

(No Model.)

H. SANDHAM.

METHOD OF PRODUCING MOLDS FOR PAPER MAKING MACHINES.

No. 577,070.

Patented Feb. 16, 1897.

Fig. 5.

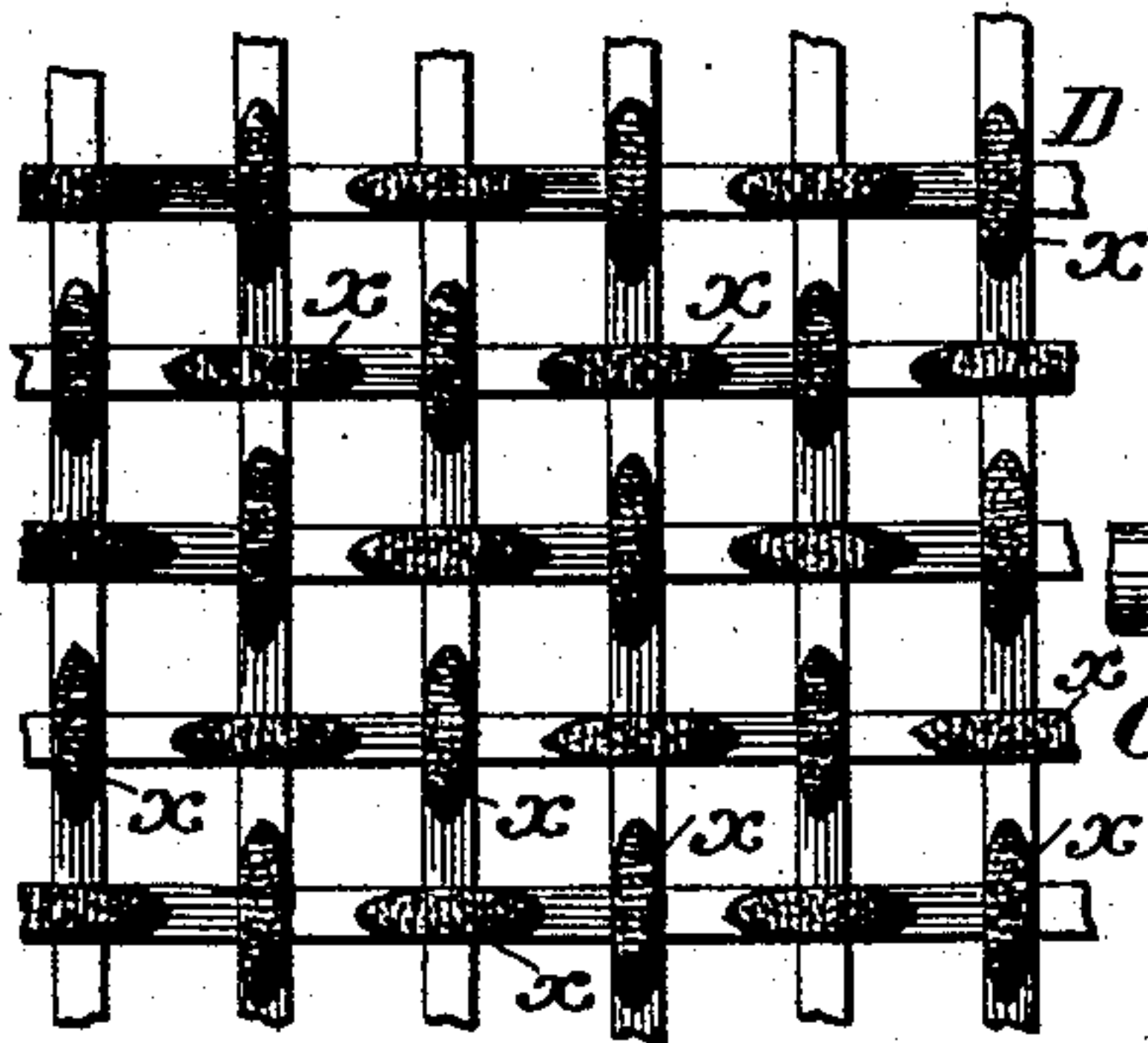


Fig. 1.

