applied to the relief paper at any time before development, but it is preferably put on immediately after the gelatin coating is first made. The coating of the lacquer is made as thinly as possible and should, of course, be done very evenly. It is best to apply it with a coating machine of well-known type. The process of simultaneous development and casting is also preferably done in a suitable frame which is so constructed that the sides of the frame act as a dam for the molten metal. By the use of such a frame, the thickness of the metal cast can also be regulated to any convenient dimension.

In certain cases it may be desirable to first develop the relief and to then make the casting in a separate step. The use of a plastic lacquer as I have described will sometimes be of advantage in this case even though simultaneous developing and casting is not employed. The lacquered gelatin surface will tend to produce a smoother relief.

Other types of plastic lacquers, such as certain resin varnishes and numbers of other types, are useful and are well known.

I consider as included in my invention all modifications and equivalents coming within the scope of the appended claims.

What I claim is:

1. The process of simultaneously developing a gelatin relief by heat and making a metal cast therefrom which comprises exposing to a light image a suitable heat developable light-sensitive, gelatin layer; coating said layer with a very thin layer of a plastic lacquer; flowing over the exposed layer a melted easily fusible alloy, whereby the heat of the metal causes the relief to develop; allowing the metal to solidify while still in contact with the relief; and then separating the relief and the metal cast so obtained.

2. The process of simultaneously developing a gelatin relief by heat and making a metal cast therefrom which comprises exposing to a light image a suitable heat developable light-sensitive, gelatin layer; coating said layer with a very thin layer of a cellulosic plastic lacquer; flowing over the exposed layer a melted easily fusible alloy, whereby the heat of the metal causes the relief to develop; allowing the metal to solidify while still in contact with the relief; and then separating the relief and the metal cast so obtained.

3. The process of simultaneously developing a gelatin relief by heat and making a metal cast therefrom which comprises exposing to a light image a suitable heat developable light-sensitive, gelatin layer; coating said layer with a very thin layer of a lacquer containing cellulose nitrate and a plasticizer; flowing over the exposed layer a melted easily fusible alloy, whereby the heat of the metal causes the relief to develop; allowing the metal to solidify while still in contact with the relief; and then separating the relief and the metal cast so obtained.

4. A light sensitive element adapted to be developed into a relief by heat alone and to have a metal cast made therefrom, comprising a support, a sensitive layer capable of having relief images formed therein by heat development and comprising gelatin, an organic acid, and a ferric salt; and over said sensitive layer a thin coating of a plastic cellulosic lacquer.

5. A light sensitive element adapted to be developed into a relief by heat alone and to have a metal cast made therefrom, comprising a support; a colloid layer capable of having formed therein a latent image developable into a relief image by heat alone and including ferric ammonium oxalate; and over said colloid layer a thin coating of a lacquer containing a cellulose derivative and a plasticizer.

ALEXANDER MURRAY.