UNITED STATES PATENT OFFICE.

IWAN ORLOFF, OF ST. PETERSBURG, RUSSIA.

PROCESS OF SUPERIMPOSING PRINTING-INKS.

SPECIFICATION forming part of Letters Patent No. 648,285, dated April 24, 1900.

Application filed August 19, 1899. Serial No. 727,851. (No specimens.)

To all whom it may concern:

Be it known that I, IWAN ORLOFF, a subject of the Russian Emperor, residing at St. Petersburg, Russia, have invented a new and useful Process of Superimposing or Imprinting upon each other a Plurality of Colors or Printing-Inks in a Moist Condition, of which the following is a specification.

The object of my invention is to provide a process which allows of transferring but singly the color or ink from a fresh colored or inked surface to another similar surface by the contact of both surfaces, so as to superimpose upon each other on the latter both colors or inks in a moist condition, no transfer of color or ink taking place from the latter to the former surface. By further transferring after my invention the color or ink from a third fresh-colored surface to the surface already provided with two layers of colors or inks a threefold layer of colors or inks will be deposited on the latter, a retrogressive transfer of colors or inks from the same to the former being again excluded. Thus by continuing as described my invention allows of assembling on a common surface a plurality of layers of colors or inks in a moist condition, successively transferred thereto by contact from a plurality of individual color-surfaces, no retrogressive transfer of any color or ink taking place from the assembling-surface to the latter.

By applying my invention to the printing art I overcome two great inconveniences hitherto inherent to that art—that is to say, the difficulty met with in the inking of printing-forms in general, and especially in multicolor-printing, and the impossibility of successfully imprinting upon each other several colors in a moist condition.

When inking a printing-form by means of a plurality of form-rollers, as usual, with one and the same ink, I have found that the ink to be supplied by the second and the following form-rollers will not be fully transferred from the latter to the printing-form, while, on the other hand, a retrogressive transfer of inks takes place from the printing-form inked by the first roller to the following form-rollers. Thus the quantity of ink deposited on the form-rollers could not be fully assembled on the printing-form, nor the full effect of an inking device comprising a plurality of form-rollers ever be obtained. Hitherto, for instance, a printing-form by means of even four form-rollers cannot be inked with much more intensity than the rollers themselves and never with a greater intensity of color than the rollers even though employing any greater number of rollers, while by using my invention a form is fully inked by but two rollers, and any roller to be added will raise the intensity of ink on the form above that on the rollers. This feature of my invention is of importance for unicolor art-printing, and especially for printing unicolor half-tones.

In multicolor-printing, for the same reason as stated heretofore, it has been hitherto impossible to imprint fresh colors upon each other, and thereby obtain an unvaried clean color tone throughout the copies of one impression, as, first, when imprinting the second color upon the first one the former is not fully transferred to the latter, and, second, the first color will be partially transferred back to the second color-plate, this twofold defect occurring on the impression of each following color. In consequence thereof the surface to be printed upon does not receive the due quantity of each color to give the proper color tone required, while at the same time the colors of the several color-forms are soiled and clouded by the retrogressive transfer of colors, so as to more and more change their proper color tone and for their part transfer clouded colors to the impression-surface instead of the proper clean colors they should transfer. Thus the several copies of one impression will successively change the color tone, which finally degenerates into a uniformly-smurched gray tint. Now I have discovered that by the contact of two fresh colored or inked surfaces a mutual transfer of the colors from and to either surface does not take place, excepting in the case of both colors or inks being of the same "strength," this word being understood by the craft to designate that quality of colors which results from the respective proportions of their viscosity, consistence, and adhesive power, but that by the contact of two surfaces provided with colors or inks or different strength the color of less strength passes over to that of greater strength. Thus, for instance, by rolling a red-inked roller over a yellow-inked form the red ink will be transferred to the yellow form if the yellow ink is that of greater strength, and, vice versa, the

yellow ink will be transferred to the red-ink roller in the other case. In accordance therewith my invention when applied to multicolor-printing consists in preparing the several colors to be printed with different degrees of strength, imprinting first the color of greatest strength and the other colors in succession as their strength decreases. If intended to perform the impression in the usual succession of the several colors, the latter are to be prepared with degrees of strength decreasing, respectively, in the same succession.

