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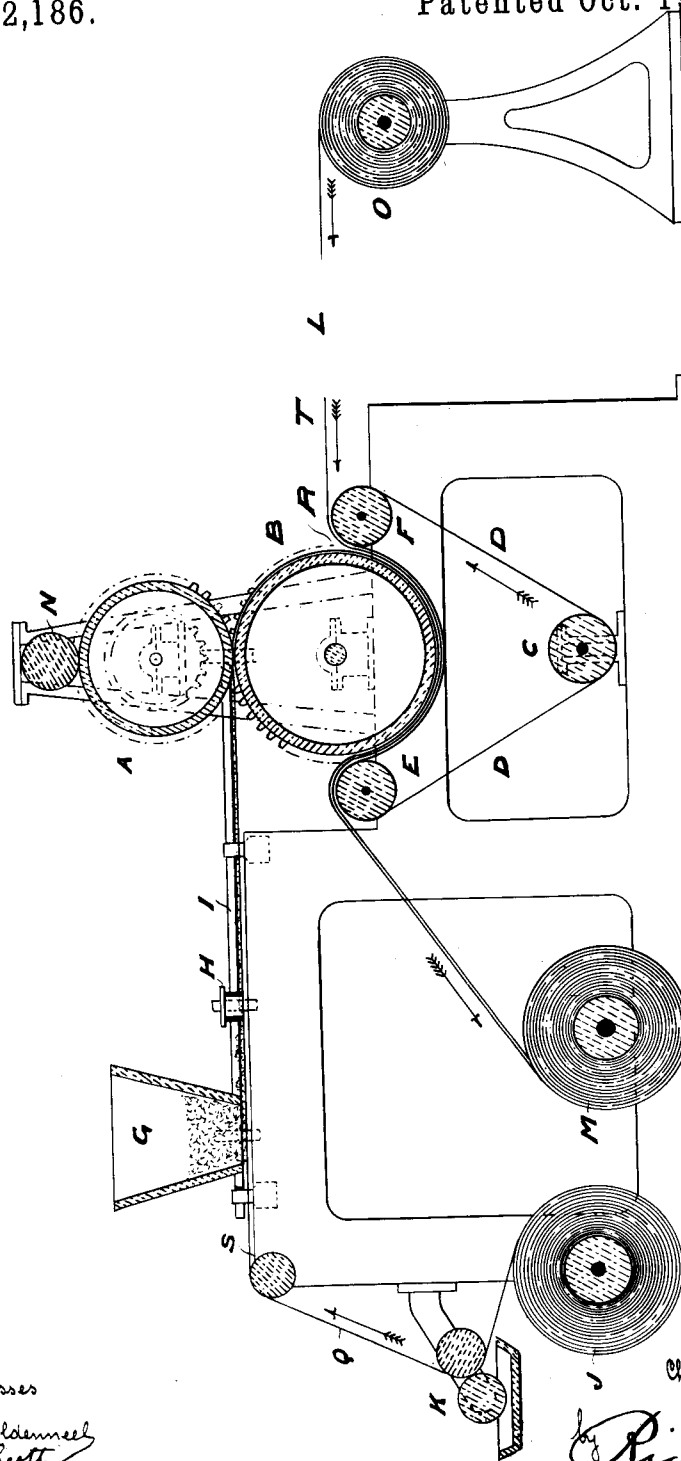
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J. E. & C. S. BEDFORD.

PROCESS OF PRINTING INLAID PATTERNS UPON LINOLEUM OR
LIKE FABRICS.

No. 592,186.

Patented Oct. 19, 1897.



Witnesses
H. van Oldenmeel
E. A. Scott

Inventors
James Edward Bedford
Charles Samuel Bedford

by *Richardson*
Attorneys

(No Model.)

