

(No Model.)

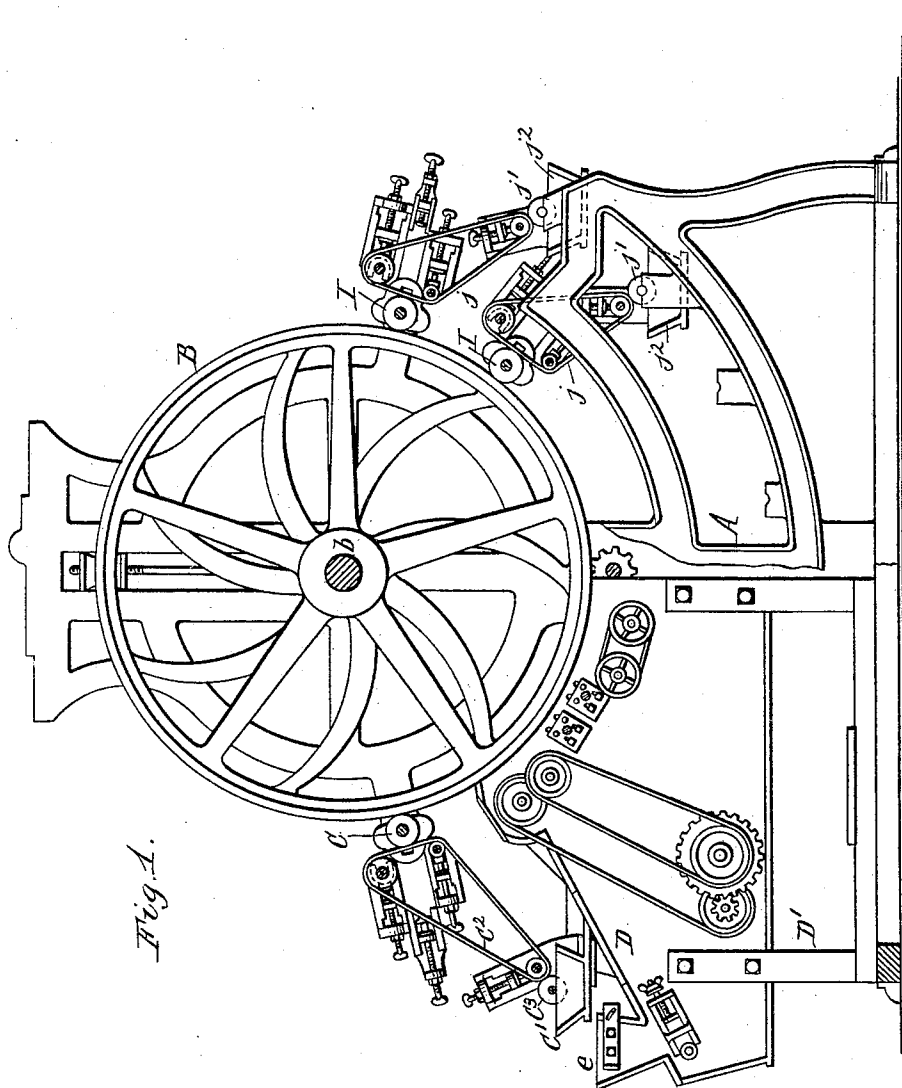
4 Sheets—Sheet 1.

G. K. BIRGE.

APPARATUS FOR PRINTING WALL PAPER.

No. 479,346.

Patented July 19, 1892.



Witnesses:
Emil Neuhart.
Friedrich, Gustav, Wilhelm

George K. Ruge Inventor.
By Wilhelm & Bonner
Attorneys.

(No Model.)