When applying my invention to unicolor-printing—say for deeply inking the printing form or forms by means of a plurality of form-rollers—the ink or single color to be printed is to be prepared with different degrees of strength in order to supply the ink of the greatest strength to the first form-roller and respectively inks of successively-decreasing strength to the second and the following form-rollers.

My invention is not limited to any mode of preparing colors or inks of different degrees of strength. As to the common printing inks and colors this object will be generally and preferably attained by conveniently regulating the proportion of varnish contained therein, and under same conditions in other respects the strength of a color or ink decreases in the measure as the proportion of varnish contained therein increases. However, the degree of strength is not throughout the same for any colors which may contain the same percentage of varnish; but it will easily be possible by experience to find for any color the proportion of varnish needed to give it a predetermined degree of strength, and thus arrange any number of colors in a given succession of strength.

As to the material to be printed upon in accordance with my invention it will be obviously subjected to somewhat other conditions than in printing with common inks, owing to the greater amount of varnish contained in the inks prepared after my invention. In the case of the said material being of sufficient resistance or provided with a convenient surface to withstand the influence of the colors successively transferred thereto and the increasing quantity of varnish deposited therewith (as metal, stone, earthenware, glass, pasteboard, and the like) the several colors may be successively and immediately printed thereupon; but if they are to be printed upon soft or flexible material—say the several kinds of paper—the latter cannot withstand the above influences, as it would warp and dilate under the increasing deposit of varnish from one impression to the following one, so as to trouble the exact register absolutely needed for multicolor-work. To avoid these inconveniences when using my invention for printing on paper or a similar material, the several colors are not to be immediately and successively printed upon the paper, but previously and successively transferred to an intermediate member of sufficient resistance, such as a metal plate, and from the latter imprinted on the paper by one impression. For transferring the color to said intermediate member transfer plates or rollers of roller composition, rubber, or leather preferably are made use of.

The surface upon which the inks or colors are assembled I shall term the "assembling-surface." As above stated, the assembling-surface may be the surface of the article to be printed or it may be any intermediate surface upon which the colors are assembled preparatory to transferring them to the article to be printed. A machine upon which my present invention may be practiced is illustrated in United States Patent No. 632,322, for multicolor-printing press, granted to me on September 5, 1899. In said machine the colors are assembled on a smooth plate and afterward transferred to a paper surface at a single impression.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The herein-described process of superimposing inks or colors in a moist condition by surface contact, which consists in preparing the inks or colors with different degrees of strength, and in successively transferring the same to an assembling-surface in the order in which their strength decreases, substantially as and for the purposes described.

2. The herein-described process of superimposing inks or colors in a moist condition by surface contact, which consists in preparing the inks or colors with different degrees of strength, in successively transferring the same to an assembling-surface in the order in which their strength decreases, and finally in simultaneously transferring the assembled inks or colors from the said assembling-surface to the surface intended to ultimately receive the superimposed inks or colors, substantially as and for the purposes described.

3. The herein-described process of superimposing inks or colors in a moist condition by surface contact, which consists in preparing the inks or colors with different degrees of strength, in successively transferring the same to an assembling-surface in the order in which their strength decreases, the said assembling-surface consisting of a material undergoing no deformation under the transfer-pressure nor under the influence of the moisture of the inks or colors transferred, and finally in simultaneously transferring the assembled inks or colors from the said assembling-surface to the surface intended to ultimately receive the superimposed inks or colors, substantially as and for the purposes described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

IWAN ORLOFF.

Witnesses:
N. TSCHENALOFFLL,
J. BLAU.