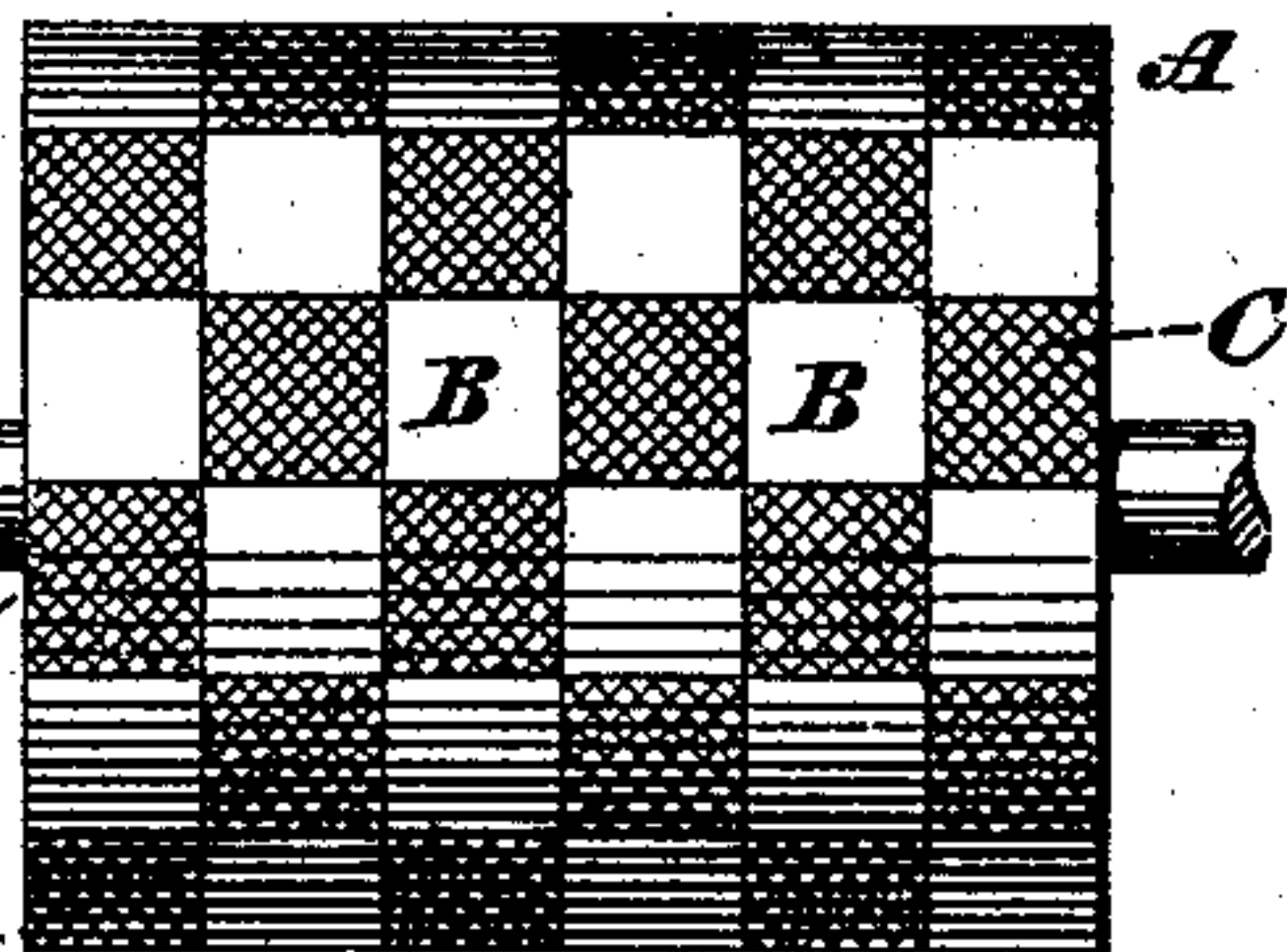


Fig. 2.

