

C. L. BURDICK.  
MACHINE FOR PRINTING PATTERNS.

APPLICATION FILED MAR. 12, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

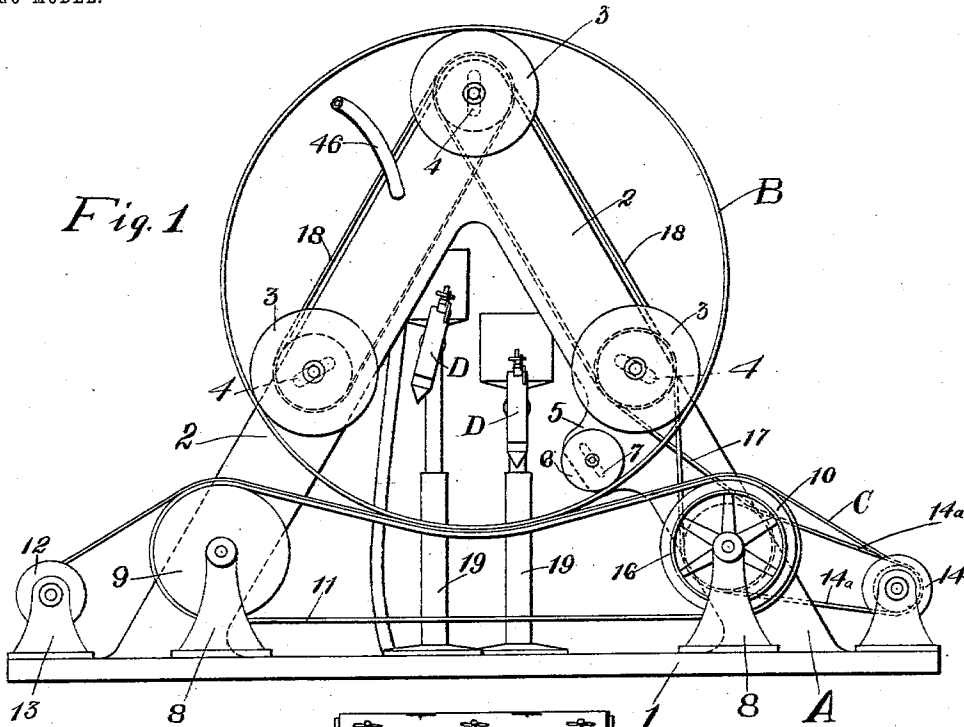


Fig. 1

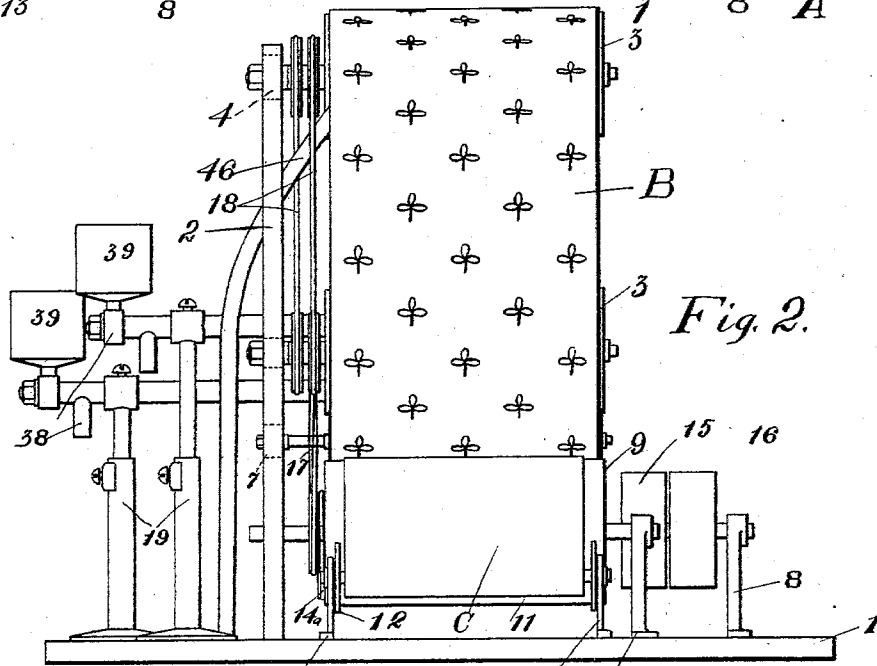


Fig. 2.

