UNITED STATES PATENT OFFICE.

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METHOD OF MANUFACTURING RELIEF GEOGRAPHICAL MAPS.

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To all whom it may concern:

Be it known that I, FREDERICK T. BURGI, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in the Method of Manufacturing Relief Geographical Maps; and I do hereby declare the following to be a full, clear, and exact description of the same, which will enable those skilled in the art to practice the invention.

My invention has for its object to provide a new method of manufacturing geographical maps or globes in relief, showing the elevations and depressions of the earth's surface, though well adapted, as will be understood, to the manufacture of other molded objects of irregular contour, and it consists in certain improvements in construction, as will be hereinafter fully specified and the novel features pointed out particularly in the claims at the end of this specification.

In carrying out my invention I first model in some suitable material, preferably wax or other plastic composition, an accurate representation or topographical model for the map to be produced, being a relief map itself, or this may be accomplished by building up, upon a suitably printed map, the various elevated portions of the earth's surface indicating accurately the various topographical features of the country or section, and from this map or pattern I produce by casting or otherwise a mold or female die, preferably of plaster of paris, from which, if desired, I produce, by casting a suitable male die. I then take a sheet of ordinary printing paper, upon which is printed or otherwise marked a correct flat map, preferably suitably colored, of the country of which a relief map is desired, and soak said paper in a solution prepared substantially as follows, for about fifteen or eighteen hours, sufficiently to thoroughly impregnate the paper, but insufficiently to cause its disintegration. This solution is prepared as follows:—To five gallons of water I add one-half pound of alum, one spoonful of vinegar, and one spoonful of granulated white soap, boil this solution for about one-half hour and then allow it to cool. The vinegar may be omitted from this solution, but I prefer to employ it. After soaking the paper in this solution for from fifteen to eighteen hours, as before mentioned, I remove it therefrom and allow it to drain until about half dry. Then, while damp it is placed over the female die or mold and the parts printed on the map caused to accurately register with the corresponding parts of the mold, the printed side being next the mold. I then spread over the back of the soaked sheet or map, which is uppermost, a plastic compound capable of setting or becoming hard, prepared substantially as follows:—I take one pound of whiting, two pounds of plaster of paris, one-fourth pound of flour, one-fourth ounce of pulverized glue, mix these in one-half gallon of water, and boil for about one-half hour, which will insure the thorough dissolving of the glue and the thorough mixing of the ingredients. This compound is then placed over the rear side of the map, while over the mold or die, to the depth of about one-fourth of an inch and may be pressed down by hand, causing the paper and composition to be pressed into and fill the deepest parts of the mold, (that is, the parts constituting the highest portions of the complete map) after which the compound is worked with the fingers until it is of a uniform thickness on the paper. The map is then allowed to dry in the mold and is finally removed, attached to a suitable frame or backing, appropriately colored if desired, and varnished.

Instead of pressing the composition on the rear of the map by hand the male die or mold may be employed instead, and a stop for limiting the approach of the dies, which will insure uniformity in thickness of the backing of plastic material, but if no stops were employed the limited quantity of material used would cause this, if its escape at the sides were prevented, and the map may then be dried while between the mold-sections, but this operation performed in this way will, of course, require a longer time for drying.

The solution in which the paper is soaked enables the paper to be stretched sufficiently to fill the interstices of the mold or die without tearing, and the employment of soap in the solution enables it to slide and draw

easily over the projections without tearing, though, of course, this object could be accomplished by applying oil or some similar material to the face of the die or mold, in which event, however, it would be more difficult to varnish or paint the surface of the map when completed.

By proceeding in the manner described, relief maps may be easily and comparatively cheaply made, without the necessity heretofore existing, of first forming the relief map in paper, papier maché, or similar material, and then painting or printing the names of the rivers, lakes, cities, &c., upon it, as these are of course indicated upon the printed map, which is formed into the topographical map.

While I prefer to employ the solution and the plastic composition herein described, as I have found them well adapted for the purpose and capable of producing excellent results, I do not wish to be confined to exactly the proportions or ingredients described, as they could be modified to some extent without departing from the spirit of my invention; as for instance, other plastic materials than whiting and plaster of paris, and other binding materials than flour and glue could be used, but, as stated, I prefer these as I have used them with success, and they are comparatively inexpensive.

When employing the male and female dies in producing maps, I prefer to place a piece of tissue or similar thin paper over the plastic composition to prevent its adhering to the male die and also to submit the map and plastic composition to pressure between the dies for about five hours, as I find that the best results are produced by this method of procedure.

The map thus produced has as a support for the printed paper only a thin shell of composition that is not rigid enough to be readily fractured by a blow, but is light and sufficiently rigid for all practical purposes, and is made in such a way that all the parts of the map in high relief are faithfully reproduced.

I claim as my invention—

1. The herein described method of making relief maps consisting in forming a mold or die exhibiting the topographical features of the country, then placing over this a map suitably printed and rendered pliable by soaking in a solution of alum and soap, causing the parts of the map to register with those in the mold, then covering the back of the paper map with a plastic composition capable of hardening, pressing the composition and map into the mold, and drying it, as set forth.

2. The herein described method of making relief maps consisting in forming a mold or die exhibiting the topographical features of the country, then placing over this a map suitably printed and rendered pliable, causing the parts of the map to register with those in the mold, then covering the back of the map with a plastic composition composed of whiting, plaster of paris, flour and glue, pressing the map and composition in the mold, and drying the whole, as set forth.

FREDERICK T. BURGI.

Witnesses:
FRED F. CHURCH,
GRACE A. RODA.