

UNITED STATES PATENT OFFICE

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METHOD OF MAKING AND REPAIRING PRINTING ROLLERS

No Drawing.

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The object of this invention is to provide an improved process for the production of yielding elastic rollers which will possess a uniform smooth and glazed surface free of indentations. Rollers of the character specified are particularly adapted for use in connection with printing operations and may be used for the purpose of applying ink to the surface of printing type members or they may be used as the transfer medium in an "offset" printing process. A particular use which requires an especially smooth surface on the roller is that of transferring stain from a pattern cylinder or plate to a metallic or other surface in a graining process for imitating the graining of wood.

It has been found by experiment that in carrying out the improved process of making rollers various compositions may be utilized but the preferred composition comprises the following ingredients in substantially the percentages named:

	Per cent
Glue.....	26
Water.....	29
Linseed oil.....	5
Sugar.....	10
Zinc oxide.....	2
Glycerine.....	28
Venice turpentine, 1-oz. to every 15-lb. of composition desired.	

The above mentioned ingredients prepared in substantially the percentages named, the water being preferably hot, are mixed and the liquid is thoroughly agitated by any suitable means to insure the coalescence of the ingredients. The composition, while still in a liquid state is then poured into a mold provided with suitable end bearings and a water jacket. After the mold is filled it is given a rotational movement about its end bearings either vertically or horizontally at approximately 300 R. P. M. for about one hour. This eliminates to a great extent the air pockets or bubbles that may have been formed while the liquid composition was being poured or agitated.

At the termination of the period selected for rotating the mold the composition which has partially congealed and become plastic

by reason of the reduction of its temperature is further cooled by circulating cooling water around and through the jacket surrounding the mold. This step, however, is not essential, the particular advantage of it being that it reduces the time necessary to manufacture such rollers. Where the time element is not a particularly important consideration this may be omitted, and if desired, the water jacket need not be provided, thus permitting the composition to cool off naturally due to the lower temperature of the surrounding air.

During the cooling stage the composition will coagulate and form itself into a substantially homogeneous jelly-like but firm mass, the form of course, depending upon the mold, and while the composition best lends itself to the formation of a cylindrical roller, other forms, more or less irregular in cross-section, have been produced with equally as good results. Whenever the term roller is used in this specification and in the claims which follow, it is to be understood to include bodies having other suitable forms as well as the true cylindrical form. After the composition has been cooled the mass may be withdrawn from the mold.

Rollers made according to the present process may, as already stated, be used for a variety of purposes, such as, for inking rollers to supply ink to type elements or as a transfer medium in "offset" printing processes. A particular use of the roller which, it has been found, requires special care to obtain a smooth, unindented surface, is in connection with the production of wood graining effects. In order that this use of the roller formed by this invention may be more readily understood the graining process will now be very briefly explained.

In reproducing the grains of quartered oak, mahogany or any other woods having grain which it is desired to imitate an etched copper plate is formed by means of any of the processes well known in the art and a plate so prepared is coated with a stain in any manner desired. After the plate has received a coat of stain a "scraper" or "doctor" blade is drawn across the surface so that all the

surface stain will be wiped off leaving a deposit of stain in the depressions formed in the etched plate.

A roller such as the one formed according to the process and by use of the composition hereinbefore explained is rolled over the surface of the plate and this roller picks up the stain on the plate. The roller is subsequently rolled over the surface or portion of the article to be grained and if this is a metal surface it will have been previously painted or enameled with a suitable ground color. The stain previously picked up from the copper plate will thus be transferred from the roller to the article to be grained and there will be effected a reproduction on the article of the markings on the etched plate. The reproduction on the article may be preserved indefinitely by lacquering or varnishing the surface and subsequently subjecting the article to heat treatments to harden the finish.

While the results obtained by the use of rollers manufactured by the process hereinbefore explained are satisfactory to a certain degree it has been found in practical use that the quality of reproduction of wood grain to a great extent depends upon the nature of the surface of the roller of the transferring instruments.

While rotation of the plastic composition eliminates and removes to a great extent the air pockets and bubbles it does not entirely do away with them and the formation of these bubbles produces slight irregularities and indentations on the periphery of the roller which reduce the quality of reproduction. It is obvious that the mark of such indentations will be left upon the article to be grained and the lines which are intended to simulate the graining will be broken and irregular. During the process of graining the soft rollers are forced with considerable pressure upon the article to be marked and occasionally the edges of the article or perforations therein will result in cutting and otherwise destroying the surface of the roller so that in a relatively short time the roller may become useless.

The surface of the roller should be perfectly smooth and preferably glazed in order to readily pick up the stain on the etched plate and it has been discovered that by the application of steam directly upon the periphery of each roller which has been made by the process previously explained the surface of the original roller will be changed from one having a comparatively dull finish to one having a glass-like uniform surface possessing all the desired characteristics.