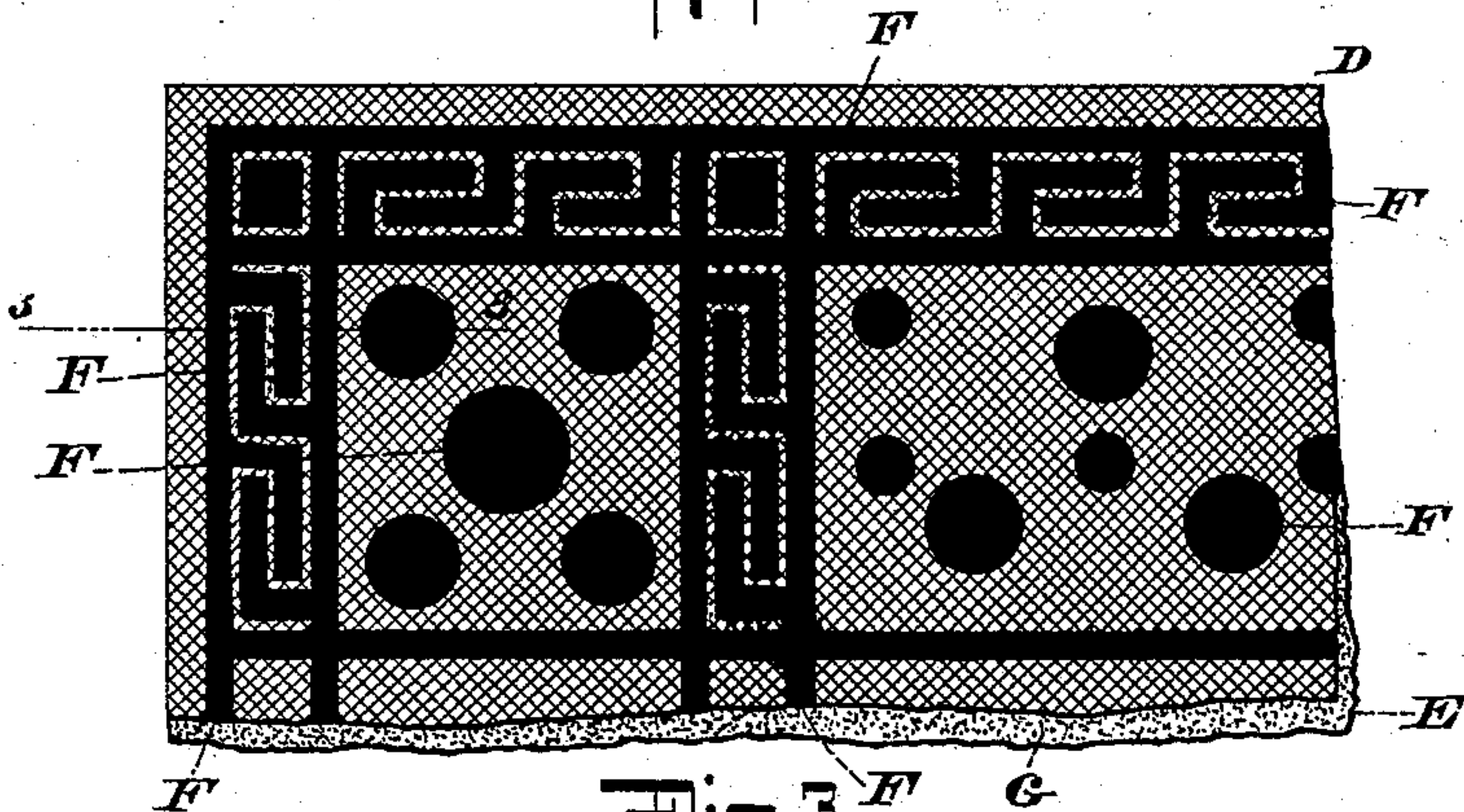


Fig. 3.