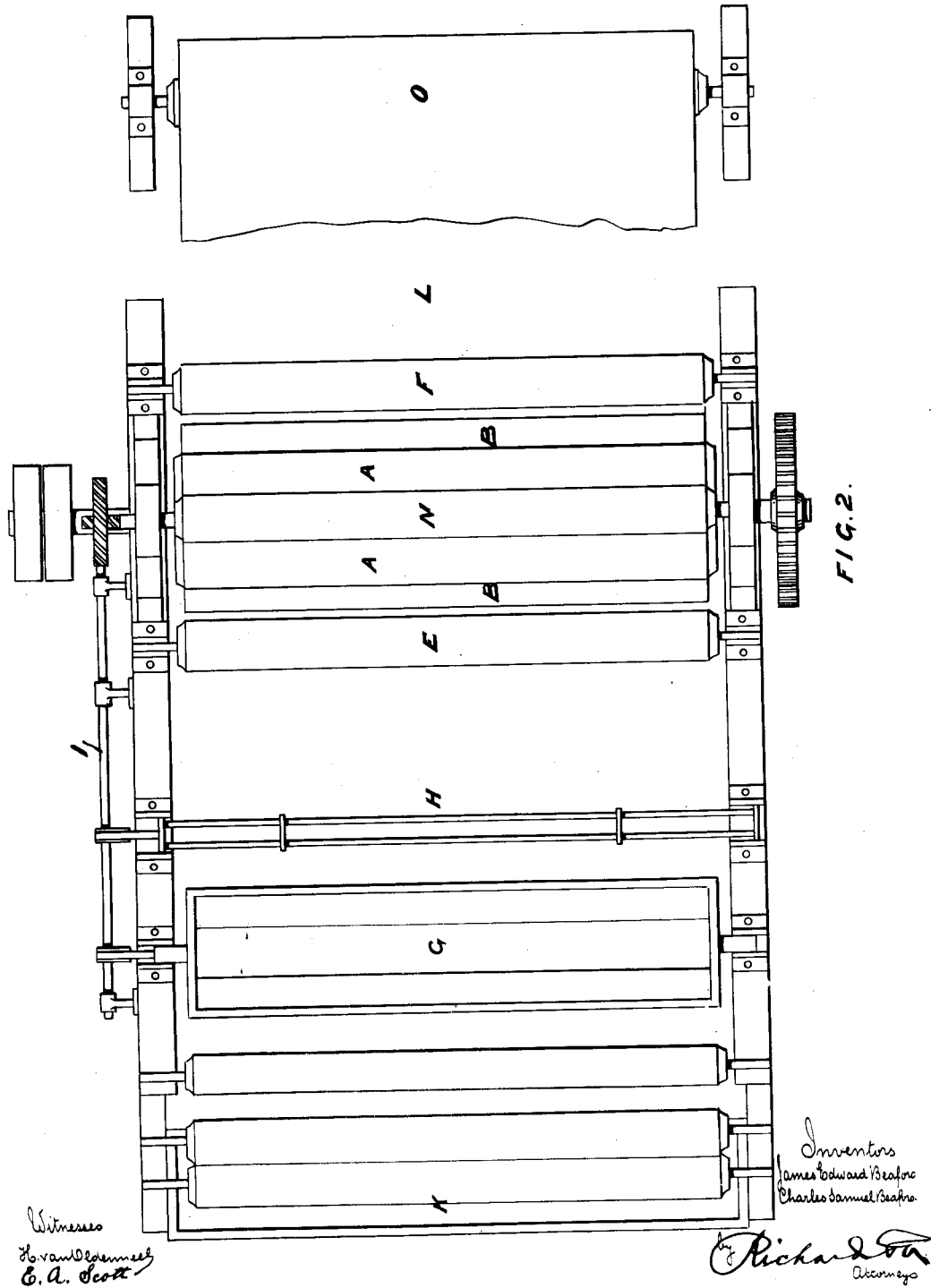
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