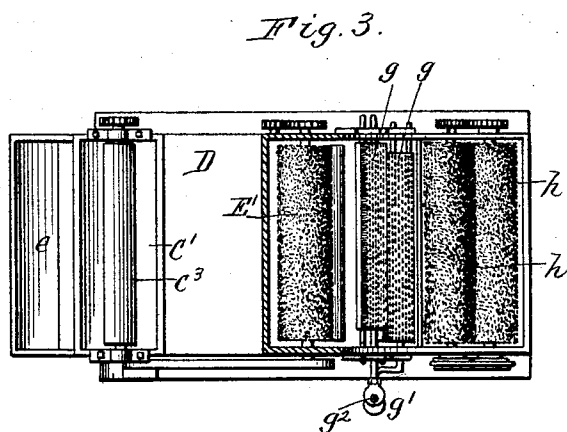
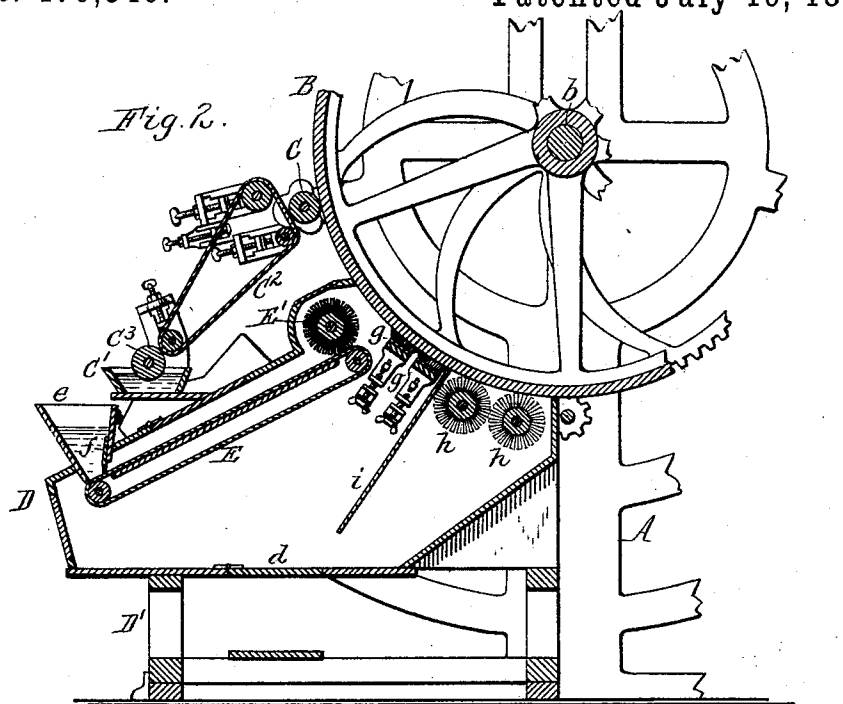
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4 Sheets—Sheet 3.

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Fig. 4.