In carrying out this step of the process the roller may be held in a suitable frame either vertically or horizontally, and moist steam is applied from the nozzle of a hose, the pressure and force being regulated by a suitable valve. The heat from the steam attacks the com-

position, the latter melting and filling up such irregularities and depressions as originally existed. The nozzle is preferably shifted longitudinally and passed over the periphery of the roller the latter being slowly rotated so as to treat all the peripheral area in the same way the general effect being to change it into a uniform regular surface and when the application of steam is discontinued the surface will appear glossy and perfectly smooth.

If at any time a roller has been cut or it is desired to remove any foreign matter in the roller the crack or cavity may be filled in by some addition of the plastic composition and steam may be applied locally. This will cause the added material to weld or coalesce with the material of the roller filling up the indentation and producing a smooth surface.

Rollers which by reason of constant use have acquired a poor surface may be readily refinished by thoroughly cleansing the surface and subsequently applying steam to the same. Thus, manufactured rollers may be used indefinitely, the cost of the refinishing process being comparatively slight in comparison with the cost of a new roller.

While it has been found that steam is particularly advantageous as the source of heat for the last step of the process, as above explained, due to the moisture which it supplies with the heat, other heating mediums may be employed and it is not intended to restrict the present invention to the use of steam.

It is also the desire not to be limited to the proportions of the plastic composition previously given since they may be altered and if desired some of the ingredients may be omitted and others added. It is only essential that the composition possess a low melting point and be capable of producing when subjected to the heated vapor treatment a surface possessing the desired characteristics.

What I claim is:

1. The improved process for forming printing rollers comprising the use of a liquid composition capable of forming a yielding and elastic substance when solidified and having a relatively low melting point; placing the liquid composition in a mold; rotating the latter to decrease the number of air pockets or bubbles; cooling the composition; and then applying steam to the periphery of the cooled roller whereby the composition will be partly melted to fill in the crevices or indentations appearing on the surface.

2. The improved process for forming printing rollers comprising the use of a liquid composition capable of forming a yielding and elastic substance when solidified and having a relatively low melting point; placing the liquid composition in a mold; rotating the latter to decrease the number of air pockets or bubbles; cooling the composition to solidify it, and then applying moist steam

to the periphery of the solidified roller whereby the composition will be partly melted to fill in the indentations present on the surface.

3. The improved process for making printing rollers comprising the use of a liquid composition capable of forming a yielding and elastic substance when solidified, placing the liquid composition in a mold of desired shape, rotating the mold about its axis to decrease the number of air pockets or bubbles; cooling the composition to solidify the mass, and then subjecting the surface of the roller to the heat from a jet of vapor having a temperature higher than that of the melting point of the composition.

4. The improved method of finishing or resurfacing members composed of a composition having a relatively low melting point comprising the application of steam to the periphery of the members, the steam having a temperature higher than that of the melting point of the composition.

5. The improved method of finishing or resurfacing members composed of a yielding elastic composition having a relatively low melting point comprising the application of moist steam to the periphery of the members, the moist steam having a temperature higher than that of the melting point of the composition.

6. The improved method of refinishing the indented surfaces of inking members composed of yielding and elastic composition having a relatively low melting point, comprising the insertion of a suitable added piece of the same composition in the indentation in the surface, and applying locally a jet of steam whereby the composition will partly melt and coalesce to effect a smooth surface.

7. The improved process of refinishing the surface of yielding printing members comprising the application of a jet of moist steam to the surface, and effecting a relative movement between the jet of steam and the inking member whereby the entire peripheral area will be similarly treated.

8. The process herein described of refinishing the surfaces of materials composed of a yielding and elastic composition, which consists in bringing the surface of the material into the range of steam of sufficient heat to permit the material to melt at the surface and flow evenly over the exterior surface.

9. The process herein described of refinishing the surfaces of materials composed of a yielding and elastic composition which consists in bringing the surface of the material into the range of heated vapor of sufficient temperature to permit the surface material to melt and flow evenly over the entire exterior surface.

10. A process of making printing rollers for the purpose described comprising, the use of a yielding and elastic composition having a low melting point, molding the composition

into a desired form, and directing a heated medium at a temperature slightly above the melting point of the composition to all portions of the surface of the roller.

11. A process of finishing the surface of a printing roller or the like formed of a yielding and elastic composition having a low melting point comprising the application of a jet of heated fluid having a temperature above that of the melting point of the composition to all parts of the surface to be finished.

In witness whereof I have signed my name this 22d day of July, 1925.

CLARENCE HAMER.

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