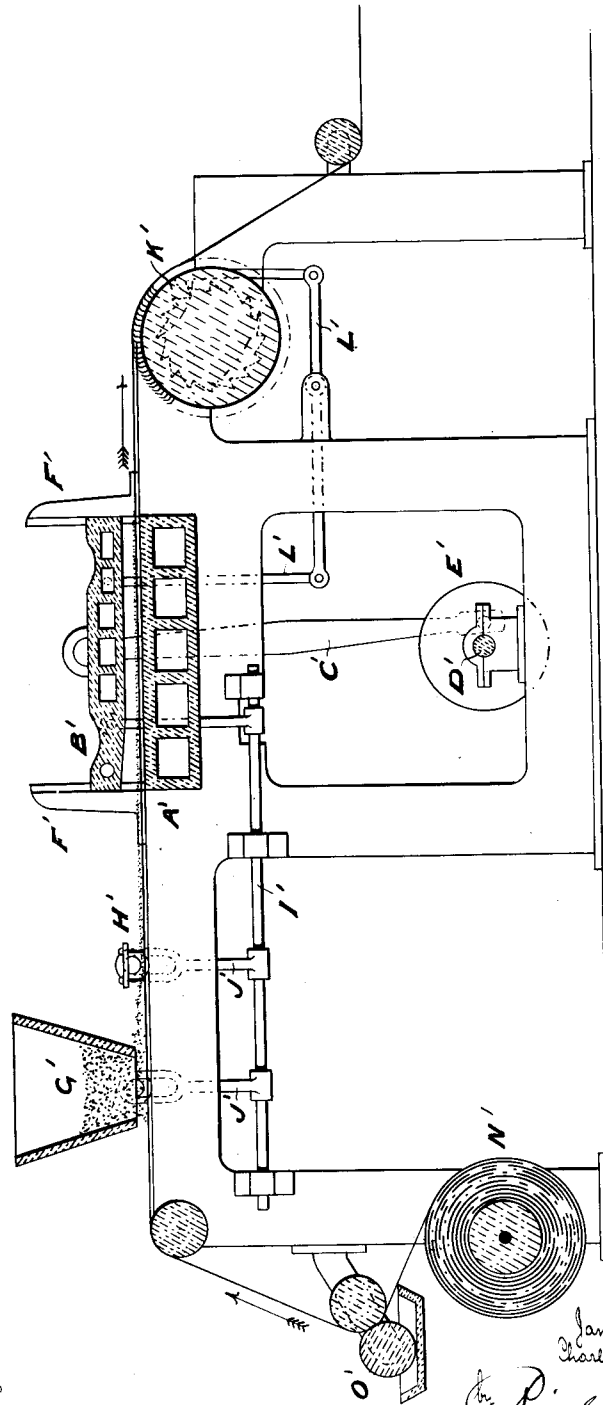


