

I. D. HURLBUT.
RELIEF PRINTING PROCESS.
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1,047,640.

Patented Dec. 17, 1912.

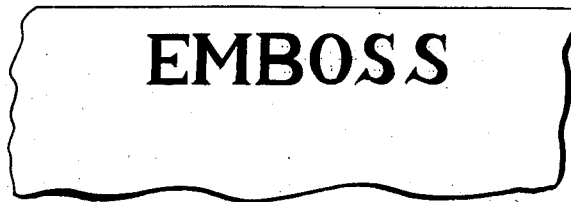


Fig. 1.



Fig. 2.

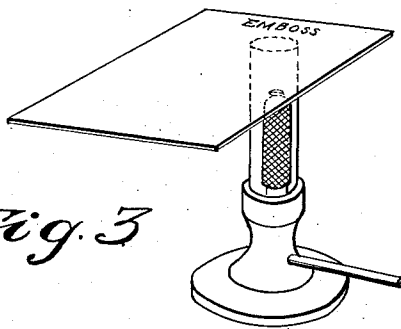


Fig. 3.

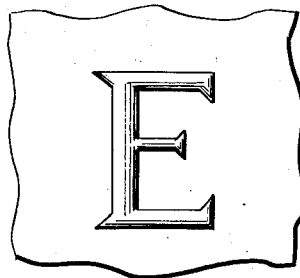


Fig. 4.

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RELIEF-PRINTING PROCESS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, IRA D. HURLBUT, a citizen of the United States, residing at Prairie du Chien, in the county of Crawford and State of Wisconsin, have invented new and useful Improvements in Relief-Printing Processes, of which the following is a specification.

This invention relates to the art of printing and has special reference to the art of producing embossed characters upon a surface, such as paper, bristol board, fabric, or the like, which will simulate die pressed characters of the kind ordinarily used in what is commonly termed embossed work.

The principal object of this invention is to improve and simplify a process for producing work of this character.

A second object of this invention is to provide for the production of a raised or embossed character wherein the base or delimiting imprint will consist of an ink containing a relatively large drier content superposed by a granulated fusible gum having a relatively high surface tension, it being understood that such a gum will not, on account of such surface tension, tend to spread beyond the impressed delimitations.

A third object of the invention is the employment, in the described process, of a gum, preferably in the state of granulations of varying size, which will so unite or adhere to the impressed base as not to flow beyond the delimiting lines of the base and produce a false effect.

With the above and other objects in view, the invention consists in general of a certain novel process of producing characters, simulating steel die embossed characters, herein-after fully described, claimed, and illustrated in the steps set forth in the appended drawings.

In the appended drawings:—Figure 1 is a view illustrating the first step of my process, laying on the ink design, Fig. 2, a view illustrating the second step, placing the granulated composition on the ink design, Fig. 3, a view showing the third step, subjecting the printed production to the action of heat, and Fig. 4, the completed production.

In the present process there is first impressed on the surface on which the characters are to be produced a ground work of the design which is printed by the usual means except that the ink used is carefully prepared to remove the oils until the same con-

tains the minimum of oily content and at the same time contains the maximum of "drier" consistent with distribution of ink and evenness of color. By this means there is produced a "base" which defines the design and wherein the coloring matter contributes to fully or partially color the embossing, it being understood that the excess of "drier" over the normal serves not only to hasten the drying of the base but also, by reason of its excess, to expedite the drying of the superimposed composition. This first step in my process is shown in Fig. 1 of the drawings. The design having been printed, as stated above, the next step in the development of the relief is the application of the composition, that forms the relief to the design, before it has dried. This composition is an essential feature of my process and consists of the resin of gum elemi and saccharine matter, preferably candied honey in the proportions of approximately ninety-nine (99) parts of gum elemi to one (1) part of candied honey, although in practice I may use as high as twenty-five per cent. of candied honey according to the crystallization of the honey used, and any other saccharine matter that will impart toughness and flexibility may be employed instead of the honey. The gum alone or combined with "drying agents" is quite brittle in its hardened condition and relief work produced with it readily loses its surface finish with the abrasion incident to use. The addition of saccharine matter of suitable character and in proper proportion overcomes this fault. In preparing the material I take the gum elemi of commerce which is a soft, plastic aggregate consisting of resin combined with oil and sap. The sap and the greater portion of the oil is removed in any suitable manner, such, for instance, as by the application of heat, and the resultant is a flexibly frangible substance, principally resinous, having some of the characteristics of rubber. To this material I add approximately one per cent. of saccharine matter preferably in the form of candied honey. The mixed resin and saccharine matter or candied honey is then ground into granules of various sizes within narrow limits, the smallest of which will not pass through No. 8 bolt cloth, and the largest will pass through No. 50 strainer cloth. The fine dust-like particles that pass through a dust sieve are of no availability in my process because not enough of