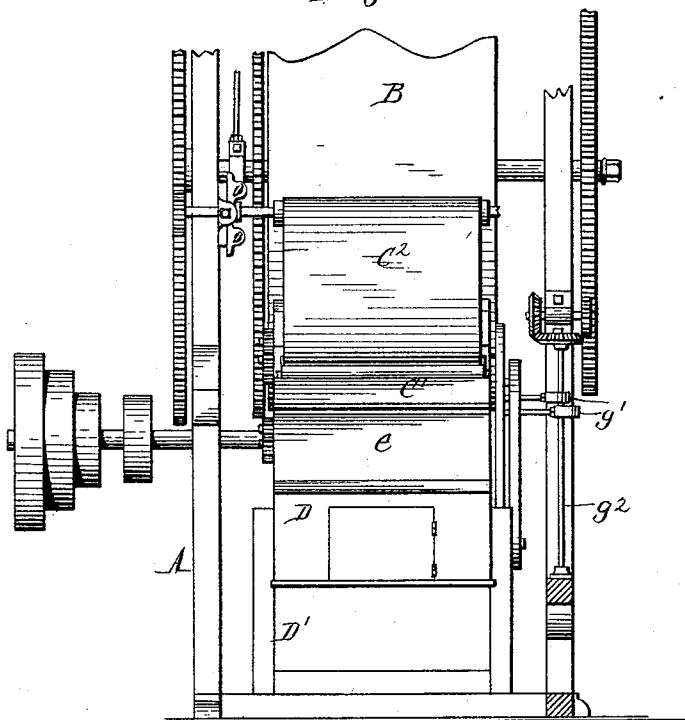
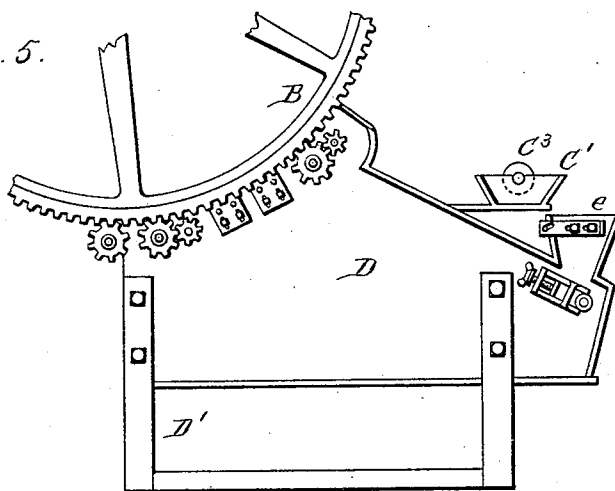


Fig. 5.



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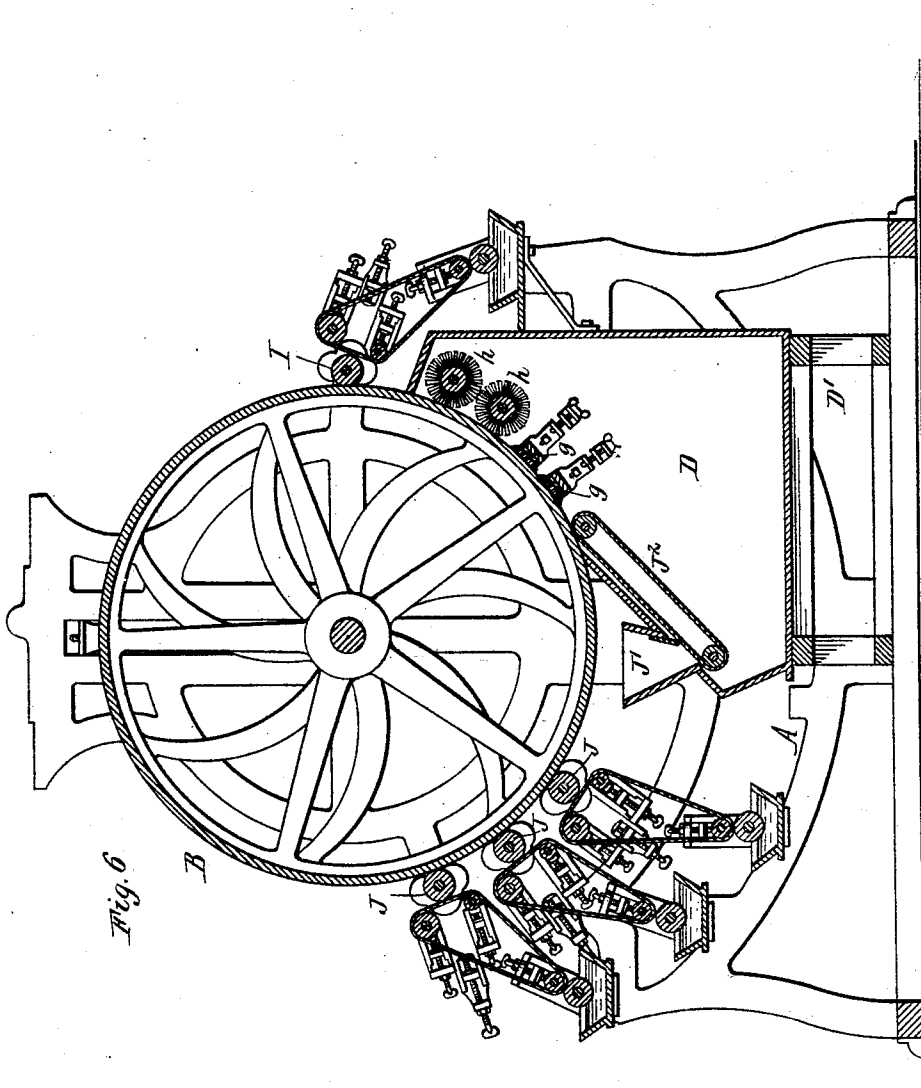
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UNITED STATES PATENT OFFICE.