FIG. 3.

Witnesses
H. van Dusen
E. A. Scott

Inventors
James Edward Bedford
Charles Samuel Bedford

Richardson
Attorneys

(No Model.)

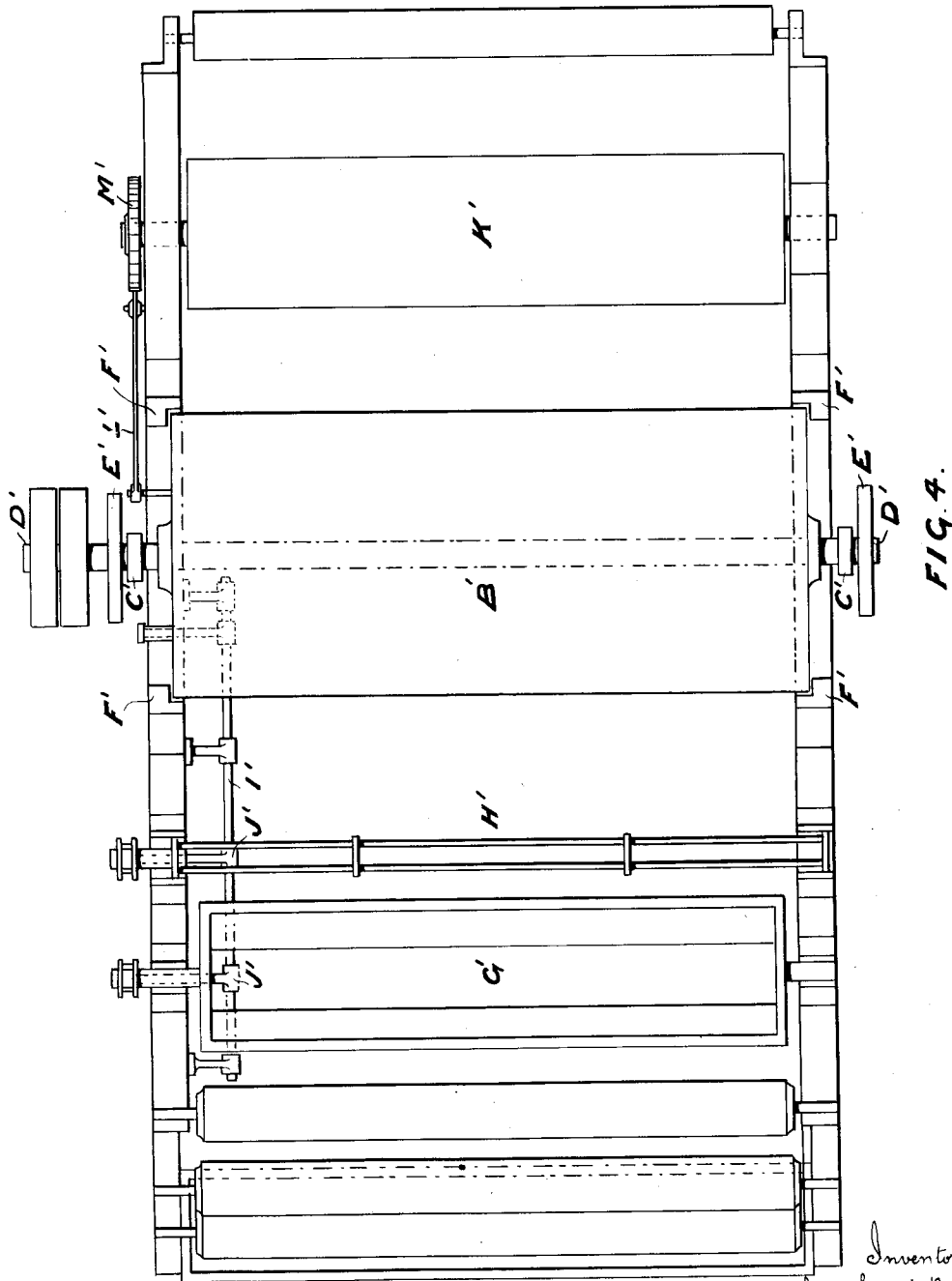
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Witnesses
H. van Dusen
& A. Scott

Inventors
James Edward Bedford
Charles Samuel Bedford
By Richard R. [Signature]
Attorneys

(No Model.)

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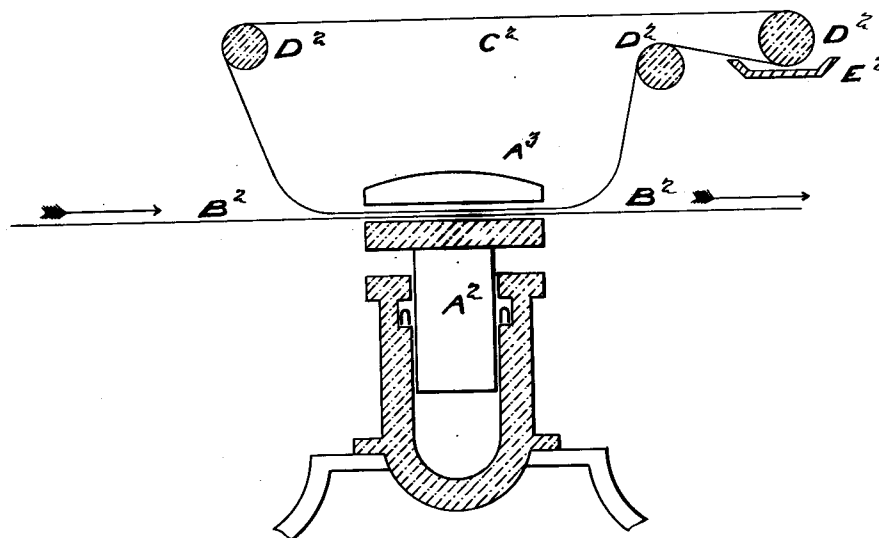


