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PROCESS OF COLORING

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Fig. 1.

Fig. 2.
The invention relates to a process of printing on paper or like material, and more particularly to a process for printing upon wall coverings to produce a variegated or mottled effect in accordance with the inequalities or roughness of the surface or texture of the material, incident to the manufacture thereof.

An object of the invention is to get these effects in a simple and inexpensive manner.

The process may be practiced upon fibrous or cellular material of a somewhat absorbent or porous character into which the coloring material, of a character to be described, may be forced to a desired extent. The member on which the print is to be formed is preferably paper, cardboard or the like, which may be referred to generally as felled cellulose material, although other forms of fibrous or cellular material, such as various forms of fabric, may be utilized.

Un glazed paper or cardboard or the like, of an apparently uniform character, and more or less smooth actually is made up of portions which are slightly higher or harder, or otherwise less readily absorbent than other portions. This is so because of the manner in which the paper or the like is made by felting together cellulose carrying and having mixed therewith various impurities, this being particularly true in the cheaper grades of paper.

I have found that advantage may be taken of this fact to form a print which will have a pleasingly mottled variegated or two-tone appearance in accordance with the structural and surface inequalities of the paper. I have found that certain coloring material may be forced into these depressions while substantially displacing or eliminating it from the fine projections so as to give a two-tone effect instead of a one-tone finish.

In accordance with the process, the paper or other material is covered with a thick gelatinous coloring material which is preferably of a semi-transparent character, and which is of such a nature that it will not adhere to a hard smooth roller or other hard non-porous surface used for exerting pressure in forming the print. This may be done by pressing a suitable character of coloring material against and into the paper by the application of considerable pressure exerted uniformly over the surface of the paper, which is covered with the coloring material.

The present preferred method of practicing the invention consists in applying to the paper a gelatinous coloring matter preferably without earthy pigments, and one that will not adhere to the pressure rolls, and then passing the paper between a yieldable roller at its back and a hard smooth face roll at the front, and exerting considerable pressure, such as to force the coloring matter into the fine depressions, and to displace it mostly from the higher or harder portions of the surface. In such a case in the resulting print the portions of the surface which are, perhaps microscopically, higher, or are harder, or otherwise less absorbent than other portions, will be lighter in shade than the other portions of the surface, and this is particularly true when the coloring material used is of a somewhat transparent character. The higher or harder, or less absorbent portions of the paper will carry coloring material to a less depth than the other portions, and will accordingly be lighter in shade in the finished print because of the underlying color, of the paper itself for example, showing through to a greater extent than in the case of the other portions.

The invention consists in the process of printing and in the various steps and combinations of steps thereof, all as described more fully in the following specification and claimed in the appended claims.

In order that the invention may be more fully understood, attention is hereby directed to the accompanying drawings forming part of this application and illustrating one manner in which the invention may be carried out. In the drawings,

Fig. 1 is a view representing, in side elevation, and partly in section an apparatus by which the printing may be effected in accordance with a form of the process which at the present time is deemed desirable, and...
being covered with the thick gelatinous coloring material is positioned against a resilient backing and pressure applied uniformly as by means of a smooth surface roller over the covered surface of the paper to force the coloring material into the strip. The paper may be fed from a roll 5 and passed therefrom about a roller 2 which is provided with a somewhat resilient surface, so that it will act as a backing roller. The paper passes from roller 2 between the latter and the printing roller 1, which has a hard, even, non-porous surface, such as a metal surface.

The bearings 3 of roller 1, or if desired, of roller 2, or of both rollers, are adjustable in position for the purpose of adjusting the pressure to be exerted upon the paper and the coloring material thereon.

The coloring material may be placed in a tank 6 above the rollers and fed therefrom through an outlet 7 upon the paper at or slightly above the nip of the rollers, that is, the line in which the greatest pressure is exerted by the rollers upon the paper and coloring material between them. The coloring material may be fed in any desired manner upon the paper and the feed may be so regulated as to insure the coloring material feeding onto the paper to a desired depth. As illustrated, the coloring material may feed under its own pressure onto the paper, and tank 6 may be kept filled to a desired depth to insure the proper feed.