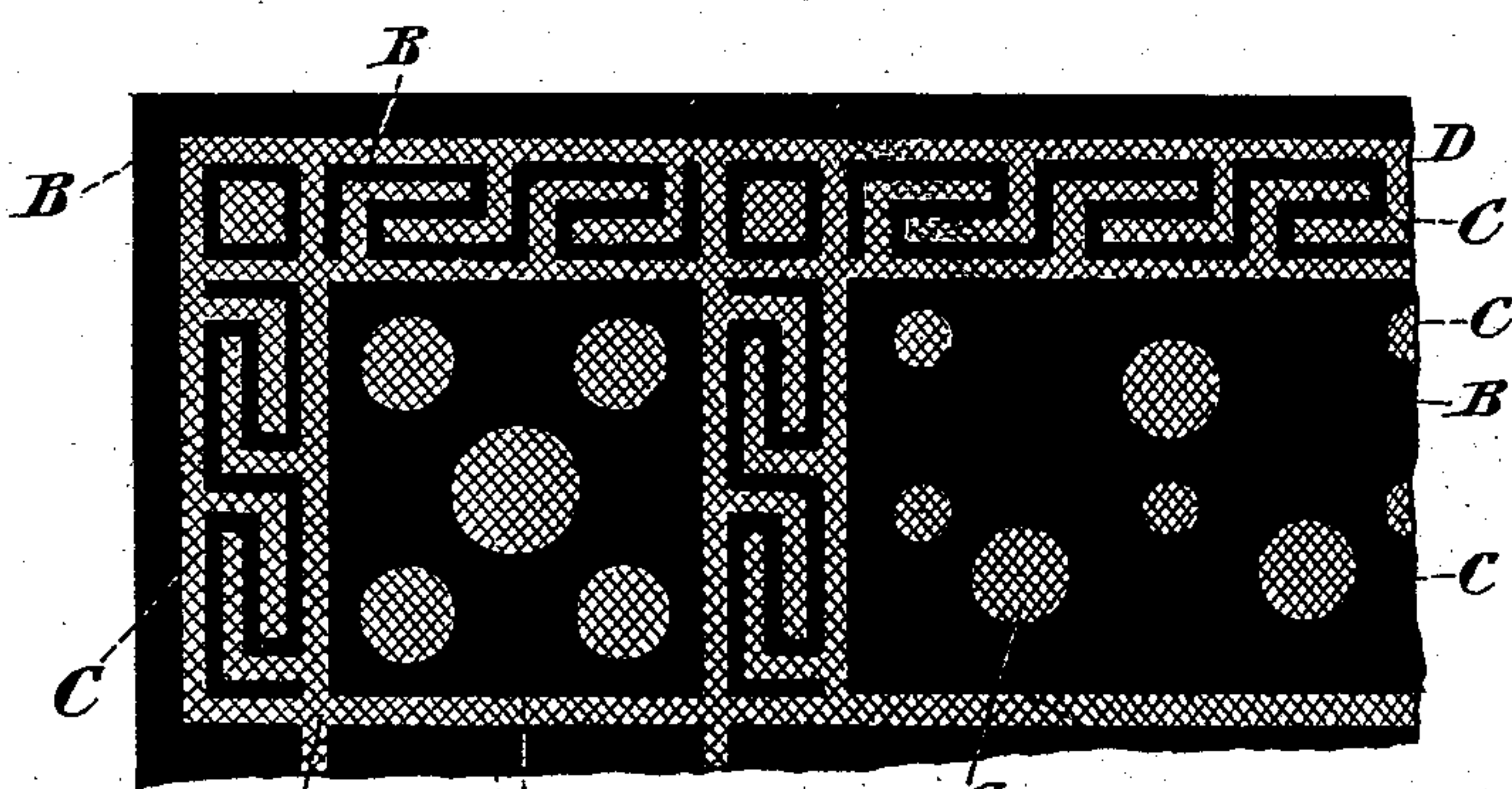


Fig. 4.

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# UNITED STATES PATENT OFFICE.

HARRY SANDHAM, OF SPOKANE, WASHINGTON, ASSIGNOR TO SAMUEL CRUMP, OF SAME PLACE.

## METHOD OF PRODUCING MOLDS FOR PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 577,070, dated February 16, 1897.

Application filed January 20, 1896. Serial No. 576,084. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY SANDHAM, a citizen of the United States, and a resident of Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Methods of Producing Molds for Paper-Making Machines, of which the following is a specification.

10 The invention relates to improvements in the manufacture of decorated paper and pulp boards; and it consists particularly in the method hereinafter described for producing the pattern-mold whereby the decoration  
15 may be applied to the surface or surfaces of the paper or pulp boards.

In accordance with my invention the paper and straw or other pulp boards during or after their process of manufacture have im-  
20 parted to their upper or lower or both surfaces permanent designs of any desired outline or pattern in pulp-stock preferably of a color different from that of the main body of the paper or board. The designs in color  
25 form an integral part of the body of the paper or pulp board, and hence the latter will possess a surface or surfaces bearing permanent designs in as many colors and as elaborate in character as may be desired.

30 In the paper-making machines embodying my invention the mold which is to form the surface decoration will have provided upon it a fixed imperforate pattern which will entirely exclude the pulp, while the remaining  
35 surface of the mold is left in its usual open condition, whereby the same will be enabled to form its layer of the colored pulp with an entirely open design corresponding with the imperforate pattern of the same. The layer  
40 of pulp thus formed becomes an integral part of the surface of the board, and hence the design is permanent in character. As many of the pattern-molds as desired may be employed in accordance with the particular ef-  
45 fect it may be wished to produce in the finished board. If it should be desired to decorate the board with several colors, a corresponding number of the pattern-molds should be employed, and the outlines formed there-  
50 on should be so arranged with respect to each

other as to secure the proper register in the finished design.