GEORGE K. BIRGE, OF BUFFALO, NEW YORK.

APPARATUS FOR PRINTING WALL-PAPER.

SPECIFICATION forming part of Letters Patent No. 479,346, dated July 19, 1892.

Application filed July 27, 1891. Serial No. 400,784. (No model.)

To all whom it may concern:

Be it known that I, GEORGE K. BIRGE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Apparatus for Printing Wall-Paper, of which the following is a specification.

This invention relates to an improvement in apparatus for printing wall-paper in which the pattern or design is partly or wholly coated with a powdered substance—such, for instance, as dry bronze, mica, or flock.

The method now commonly employed and known as the "varnish process" consists in first applying to the portions of the paper which are to receive the dry bronze or other powdered coating a slow-drying gold size or varnish and to the remaining portions of the pattern a quick-drying color or colors for completing the pattern. The paper is then hung upon drying-racks until the quick-drying colors are dry, and while the slow-drying varnished portions of the paper are still wet, the paper is passed through a bronzing-machine whereby the dry bronze or other powdered coating substance is delivered upon the paper, the powdered material adhering to the varnished portions, while the surplus material is removed from the paper by dusting. The paper is then again allowed to dry preparatory to rolling it up. This process is slow, involves considerable labor, and requires a large floor-space for the necessary apparatus.

The objects of my invention are to produce wall-paper of the character referred to in a more expeditious manner and with less labor than heretofore, to apply the bronze or other powdered coating and the colors to the paper automatically in one continuous operation, and thus obviate the necessity of intermediate or repeated drying operations, and to produce results not possible by the old process, such as printing colors on top of a bronze or mica ornament.

The accompanying drawings, comprising four sheets, represent apparatus which embody my invention.

Figure 1 is a sectional side elevation of the preferred form of the apparatus. Fig. 2 is a vertical longitudinal section of the devices for applying the bronze or other coating substance to the paper. Fig. 3 is a top plan view

thereof. Fig. 4 is a fragmentary front elevation of the apparatus. Fig. 5 is a fragmentary side elevation showing the means for driving the bronze-applying mechanism. Fig. 6 is a vertical longitudinal section of a modification of the apparatus.

Like letters of reference refer to like parts in the several figures.

A is the stationary supporting-frame of the machine, and B a rotary printing-cylinder mounted upon a horizontal shaft *b*, journaled in bearings in the stationary supporting-frame. This printing-cylinder may be of the ordinary construction employed in machines for printing wall-paper.

C is a sizing-roller arranged on the front side of the printing-cylinder and having on its periphery that portion of the design or pattern which is to be covered with bronze, mica, flock, or other ornamental coating. This sizing-roller applies to the paper a quick-drying gum, size, or varnish, any well-known size or varnish which dries rapidly being suitable for the purpose. The sizing-roller is supplied from a fountain or receptacle C' by an endless apron C², running in contact with the sizing-roller and a take-up roller C³, immersed in the fountain. This endless apron runs around guide-rollers, as shown. The fountain C' is supported upon a casing D, arranged at the front of the machine and inclosing the devices for applying the bronze or other coating to the paper. This casing is supported upon a frame D'.