Witnesses:  
*Lynn A. Williams*  
*Harvey L. Hanson.*

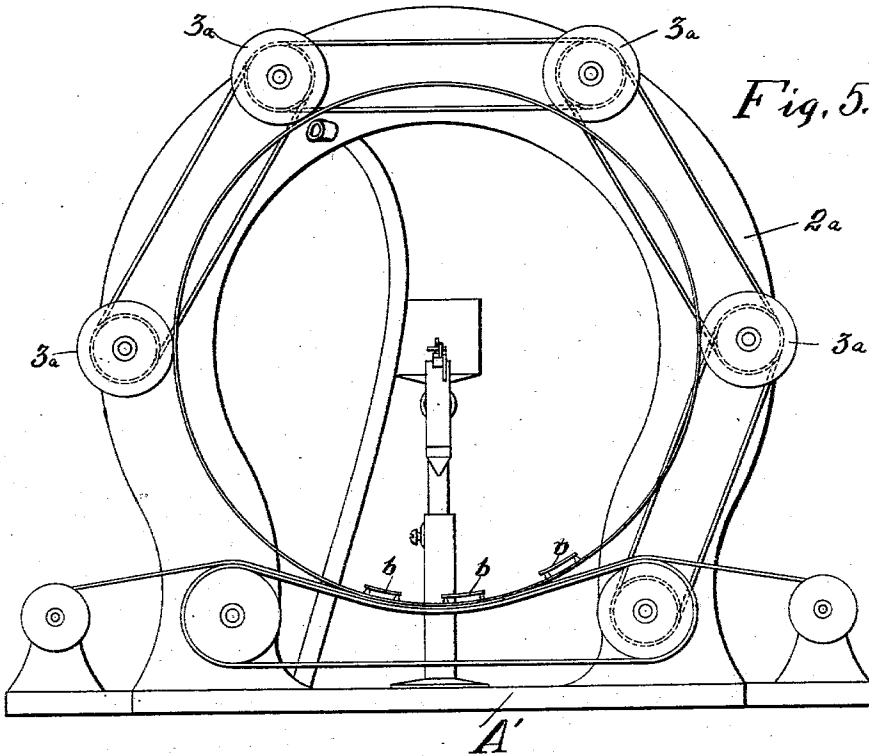
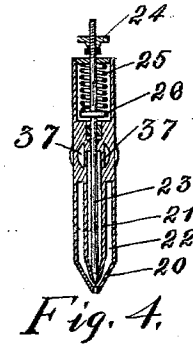
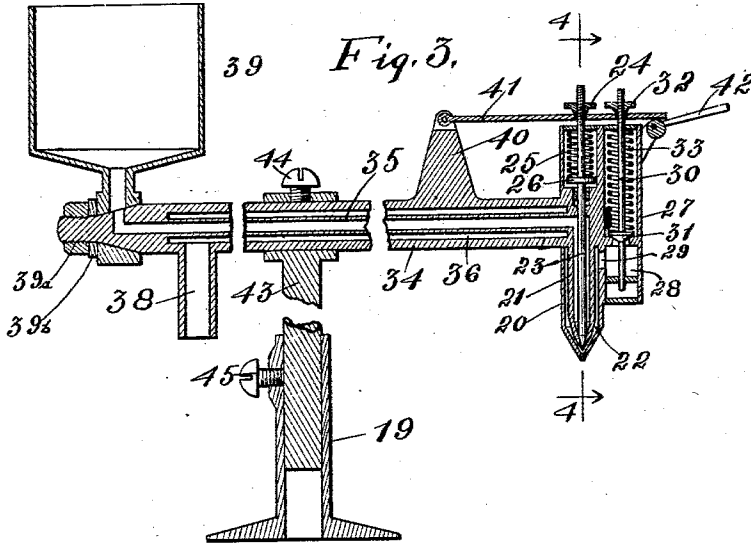
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 Attorneys.

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*Lynn A. Williams*  
*Harvey L. Hanson*

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# UNITED STATES PATENT OFFICE.