The coloring material employed is, as stated, of a thick gelatinous or jelly-like nature, this coloring material also being of such a character that it will not adhere to the surface of the printing roller 1. The coloring material is preferably of the character of that described and claimed in my application, printing color composition and method of forming same, Serial No. 730,830, filed August 6, 1924; this coloring material also preferably is of somewhat transparent character so that the spots or portions of the paper which are relatively high, or hard, or less absorbent than other portions, as stated, on which there is a reduced quantity of coloring material in the final print, will show through the coloring material to some extent in the final print to produce a more markedly lighter shade.

As an example of the coloring material referred to, as disclosed in said Jonsson application, sugar, water, and lye may be mixed cold to form a thick gluey paste, as by adding together water, 104 parts, by weight, potato starch, 9 parts, and mixing therewith 4 parts of saturated water solution of caustic soda lye. This is partly neutralized, as by adding about one part of sulphuric acid. A color solution is then separately formed, as by mixing water, 10 parts, borax, one part, and a desired aniline color, 1 to 2 parts. One part of the color composition is now mixed with ten parts of the base composition or paste, resulting in the non-adhesive, thick gelatinous composition having the character described above.

If desired, one or more thin coats of coloring matter may be applied to the printing side of the paper before it is introduced between the rolls 1 and 2. An arrangement for this purpose is shown in Fig. 1 of the drawings, comprising a roller 8 pressing against the printing side of the paper 1, around the roller 2, and transmitting color to the paper wound from the tough 9 in which it is partly submerged, such an arrangement, however, not being essential to the present process.

Considerable pressure will be produced upon the covered surface of the paper by roller 1 as the paper is continuously progressed between the two rollers. The pressure used on the rolls is preferably about 500 to 1000 pounds. This pressure will, of course, be applied before the coloring material has hardened upon the paper. The thick jelly-like consistency of the coloring material insures the same remaining on the surface of the paper and not running, or being too readily absorbed by the high portions, or being too much squeezed out of or off of the paper. The gelatinous coloring material will be pressed to some extent into the paper because of the porous character of the paper or other base, and because of the fact that the paper is backed by the resilient roller 2. Also, the relatively high, or hard, or less absorbent portions of the paper, incident to the manufacture of the same, will, in conjunction with the pressure roll, serve to some extent to press the coloring material aside and over the intermediate relatively depressed or softer, or more absorbent portions. The fact that the coloring material does not adhere to the metal roll, enables the material to be pressed cleanly from the high spots and avoids a dirty streaky effect.

The result of the process is the production of a print in which the coloring material is present to a less depth or extent upon the surface portions which are relatively higher, or harder, or less absorbent than the other portions, so that the first named portion will be lighter in shade in the finished print than the other portions of the paper on which the coloring material stands to a slightly greater depth, or into which the coloring material has been absorbed more fully. This effect is particularly marked when the coloring material is somewhat transparent, as stated, which result may be obtained by the provision of suitable aniline or other coloring agent in the coloring material. A portion of a print produced by the process is indicated in Fig. 2, which has a pleasingly motled or variegated appearance with certain
irregularly disposed areas, or portions of the print, such as those indicated at 10 being of a darker shade than other portions, such as those indicated at 11.

It should be understood that the invention is not limited strictly to the exact details which have been particularly described, but that a considerable scope of equivalents is included within the invention, the nature of the invention being indicated by the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is,—

1. A process of coloring, which consists in employing a web of absorbent fibrous or cellular material having, from its process of manufacture, surface portions slightly higher, or somewhat less readily absorb-ent, than other portions, covering said web with a gelatinous semi-transparent coloring material of a character such as to be non-adhesive to a hard, non-porous surface, and passing the web, before the coloring matter thereon has hardened, between a resilient backing roller and a smooth even-surfaced roller to which said coloring material will not adhere, said rollers being adjusted to exert considerable pressure upon the web and coloring material thereon, to force the coloring material into the web and thereby utilize the inequalities of surface or texture to produce a mottled or variegated print.

2. A process of coloring, which consists in covering a surface of a web of absorbent felted cellular material, having only the surface inequalities incident to its manufacture, with a gelatinous semi-transparent coloring material, of a character such as to be non-adhesive to a hard non-porous surface, and passing the web, before the coloring matter thereon has hardened, between a resilient backing roller and a smooth even-surfaced roller to which said coloring material will not adhere, said rollers being adjusted to exert considerable pressure upon the web and coloring material thereon, to force the coloring material into the web and thereby utilize the inequalities of surface or texture to produce a mottled or variegated print.

In testimony whereof I have signed my name to this specification.

SIXTEN IVAR JONSSON.