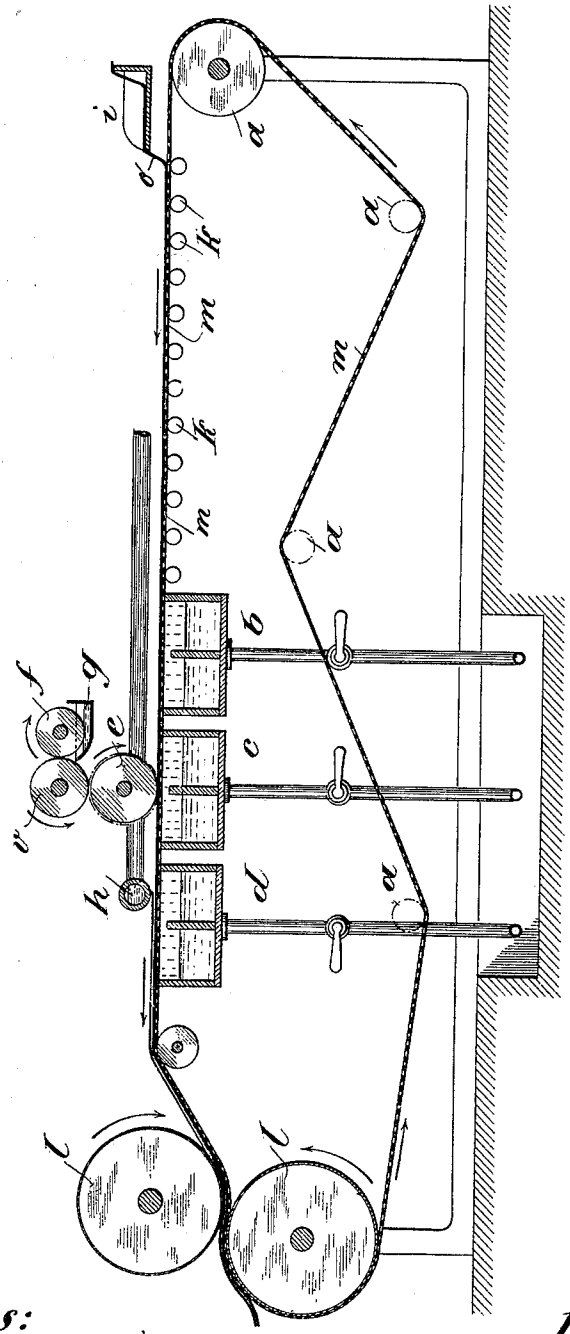
No. 672,582. Patented Apr. 23, 1901.

R. AFFELTRANGER & L. ZWEIFEL.

PRODUCTION OF WATER MARKS.

(No Model.) (Application filed Apr. 1, 1899.)



Witnesses:

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UNITED STATES PATENT OFFICE.

RUDOLF AFFELTRANGER, OF ZURICH, AND LUDWIG ZWEIFEL, OF NETTSTALL, SWITZERLAND.

PRODUCTION OF WATER-MARKS.

SPECIFICATION forming part of Letters Patent No. 672,582, dated April 23, 1901.

Application filed April 1, 1899. Serial No. 711,425. (No specimens.)

To all whom it may concern:

Be it known that we, RUDOLF AFFELTRANGER, residing at Zurich, and LUDWIG ZWEIFEL, residing at Nettstall, Switzerland, citizens of the Republic of Switzerland, have invented certain new and useful Improvements in and Connected with the Production of Water-Marks, (for which application for patent has been made in the following countries: in Switzerland on the 23d of November, 1898; in Germany on the 3d of December, 1898; in France on the 21st of January, 1899; in Great Britain on the 21st of January, 1899; in Austria on the 10th of February, 1899, and in Italy on the 11th of February, 1899,) of which the following is a specification.

According to this invention colored water-marks are incorporated in paper by applying the marks in color to the surface of the paper-pulp and sucking them into the material.