CHARLES L. BURDICK, OF LONDON, ENGLAND.

## MACHINE FOR PRINTING PATTERNS.

SPECIFICATION forming part of Letters Patent No. 746,786, dated December 15, 1903.

Application filed March 12, 1902. Serial No. 97,960. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. BURDICK, a citizen of the United States, residing at London, in the county of Middlesex, England, have invented a certain new and useful Improvement in Machines for Printing Patterns, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to machinery by which patterns may be printed upon wall-paper, fabric, and the like, in which work the patterns are printed repeatedly upon the article.

Prominent objects of my invention are to provide a simple, practical, and efficient machine of this kind, to secure accuracy and economy in the printing of the design, and to attain a high degree of efficiency.

In the machine for carrying out my invention herein set forth I arrange a stencil providing the pattern in the form of a continuous band, preferably annular in form, and support it so that its exterior comes in contact with the strip of fabric or wall-paper or like article which is to be printed. Movement is imparted to both the material and the continuous stencil so that the two travel correspondingly and in contact with one another for a moderate period of time. The printing is done by spraying-nozzles, which project or force colored liquid through the apertures in the stencil forming the pattern. If a single color is to be used, a single nozzle with liquid of this color can be employed; but if more than one color is to be used a plurality of spraying-nozzles are employed, and obviously where the number of nozzles with different colors is plural the number of colors actually printed can exceed the number of nozzles, because of the combinations which can be made by mixing the liquids coming from the different nozzles with one another.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is an end view of the same. Fig. 3 is a section showing one of the spraying-nozzles and associated mechanism. Fig. 4 is a section taken on line 4 4 of Fig. 3. Fig. 5 is a side elevation of a modified form of machine.

Referring to the apparatus as illustrated in Figs. 1 to 4, inclusive, I have shown a body-frame A, consisting of a horizontal base-piece 1 and an elevated framework 2 in the form of an inverted V. This framework 2 supports three wheels or rollers 3 3 3, each of which is mounted in a slot 4 to permit lateral adjustment of the wheel or roller. These wheels 3 3 in turn support a stencil B in the form of an annular band. The wheels 3 3 are arranged inside of the annular stencil B, so that the latter rolls upon the former. One side of the frame 2 is provided with an enlargement 5, which supports a blotting-wheel 6, made of or coated with blotting-paper or any suitable absorbent material. This wheel 6 rests upon the interior of the stencil B and is mounted in a slot 7 so that it can adjust itself as required by the stencil. The base 1 is provided with standards 8 8, which support wheels 9 and 10, carrying an endless belt 11, whose upper portion is arranged and extended below the annular stencil B. The sheet or strip of material C upon which the printing is to be done is carried upon a roll 12, mounted on a standard 13 on the base 1. From the roll 12 the material is extended over the wheel 9 and the belt 11 thereon and thence between the belt 11 and the lower portion of the stencil B and thence over the wheel 10 to a roll 14 on the other end of the base 1. The material passes continuously from the roll 12 to the roll 14, upon which latter it is coiled in a printed condition. To such end the roll 14 is provided with suitable driving mechanism—as, for example, the belt 14<sup>a</sup>. To bring about an advancement of the material and a rotation of the stencil, the wheel 10 is properly driven, as by providing fast and loose pulleys 15 and 16 on the shaft carrying the wheel 10, whereby a belt can be employed and shifted from one pulley to another to secure the rotation of said shaft. The stencil-supporting wheels 3 3 3 are also desirably driven, a simple arrangement being to provide a belt 17 from the driving-shaft to the nearest wheel 3 and other belts, 18 18, between said wheel 3 and the other wheels 3 3. The printing is accomplished by one or more spraying-nozzles D D. In the machine under discussion I have shown two such nozzles, although it will be understood that more or less can be employed, as

desired or required. The nozzles are shown mounted upon suitable pedestals 19 19 and are arranged so that they depend from the upper ends of said pedestals and point downwardly toward the lower portion of the annular stencil B.