My present invention is confined to the method hereinafter described for producing the patterns on the mold, and in accordance  
55 therewith I fill in the meshes of the wire or other material of which the mold may be formed at the desired points to form the imperforate pattern by electrolytical deposition, whereby the exterior surface of said pattern  
60 is left hard and permanent and capable of totally excluding the pulp. In the production of the pattern I subject the wire or other material of which the mold is to be formed to the following steps which comprise the  
65 method sought to be protected hereby.

I first coat the obverse side of the wire forming the screen or mold with any suitable solution which will resist electrolytical deposition, and in carrying out this step of the  
70 process I prefer to use for the purpose of coating the obverse face of the wire a dauber or printer's roller and any kind of oily printers' ink, to which is preferably added Japan or other quick-drying varnish, whereby there  
75 may be formed upon the said obverse side of the wire or screen an elastic quick-drying coating which will resist electrolytical action. The next step in the process is to provide a  
80 backing to be applied to the reverse side of the wire or screen, and this backing will preferably be composed of wax-coated paper. This backing of wax-coated paper, before it  
85 is applied to the reverse side of the wire or screen, has applied to its upper surface, so as to entirely cover the same, graphite or other metallic substance, which will form upon the upper side of the backing a metalized surface. Upon this backing thus metalized I then ap-  
90 ply the design, which will be of any character desired and in any material convenient of use which will resist electrolytical action. It will be found convenient to use oily printers' ink or lithographers' ink for the design to  
95 be applied upon the backing, and the design may be applied by printing or by the usual transferring processes employed by lithographers or in other well-known ways. The back-  
100 ing having been thus metalized and having received the design or designs in material which



will resist electrolytical deposition is applied to the reverse side of the wire or screen and preferably pressed thereon until the wax has entered the meshes of the wire to the required depth or, in other words, has reached about the middle of the thickness of the screen. The wire or screen thus has upon its obverse side a light coating of the oily printers' ink or other material which will resist electrolytical deposition, but which will not close the meshes thereof, and upon its reverse side a backing which will resist electrolytical deposition and which carries a metalized surface entering the meshes of the wire and the design in material which will resist electrolytical deposition. The wire or screen thus prepared is then submerged into the battery-trough in order that the copper or other metal may deposit upon the metalized surfaces of the backing exposed within the meshes of the wire in order that the said copper or other metal may entirely close the meshes of the wire except at the points where the design appears upon the backing. After the removal of the wire or screen from the battery-trough the wax backing and design in material which will resist electrolytical deposition are removed and the protecting-coating placed upon the obverse face of the wire or screen is also removed, thus leaving the screen or mold with its meshes entirely open within the outlines of the design that was placed upon the wax backing and entirely closed by the deposited copper at all other points. Thus the screen will be enabled to take up the pulp at the points where the design had appeared upon the wax backing and in the exact outline of said design, while all the remaining portions of the screen, its meshes being closed by the deposited copper, will be incapable of taking up the pulp.

In the accompanying drawings I illustrate a cylinder mold made in accordance with the invention.

Figure 1 is a top view of the mold; Fig. 2, a top view of a detached portion of the wire for a mold and illustrating through the meshes thereof the wax backing with the metalized surfaces and the design thereon, the design representing the decoration it is intended shall be reproduced in pulp upon the surface or surfaces of the board during the manufacture of the latter. Fig. 3 is an edge view of a detached portion of the wire for a mold and illustrating the application to the reverse side thereof of the protecting-coating of beeswax or other resisting material. Fig. 4 is a top view of a detached part of the mold corresponding with Fig. 2 after the electrolytical deposition has taken place and the wax backing and material forming the design have been removed. Fig. 5 is an enlarged top view of a portion of the wire and illustrating the coating applied to the obverse side of same by the printers' roller, the heavy black at the elevated points where the strands of wire cross one another representing the coat-

ing, these being the portions of the wire reached by the roller on its passage over the same.

In the drawings, A designates the mold, B the portions thereof which have been rendered solid by means of electrolytical deposition to exclude the pulp, and C the open portions thereof, which define the outlines of the design it is intended shall be applied to the surface of the board.