FIG. 5.

Witnesses

H. van Dusen
E. A. Scott

Inventors
James Edward Bedford
Charles Samuel Bedford

By Richard A.
Attorneys

UNITED STATES PATENT OFFICE.

JAMES EDWARD BEDFORD AND CHARLES SAMUEL BEDFORD, OF LEEDS,
ENGLAND.

PROCESS OF PRINTING INLAID PATTERNS UPON LINOLEUM OR LIKE FABRICS.

SPECIFICATION forming part of Letters Patent No. 592,186, dated October 19, 1897.

Application filed August 22, 1896. Serial No. 603,593. (No model.) Patented in England June 17, 1895, No. 11,716.

To all whom it may concern:

Be it known that we, JAMES EDWARD BEDFORD and CHARLES SAMUEL BEDFORD, subjects of the Queen of Great Britain and Ireland, residing at Leeds, in the county of York, England, have invented new and useful Improvements in Processes of Printing Inlaid Patterns upon Linoleum or Like Fabrics, (for which a patent has been granted to us by the government of Great Britain and Ireland, No. 11,716, dated June 17, 1895,) of which the following is a specification.

This invention relates to certain improvements in the method of producing inlaid colored designs upon linoleum surfaces, and has for its object the printing of paints or of coloring-matters soluble in oil upon linoleum, corticine, and like fabrics in such a manner that the pigment or coloring-matters, with their vehicles, penetrate to a greater or less extent the substance of the linoleum, and in this respect the printed fabric made by our process differs from that made by the ordinary process, in which the pigments lie upon the surface only. The utility of the fabric made according to this invention is that the pattern does not wear away with the wearing away of the surface.

To accomplish our object, we bring the paint or coloring-matter into contact with the upper surface of the material which is to form the linoleum while it is in a porous state, before being finally compressed into the consolidated form. The preparation of the linoleum material, consisting of powdered cork or wood-fiber, pigment, and linoleum cement or corticine oil in intimate mixture, is well understood by makers of plain linoleum. This composition is distributed upon the ordinary backing-cloth and subjected to light pressure in our process, in the first instance, at the ordinary or a slightly-elevated temperature, thus forming a porous mass easily penetrated by the paint or coloring-matter. To apply the coloring to the surface of the porous linoleum, we take a sheet of calico or stout cartridge-paper in dimensions equal to the piece of linoleum to be made and prepare it with size or other suitable material in order to make a non-porous tissue. We print upon this tissue the pattern to be produced upon

the linoleum by means of hand-blocks or a color-printing machine, taking care that the paint or solution of coloring-matter contains as much pigment or color intensity as possible and print it thickly upon the tissue.

In order to prevent the different colors running into each other when printed upon the tissue, we dust over each color, after printing, a small quantity of the fine linoleum composition, removing excess by a sufficiently strong blast of air. If direct printing blocks or rollers are employed, the pattern on the finished linoleum will be reversed.