As all of the spraying-nozzles, with their cooperating mechanisms, are alike, I will describe but one of the same. The specific construction is illustrated in Figs. 3 and 4. Each nozzle comprises an exterior casing 20, having its lower end pointed and apertured, and an interior casing 21, arranged within the casing 20 and having a chamber 22 between such casing 20 and itself and similarly having its lower end pointed and apertured. For controlling the aperture of the inner casing 21 a spindle 23 is provided and extended within said casing and out of the upper end thereof, which upper end is screw-threaded and provided with a nut 24. A spring 25 is arranged about the upper portion of the spindle 23, being confined between the upper wall of the casing 20 and a disk 26 on the spindle 23, whereby the spindle 23 tends to descend and close the aperture in the casing 21. By this arrangement the aperture or outlet in the casing 21 is opened and closed. Outside of the casing 20 is a second or supplemental casing 27, having a chamber 28, which communicates with the chamber 22 by means of a port or passage 29, formed in the wall of casing 20. A spindle 30 is arranged in this supplemental casing 27 and is provided with a valve 31, by which a port communicating with the chamber 28 is controlled. The spindle 30 has its upper end projected outside of the casing 27 and screw-threaded and is provided with a nut 32. A spring 33 is confined in said casing and acts upon the valve 31, tending to depress the same and close the port opening into the chamber 28. By this arrangement communication between the chambers 28 and 22, and thereby the aperture of the casing 20, is controlled. The casing 20 is mounted upon a horizontally-extending tubular structure 34, with which it is desirably made integral. This tubular structure is constructed with an inner tube or pipe 35, forming between itself and the structure 34 a tubular chamber 36. This tubular chamber 36 communicates at one end with the chamber 28 of the casing 27 by means of side ports or passages 37, Fig. 4. At its other end the tubular chamber 36 communicates with an inlet-pipe 38, which is understood to be connected with a suitable source of compressed air. The inner pipe 35 communicates at one end with the interior of the inner casing 21 and at the other end with a reservoir 39, which is understood to contain colored liquid for printing purposes. This reservoir 39 is provided with a pivotal or swivel connection with the end of the structure 34, by which an angular adjustment of the reservoir 39 can be made relatively to said structure. This is accomplished by fitting the base of the res-

ervoir loosely upon the end of the structure 34 and providing set-nuts 39<sup>a</sup> and 39<sup>b</sup>, by which such pivotal connection can be tightened or loosened. The tubular structure 34 is constructed with a projection 40, to whose upper end is pivoted a lever 41, which extends under the nuts 24 and 32, and a lever 42 is mounted on a projection on the casing 27 and arranged to raise and lower the free end of the lever 41. By this arrangement the lever 41 can be so adjusted as to cause the adjustment of the spindles 23 and 30, and thereby, in effect, control the apertures in the casings 20 and 21. On the tubular structure 34 is mounted a post 43, which is arranged to telescope in the standard 19. Screws 44 and 45 are provided, the former for locking the tubular structure 34 in adjustment in the post 43 and the latter for locking the post 43 in the standard 19.

A tube 46 is arranged to deliver dry or heated air upon the interior of the stencil, so as to dry any surplus colors thereon. This tube is conveniently extended up through the base of the machine and through the upper part of the frame 2 and is understood to be connected with any suitable source of dry or heated air.

The machine as above described operates as follows: The roll 12 contains the material to be printed—such, for example, as wall-paper, fabric, or the like. Material is extended from this roll in between the upper part of the belt 11 and the lower part of the stencil B and about the roll 14. The latter is then properly driven by the belt 14<sup>a</sup>, and the wheel 10, carrying the belt 11, is also driven. Thus a continuous movement of the material below and in contact with the stencil is brought about and a corresponding and continuous rotation of the stencil is produced. The spraying-nozzles D D are then operated so as to produce a printing of the pattern of the stencil upon the material. For this purpose the reservoirs 39 39 are properly supplied with the desired colored liquid, and compressed air is supplied to the inlet 38, the result being that the compressed air passes along the tubular chamber 36, thence to the chamber 28 and the chamber 22, and out of the nozzle of the casing 20. The liquid flows along the pipe 35 and down the interior of the casing 21 and out of the aperture thereof, when it mixes with the compressed air in the chamber 22 and is delivered from the nozzle in a fine spray. The air and color outlets of the nozzles are suitably controlled by the valve-spindles 23 and 30, and these can be adjusted by adjusting the threaded nuts 24 and 32. As a preferred arrangement the nut 24 is set a little higher than the nut 32, by which the air-valve will open a little before the color-valve and close a little later than the same, thus keeping the point of the discharge-orifice free from small drops of color. These nozzles, as before stated, can be in any suitable number to produce the desired color or colors, and they can be arranged to direct their sprays at any