The mechanism whereby the powdered bronze, mica, flock, or a similar substance is applied to the paper after the same has received the sizing consists, preferably, of a hopper *e*, into which the bronze or other material is deposited, an endless apron E, arranged in the casing D below the hopper and receiving the material discharged from the hopper, and a rotary brush E', which removes the material from the apron and throws it upwardly and rearwardly against the paper. The hopper is preferably provided in its discharge opening or throat with a gate *f* for regulating the discharge of the material therefrom. As the apron passes underneath the rotary brush the latter sweeps the material from the apron and throws it against the paper, a portion of the material adhering to the moist-varnished

portions of the paper, while the remainder falls upon the bottom of the casing. The periphery or face of the rotating brush is arranged at a short distance from the printed surface of the paper, so that the brush itself does not touch the paper, but merely throws the bronze against the same, whereby the pattern, which has been printed with size, is completely covered with bronze without being brought into contact with the brush. This effects a uniform and even coating of the pattern with the bronze and prevents the moisture printing from being disturbed by the bronze-applying device and also prevents the latter from becoming covered with size.

g g represent reciprocating polishers arranged in the casing *D* behind the delivery-brush and bearing against the paper, so as to compress and polish the bronze or other material adhering to the varnished portions of the paper. These polishers are faced with sheep-skin or other soft material and are vibrated transversely by eccentrics *g'*, secured to an upright shaft *g''*, as represented in Figs. 3 and 4.

h h are cleaners arranged in the casing *D* in rear of the polishers *g* for removing the surplus bronze or other material from the paper. These cleaners consist, preferably, of rotary feather brushes, which dust the loose bronze off the paper. The detached material which accumulates in the casing *D* is removed through an opening in the bottom of the casing, to which is applied a hinged door *d*. An inclined delivery-board *i* is arranged in the casing *D* for directing the detached material toward the discharge-opening of the latter.

I I are print-rollers arranged beyond the cleaners *h h* on the rear side of the cylinder and which bear the remaining portion of the design or pattern. These rollers apply the colors to the paper to complete the pattern after the bronze or other material has been applied to the varnished portions of the paper. The print-rollers are supplied with colors in a well-known manner by endless aprons *j*, running in contact with take-up rollers *j'*, immersed in the fountains *j''*. The sheet of paper to be printed is inserted between the printing-cylinder *B* and the sizing-cylinder and passes between the cylinder, the polishers *g*, cleaners *h*, and print-rollers *I*, being conveyed through the machine by the several rollers bearing against the printing-cylinder in a common manner. As the paper passes between the printing-cylinder and the sizing-roller it receives from the latter the quick-drying size or varnish, and before the latter has had time to dry or set the paper arrives opposite the delivery-brush, which latter throws the bronze, mica, flock, or other coating substance against the paper, covering the varnished portions thereof. The coated portions of the paper are next smoothed by the polishers *g* and then freed from the surplus material by the cleaners *h*. It finally passes over the print-rollers *I*, from which it receives

the colors which complete the pattern. The paper is now hung upon suitable drying-racks, and when dry is rolled up ready for storage or shipment.

By applying the bronze or other coating to the paper by means of a quick-drying varnish and subsequently printing the color or colors which complete the pattern the varnished and coated portions of the paper are comparatively dry when the paper leaves the apparatus, so that but a short period is required to finish drying the paper upon the racks. The drying operation, which must precede the application of the bronze to the sized paper in the old process, is thus dispensed with, thereby not only effecting an important saving in the time required to finish the paper, but also saving the labor incident to an extra handling thereof for the intermediate drying operation. As the drying of the varnished portions of the paper is effected principally during the transit of the paper through the apparatus, fewer drying-racks are required in a factory of a given capacity than by the old method, thus economizing, also, in floor-space. When the layer of bronze, mica, or other coating is so dense or absorbent that it dries the varnish quickly, the ordinary slow-drying varnish or size may be employed; but I prefer a quick-drying varnish because it produces better work.