the material in this form would adhere to the printed sheet to produce a relief effect that would be apparent to the eye or touch. In applying this composition to the printed design, as stated above, it is necessary to adapt the granules to the strength of the lines of the design, the smallest granules being adapted to the small details and finer lines of the design, while the largest granules are adapted to the strongest lines. The material is applied to the design while still wet by pouring from a suitable receptacle, or in any other desired manner, the excess of the material, that does not adhere to the design, being removed by striking the printed sheet on its edge. This step in my process is illustrated in Fig. 2, the printed design being shown covered with granules of the composition described. The next step in the process, illustrated in Fig. 3, is the application of heat to the printed and covered design to melt the granules adhering thereto, the temperature being sufficient to liquefy the granules so that they are fused together, but not so that the composition will run outside of the outlines of the printed design. After this the composition is allowed to cool, and the pigment of the ink and the drier contained therein having become incorporated with the composition, the pigment serving to give the composition the color of the printed design, while the drier causes the composition to quickly set and harden, so that the finished product shown in Fig. 4, is available for immediate use. As stated, the pigment of the ink unites with the relief composition and serves to color the relief, but if a more highly colored production is desired the composition may be colored by a pigment while being prepared, and if an illuminated product is desired sufficient gold, copper, aluminum or other metallic powder may be applied to the granules that will adhere thereto without allowing much free metallic powder in the aggregate. When the composition is used to which a metallic powder has been added, as above described, the metallic powder appears wholly on the surface of the finished product in a thin layer of metal, the effect being a very close imitation of the illuminated product of the die stamp and allied methods.

I am aware that a process has been heretofore patented for drying and varnishing prints in which it is stated that the varnishing matter may be comminuted in any way and may be any of the commercial gums—as gum-dammar, gum-sandarac, kauri, or any other similar varnishing material capable of being applied as fine dried powder, and applied to a design for the purpose of giving a brilliant effect. I do not claim this as my invention. The finished product of this patented process is as the patentee states merely a varnished print, while the finished

product of my invention is an embossed surface varying in thickness according to the lines of the design and the size of the granules used and converging at the center by reason of the high surface tension of my composition. This surface tension is a peculiar and an essential feature of my composition which is not obtainable by the use of any of the commercial gums specified in said patent for varnished prints, nor so far as I am aware, any resinous gum except the resin of gum elemi and saccharine matter in granular form. On the contrary all of the other gums or resins thereof have a tendency to spread and produce false effects.

My invention relates to the production of relief or embossed designs on printed surfaces and this can only be produced by the method of using granules of a fusible composition of granulated or assorted sizes, as the dust-like powder used in the patented process will simply cover the design and when melted and cooled will give an illuminated effect but no perceptible relief or emboss. Furthermore the addition of a drier to any gum for use in this or analogous processes, is entirely impracticable because to be a drier it must fuse at a higher temperature than the gum, if at all, and such a combination would be fatal to successful relief printing. Furthermore I have specified a minimum and maximum size of granules of my composition as used in the process, and, so far as the minimum size is concerned this is about the limit of practicability but it may be stated that the wider the printed surface to be treated the larger the granule employed must be, this ratio between the width of the printed surface and the size of the granule being direct, but it will be understood that there is a limit of practicability in maximum size of the granule as well as in the minimum.

Having thus described my invention what I claim is:—

1. The process of making relief printing effects consisting in producing a design in ink containing the minimum content of oil and the maximum content of drying agent, then applying granules of the resin of gum elemi to the printed design while still wet, and then subjecting the printed matter and granules to the effect of a temperature sufficient to fuse the granules.

2. The process of making embossed printing effects which consists in printing on a surface with ink from which the oily content has been substantially extracted and an excess of drier added to provide a base, coating the printed surface with a composition consisting of the resin of gum elemi and saccharine matter in variable sized granules, fusing the coating, and cooling.

3. The process of making embossed printing effects which consists in printing on a

surface with ink from which the oily content has been substantially extracted and an excess of drier added to provide a base, coating the printed surface with a resin of gum elemi and candied honey composition in variable sized granules, fusing the coating and cooling.

4. The process of making embossed printing effects which consists in printing on a surface with ink from which the oily content has been substantially extracted and an excess of drier added to provide a base, coating

the printed surface with the composition in variable sized granules of the resin gum elemi and candied honey, in the approximate proportions of 99 to 1, respectively, fusing the coating, and cooling. 15

In testimony whereof I hereto affix my signature in the presence of two witnesses.

IRA D. HURLBUT.

Witnesses:

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