

# UNITED STATES PATENT OFFICE.

ARTHUR H. MARTIN, ROBERT E. TINKER, AND THOMAS D. RYAN, OF BUFFALO, NEW YORK, ASSIGNORS TO NATIONAL PAN-METALLIC COMPANY, OF NEW YORK.

PROCESS OF PREPARING AND MANIPULATING FIBROUS MATERIAL FOR RELIEF-WORK.

SPECIFICATION forming part of Letters Patent No. 675,011, dated May 28, 1901.

Application filed July 11, 1900. Serial No. 23,198. (No specimens.)

*To all whom it may concern:*

Be it known that we, ARTHUR H. MARTIN, ROBERT E. TINKER, and THOMAS D. RYAN, citizens of the United States, and residents of the city of Buffalo, New York, have invented certain new and useful Improvements in Processes of Preparing and Manipulating Fibrous Materials for Relief-Work, of which the following is a full, clear, and exact description.

Our process in general relates to means and methods of preparing wood-pulp or paper-pulp or similar fibrous material, so that the same may be pressed or embossed or otherwise formed, and also relates to the process of so forming or shaping said material.

It is well known that in embossing ordinary paper or paper-board the limit of relief produced is small. Various means and methods have been heretofore employed for rendering the cellulose sufficiently ductile to permit of more or less extensive relief-work, and also means have been employed for retaining the configuration or relief produced—as, for example, the heating of the dies; but with none of these processes has it been possible heretofore to obtain a high relief and a strict conformity to the shape of the mold or die after the mold or die has been removed. Moreover, the process of heating the die has rendered the fiber brittle and in many cases worthless.

The purpose of our invention is therefore to render the fiber thoroughly ductile, so that high relief-work may be produced or configuration of any desired pattern formed, and so that the material will retain the impression and form given it and at once be hard and rigid.

By the process about to be described ordinary paper or pulp-board or similar paper is so rendered ductile that by the application of a reasonable amount of heat a temporary condition of ductility is given to the material, whereupon it may be subjected to the die or form and under pressure brought into the shape or configuration desired, and as the result of such pressure and formation the material at once retains its proper form and upon cooling becomes rigid and hard to a suf-

ficient extent for all ordinary purposes and is not again affected as to its configuration, even though it be subjected to considerable heat.

Our process of preparing the paper or paper material is as follows: (For convenience we will assume the application to be made to two or more sheets of the material, which are to be secured together to form an ordinary card or board section.) We first prepare a solution consisting of substantially the following parts, namely: common glue, twelve ounces, by weight; fish-glue, three ounces, by weight; sugar, ten ounces, by weight; white lead, (dry,) four ounces, by weight; talc, five ounces, by weight; glycerin, ten ounces, by measure. The paper sections are immersed in this solution, so that the same may permeate the paper, and then the sections are preferably glued together with it, making the solution answer the purpose above referred to and also that of a glue for gluing sheets together. When dry, the board is then ready to be used.

The process of using is to submit the board so treated and dried to a sufficient amount of heat to render the same pliable and while in such heated condition to subject the same to pressure by any suitable means which will produce the desired configuration. The paper will be sufficiently cooled under the dies to prevent it from losing the shape given it, and as soon as the same is thoroughly cooled it is thoroughly rigid and strong.

It will be noted that the proportions herein set forth are capable of variation within considerable limits, but produce the same results in slightly-different relations for different purposes and uses. For example, it is evident that the addition of a greater amount of sugar will produce a greater amount of elasticity under heat, that a greater amount of white lead will produce greater toughness, and that a greater amount of talc will produce a denser or more perfectly filled fiber, and that the addition of more glycerin will produce a permanent state of greater pliability. It will also be noted that while the proportions suggested of common glue and fish-glue are the most desirable equivalent materials may be substituted, producing the



same effect; that for sugar a glucose may be substituted with a like effect; that while talc is preferable other forms of filler, such as the various forms of lime and similar granular materials, may be substituted with like effect, but our process may be employed without the use of any filler, (in such case, however, the product is lacking in finish and body;) that any compound which will perform the function of combining with glues to render them semiductile may be substituted as an equivalent for the glycerin; that red lead may be substituted for white lead; but the product in such case is more or less colored. We do not therefore limit ourselves narrowly to the materials above set forth or to the exact proportions of the same, but claim, broadly, the use of compounds to produce these effects, which are novel in this art.

It will be noted that the sugar or its equivalent is the leading factor in producing the effect of after-hardening which renders the article incapable of being readily softened by heat, and it will also be noted that the action of the glycerin and glue in combination with the filling materials enables us to produce a depth of outline and configuration hitherto unattainable.

Having thus described our invention and its use, what we claim is—

1. The herein-described process of treating paper to render it ductile, consisting of subjecting the same to a preparation consisting of a glue, a saccharine substance, white lead and glycerin, substantially as and for the purposes set forth.

2. The herein-described process of treating

paper to render it ductile, consisting of subjecting the same to a preparation composed of a glue, a saccharine substance, red lead and glycerin, substantially as and for the purposes set forth.

3. The herein-described process of treating paper or cellulose material, consisting of subjecting the same to a solution consisting of a fish-glue, a saccharine substance, white lead, a filler, and glycerin, substantially in the proportions and for the purposes set forth.

4. The herein-described process of rendering paper or cellulose material pliable and ductile, consisting of subjecting the same to a solution of common glue, fish-glue, sugar, white lead, talc and glycerin, substantially in the proportions and for the purposes set forth.

5. The herein-described process of forming wood-pulp paper, or other fibrous material, consisting of treating the same with a solution composed of a glue, a saccharine substance, white lead, a filler and glycerin, and drying the same, subjecting the same to heat to render it pliable, and then subjecting the same to pressure or other means of forming to produce the desired configuration, substantially as and for the purposes set forth.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

ARTHUR H. MARTIN.  
ROBERT E. TINKER.  
THOMAS D. RYAN.

Witnesses:

A. W. PLEMLEY,  
M. E. SNYDER.