Another important feature of my improved apparatus is the embodiment of the bronzing and printing devices in a single machine, whereby the paper is bronzed or otherwise coated and then printed in one continuous operation without requiring the paper to be handled between the sizing and bronzing operations or between the bronzing and printing operations. This organization of the bronzing and printing devices in the same machine still further reduces the amount of floor-space required. After the bronze or other coating is applied to the varnished portions of the paper and by the time that the latter reaches the print roller or rollers which apply the colors the bronzed or coated portions are so nearly dry that the colors can be printed closely to the edge or on top of the bronzed or coated portions of the pattern without liability of the colors and the sizing running together and spoiling the pattern. This is especially advantageous in certain classes of designs—such, for instance, as those in which the body of the design is covered with bronze, mica, or flock and outlined or subdivided by colors.

The arrangement of the bronze-applying device on the under side of the impression-surface permits of the arrangement of the size and color printing devices also on the lower side of the impression-surface, so that the size and the color which runs rather freely are elevated from their reservoirs to the print-rollers, whereby flooding of the print-rollers is prevented.

Fig. 6 shows a machine which may be em-

ployed for ornamenting the pattern or design with mica of different colors. These are produced by applying different-colored gums or varnishes to the portions of the paper which are to receive the mica, which latter being transparent presents the appearance of being variously colored. In the machine above referred to three sizing-rollers J are employed for applying three gums or varnishes of different colors to the paper and the mica is delivered upon the paper from the hopper J' by an endless belt or carrier J², the upper end of which is arranged in close contact with the paper on the printing-cylinder.

In the construction of the machine represented in Fig. 6 the delivery-brush is omitted and the powdered material is applied to the paper by the direct contact of the carrying-apron with the paper. This construction is simpler than the one in which the brush is employed, but is not so desirable in other respects.

The machine represented in Fig. 6 contains but a single-print roller I, which is used, for instance, when the pattern which receives the powdered material is bounded by an outline in a color. When no color is to be printed upon the paper except that which is applied by the varnish or size which is covered by the powdered material, the print-roller is omitted.

I claim as my invention—

1. In a machine for printing wall-paper, the combination, with an endless impression-surface, of a preliminary sizing-roller, whereby the pattern is printed by an adhesive liquid, a subsequent printing-roller, whereby the pattern is printed with color, and an intermediate bronze-applying device, whereby bronze or powdered material is applied to the size

printing while the paper is moving in the printing-machine from the sizing-roller to the color-printing roller, substantially as set forth.

2. In a machine for printing wall-paper, the combination, with an endless impression-surface, of a sizing-roller arranged on the receiving side of the impression-surface, a color-printing roller arranged on the delivery side of the impression-surface, and an intermediate bronze-applying device arranged on the under side of the impression-surface, substantially as set forth.

3. In a machine for printing wall-paper, the combination, with an endless impression-surface, of a sizing-roller, by which the pattern is printed with an adhesive liquid, and a rotating bronze-applying device having its face arranged at a distance from the under side of the impression-surface and from the paper moving with the same, whereby the bronze is thrown against the paper while the bronze-applying device does not come in contact therewith, substantially as set forth.

4. In a machine for printing wall-paper, the combination, with an endless impression-surface, of a sizing-roller, whereby the pattern is printed with an adhesive liquid, a bronze-applying device, whereby bronze or powdered material is delivered upon the printed paper, a polisher whereby the bronze is smoothed, a cleaner whereby the surplus bronze is removed, and a print-roller whereby a color is printed upon the bronzed paper, substantially as set forth.

Witness my hand this 21st day of July, 1891.

GEORGE K. BIRGE.

Witnesses:

HENRY M. COWLES,
JAS. B. WEAVER.