According to this invention, also, by giving the water-mark-printing roller a differential velocity water-marks are formed with shaded portions.

The accompanying drawing represents by a longitudinal vertical section an example of apparatus for producing water-marks according to this invention.

An endless making-wire *m* is led around rollers *a* and passes over three suction-boxes *b c d*. Over the central suction-box *c* there is arranged a printing-roller *e*, which is provided on its periphery with a design composed of letters, patterns, or the like. The design may be made on a suitable material—such, for example, as wood, metal, or caoutchouc. A color-roller *f* dips into a color-trough *g*. Between the color-roller and the printing-roller there runs a distributing-roller *v*, which touches both and is adapted to take the color from the color-roller and to apply it uniformly to the printing-roller *e*. Above the suction-box *d* there is a pipe *h*, which is provided with an outlet. At one end there is arranged over the wire *m* a stuff-feeder *i*, and below the wire there are provided supporting tube-rolls *k*, which prevent the wire from sagging. The making-wire *m* passes at the opposite end and behind the suction-boxes between two pressure or couch rollers *l* and then returns below.

The operation of the apparatus just described is as follows: The paper-pulp *o* passes from the stuff-feeder *i* to the making-wire *m*, moves with the same over the supporting tube-roll *k*, passes onto the suction-boxes *b c d*, and is sucked thereby. Over the middle suction-box *c* the printing-roller *a* imprints its design in color upon the layer of paper-pulp. The sucking of the paper-pulp downward on the suction-box prevents it from adhering to the printing-roller. The color is fixed more quickly by the suction and cannot spread in the paper-pulp. If the color is applied to transparent paper-pulp, then the colored part will also appear transparent when looking through the paper. For the purposes of increasing the durability of the paper and of protecting it from imitation fine fresh paper-pulp may be supplied from the pipe *h*, that is situated over the suction-box *d*, to the printed pulp, so as to become felted therewith and to cover the imprint. For the purpose of causing the impressions made in the manner described to appear with boundary shadows, and thus to acquire a still more characteristic appearance, the velocity of the roller *e* is altered at a suitable moment and to a suitable degree. The difference thus produced in the velocities of the roller *e*, the making-wire *m*, and the pulp thereon is small of itself; but it produces in the layer of pulp a shifting or spreading of the color beyond the boundary-lines of the design imprinted, whereby the shadows or the characteristic light effects are produced. This method may also be resorted to in ordinary watermarking, and the water-marks will then have only the characteristic light and shade effect.

We claim—

1. In the art of watermarking paper, the improvement which consists in imprinting the mark upon one face of a layer of pulp and applying suction to the opposite face thereof at the point where the impression is made and superimposing a layer of pulp upon the marked layer, for the purpose set forth.

2. In the art of watermarking paper, the improvement which consists in imprinting the mark upon one face of a layer of pulp while being formed into a web, applying suction to the opposite face of said layer at the

point where the impression is made, and making the impression at a speed different from that at which the layer of pulp travels, for the purpose set forth.

3. In the art of watermarking paper, the improvement which consists in imprinting the mark with a marking fluid upon a layer of paper-pulp, drawing such fluid into the pulp by suction and superimposing a layer of pulp upon the marked layer, for the purpose set forth.

4. In the art of watermarking paper, the improvement which consists in imprinting the mark with a marking fluid upon a layer of paper-pulp while being formed into a web, drawing said fluid into the pulp by suction, and making the impression at a speed different from that at which the pulp travels, for the purpose set forth.

5. A paper comprising a plurality of layers, one of said layers only being watermarked, substantially as set forth.

6. A paper comprising a plurality of layers, one layer of which has a colored water-mark, substantially as set forth.

7. A paper comprising a watermarked web intermediate unwatermarked webs, substantially as set forth.

8. A paper comprising a web provided with a colored water-mark intermediate unwatermarked webs, substantially as set forth.

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

RUDOLF AFFELTRANGER.
LUDWIG ZWEIFEL.

Witnesses:
MORITZ VERTH,
A. LIEBERKNECHT.