The wire in Figs. 2 and 3 is lettered D. In Fig. 3 the coating of wax or other suitable substance applied to the reverse side of the wire is designated by the letter E and the material forming the design placed upon the said backing is indicated by the letter F, while the letter G denotes the metalized surfaces upon the wax backing within the meshes of the wire, and which surfaces receive the deposited metal which fills the said meshes and forms solid permanent metal surfaces, (indicated in Fig. 1 by the letter B.)

The design to be applied upon the wax backing and represented upon the finished mold may be of any suitable outline or character desired, and hence in Figs. 1 and 2 I illustrate two separate designs.

The first step in the process of forming the mold is to apply by means of a dauber or roller an exterior coating upon the upper surface of the wire or screen in order to prevent electrolytical deposition taking place directly upon said surface. The coating applied to the obverse face of the wire is shown in Fig. 5 at *a*, but it is not in every instance necessary to use this coating. This coating is desirable in instances in which wire of a fine mesh is used; but when the wire is of coarse mesh the obverse coating may be omitted, care being taken, however, not to permit the wire during the later stages of its treatment to remain an undue time in the battery-trough. The wax backing is then prepared and given a metalized surface, and thereafter the desired design, by printing, transferring, or other convenient process, is applied to the wax backing in material which will resist electrolytical deposition, whereupon the said backing is applied to the reverse side of the wire or screen and pressed thereupon until the metalized wax surface has entered and closed the meshes of the wire. The wire or screen thus prepared is then subjected to the battery-trough in order that the copper or other metal may deposit upon the said metalized surface of the backing exposed within the meshes of the wire, whereby the said meshes at all points, except directly over the design applied to said backing, will be entirely closed and form an imperforate pattern. The wire or screen is then removed from the battery-trough, and the wax backing and the design carried thereby are removed from the wire or screen, and the light coating which was first applied to the obverse side of the screen is also removed, thus leaving the wire or screen entirely clean, with all of its meshes closed except at the



points directly over the said design, which, being of a material capable of resisting electrolytical deposition, preserved the meshes directly over it from being closed by the copper or other metal. The screen thus formed will be enabled to take up the pulp at the points where the design had appeared on the wax backing and in the exact outline of said design, while all the remaining portions of the screen, its meshes having been closed by the deposited copper, will be incapable of taking up the pulp.

The invention is not limited to any special character of backing for the reverse side of the screen, nor to any special material for coating the obverse side of the screen; nor is the invention confined to any special manner of applying the design to the upper surface of the backing previous to its having been placed upon the screen, nor to any special manner or means for forming a metalized surface upon the upper surface of said backing.

The mold formed in accordance with my invention may be used continuously, and the solid pattern thereof will exclude the pulp, while the open surfaces of the wire between the outlines of said pattern will constitute the design and take up the pulp and deliver the web thereof to the body of the board, which will thus carry as an integral part the desired design in pulp and of a character or color preferably different from the main body of the board.

The mold constructed in accordance with and embodying my invention will form the web of pulp possessing the open-work design with certainty, rapidity, and accuracy, and with such sharp, well-defined outlines that said design may be very elaborate and artistic in character.

The invention is not confined to any special type of mold, and is applicable to cylinder, Fourdrinier, and hand molds.

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

1. The method hereinbefore described of

forming a pattern on the wire mold of a paper-making machine, which consists in applying to the obverse face of the wire a protecting-surface, forming a backing for the reverse face of the wire in material which will resist electrolytical deposition, applying to the upper surface of said backing a metalized surface and the design in material which will resist electrolytical deposition, applying said backing to the reverse side of the wire and permanently depositing metal by electrolytic action upon the said metalized surface to form the pattern and close the meshes of the wire, except at points where said meshes are protected from electrolytical deposition by means of said design and protecting-surface.

2. The method hereinbefore described of forming a pattern on the wire mold of a paper-making machine, which consists in providing a backing in material which will resist electrolytical deposition, applying a metalized surface and the design in non-conducting material upon the upper surface of said backing, applying said backing and design to one side of the wire, and closing all of the meshes of the wire outside of the outlines of said design by means of electrolytical deposition.

3. The method hereinbefore described of forming a pattern on the wire mold of a paper-making machine, which method consists in providing a backing having a metalized upper surface for the reverse face of the wire, applying the design in material which will resist electrolytical deposition upon the said upper surface of said backing, applying said backing and design to one side of the wire, and closing all of the meshes of the wire outside of the outlines of said design by means of electrolytical deposition.

Signed at New York, in the county of New York and State of New York, this 14th day of January, A. D. 1896.

HARRY SANDHAM.

Witnesses:

CHAS. C. GILL,  
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