desired point. For this purpose adjustment of the nozzles can be made either vertically by adjusting the post 43 and the standard 19 or at an angle by adjusting the tubular structure 34 in the top of the post 43. When the nozzles are adjusted angularly, the reservoirs 39 must of course be maintained in a substantially vertical position to prevent overflow of the liquid, and to such end these reservoirs are adjusted by their swivel connections with the ends of the tubular structures 34. Thus a continuous movement of the material and stencil and a continuous delivery of colored liquid or liquids to the interior of the stencil cause the printing of the pattern of the stencil upon the material. The blotting-wheel 6, resting upon the interior of the stencil at one side of its point of contact with the material, absorbs any liquid that may be deposited upon the interior of the stencil and carried therewith, and the dry or heated air delivered by the tube 46 serves to completely dry any liquid that may be left by the blotting-paper.

In Fig. 5 is shown a modified arrangement having the principles of operation and construction of the machine thus described. In this apparatus of Fig. 5 the arrangement is the same except that the stencil is made with interiorly raised or projecting portions, by which softened edges may be given to the design as it is blown upon the material. These projections on the stencil are indicated at *b b*. To arrange for proper guiding and supporting of the stencil constructed in this way, the supporting and guiding wheels are arranged outside thereof instead of inside, as in the machine previously described. Thus I have shown four guiding and supporting wheels 3<sup>a</sup> 3<sup>a</sup> arranged outside of the stencil at intervals, and for the proper support of these wheels I have shown a frame A', having an upper framework 2<sup>a</sup> made circular in form except at its lower portion, where it connects with the base. Aside from this difference in construction the machine is the same as the first-mentioned one and the operation is the same.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not wish to limit myself to the precise construction and arrangement as herein shown and particularly described; but,

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

1. A device of the class specified, comprising a stencil made in the form of an annular band, means for supporting and guiding such band during rotation, a flexible support arranged below the annular band and adapted

for continuous movement, whereby the material can be passed between the band and said support, and movement of the latter will cause movement of the material and of the stencil, and a spraying device or devices adapted to apply color to the interior of the stencil where it comes in contact with the material, substantially as described.

2. A device of the class specified, comprising an annular stencil, supporting and guiding wheels therefor, an endless belt arranged below the stencil and having its upper portion adapted to support the same, pulleys for said belt, means for driving one of said pulleys, and a spraying nozzle or nozzles for applying color to the interior of the stencil where it rests upon said belt, substantially as described.

3. A device of the class specified, comprising a continuous stencil made in the form of an annular band, supporting and guiding wheels therefor, a frame supporting said wheels, which latter have bearings adapted to permit their adjustment as required by the stencil, power-transmitting connection between said wheels, whereby all are driven in unison, an endless belt arranged below the stencil whereby the material can be passed between the latter and the belt, pulleys supporting said belt, means for driving one of said pulleys, power-transmitting connection between the same and one of said guiding and supporting wheels, and a spraying nozzle or nozzles for applying color to the interior of the stencil above the belt, substantially as described.

4. In a machine of the class specified, the combination with a rotary stencil, of an endless belt, and means for supporting the belt close to the rotary stencil, whereby the material can pass between the belt and stencil, substantially as described.

5. In a device of the class specified, the combination with a rotary stencil and means for supporting the same, of an endless belt, and means for supporting the belt below the stencil whereby the latter can rest upon the belt and the material can pass between the same and the stencil, substantially as described.

6. In a device of the class specified, the combination of a continuous stencil, means for supporting the same, and a traveling support arranged to carry the material into contact with the stencil, substantially as described.

In witness whereof I hereunto subscribe my name this 29th day of January, A. D. 1902.  
CHARLES L. BURDICK.

Witnesses:

R. WESTACOTT,  
H. D. JAMESON.