The porous linoleum is prepared by distributing the linoleum material evenly upon ordinary jute backing-cloth by any suitable means, drawing it through and between metal rollers, the upper one of which is polished, capable of being heated by hot water or steam, and set the necessary distance from the lower one to produce the thickness of linoleum required. As the cloth issues from the rollers the printed tissue is laid face side upon it, and the two together are carried forward around the lower half of a heated metal roller supplied with a stout linen apron or band capable of being adjusted so as to bring pressure to bear upon the cloth and tissue passing between it and the roller, and thus the design is transferred from the tissue to the cloth. The pressure during this transforming action is sufficient to cause the colors to penetrate to the backing. This is an important step in our process, as the colors are not applied in such quantity as to soak through the porous material, but by the pressure applied immediately after the printing the colors are forced through to the backing material, the quantity of color being so determined as to secure a thorough impregnation of the porous material under this pressure. By this means the paint or coloring-matter dissolved in oil is thoroughly absorbed by the porous linoleum. After passing out of the apron the cloth goes forward to be finally pressed, either by means of a hydraulic press with heated polished plate or by passing through heated calender-rollers, after which the tissue is stripped from the surface by any suitable means.

Instead of applying the color by means of

a tissue, we may use printing blocks or rollers applied direct to the lightly-pressed surface of the porous composition. The composition requires to be compressed to such an extent that the blocks show no tendency to lift loose particles of the composition.

In case we require the colored or inlaid effect to penetrate the entire thickness of the linoleum, the printing-blocks are faced with felt, chamois leather, or some other device to enable them to carry a larger amount of paint or coloring. For the thicker qualities of linoleum, two or more applications of each block are necessary.

We have found it to be desirable that the vehicle used for carrying the pigment or color into the pores of the linoleum material should consist in great parts of volatile liquid capable of being removed by stoving. Otherwise it would be impossible to finally compress the fabric to the required density.

We find that the introduction of the necessary quantity of liquid material to accomplish our object into the linoleum substance by the printing operation would cause the colors to run if the fabric was consolidated at once. It is therefore necessary to only partially consolidate it at this stage in order to cause the colors to penetrate and to give the fabric strength, so that it may be placed in a stove for some hours in order to remove the greater and more volatile portion of the vehicle, after which the linoleum may be finally pressed without fear of damaging the outlines.

As an example of the manner in which we prepare pigments and coloring-matters for use in our process the following will suffice.

Pigment coloring.—The required pigment, such as burnt umber, flake white, or ultramarine, is ground to a stiff impalpable paste along with boiled or oxidized linseed-oil. Take five parts pigment paste, two parts semisolid oxidized linseed-oil, three parts petroleum, (specific gravity 812,) two parts turpentine, two parts benzol, and one-half part resin. The semisolid oxidized linseed-oil and resin are melted in the petroleum and turpentine and the benzol is added on cooling, forming the vehicle for carrying the pigment down into the pores of the material. The pasty pigment is then mixed in.

Soluble coloring.—The vehicle is prepared as above, only using a smaller proportion of petroleum. While still warm, .05 parts or thereabouts of rosaniline base are added, together with sufficient linoleic acid to render the coloring soluble. After the final pressing the linoleum is aged in the ordinary manner.

Figure 1 in the accompanying drawings shows the machinery employed for producing the porous linoleum as arranged for use in conjunction with a continuous-printing machine for printing the tissue transfer. Fig. 2 is a plan of same. Fig. 3 shows the machine for preparing porous linoleum for direct printing by means of blocks. Fig. 4

is a plan view. Fig. 5 is a sectional view of a hydraulic press.

We do not show details of the printing-machine, because we do not lay claim to the use of any particular form of machine, but we prefer to use one in which the paints or colors are printed by blocks, provided with an automatic feed, descending vertically upon the tissue.

A and B are two smooth-faced metal rollers capable of being heated by steam or hot water, and geared so that their surface-speed is the same. These rollers are set the necessary distance apart to produce the thickness of porous linoleum required when the fabric and composition are drawn between them by the action of the apron D, which has the same surface speed as the rollers A B.

The apron D consists of a stout linen or composition band of the same width as the rollers A B. It revolves round the three rollers C E F. The bearings of roller C move in slides to allow the tension of the apron to be modified.

N is a small felt-covered roller running by friction on roller A to coat same with a thin film of oil.

The shaft I serves to transmit a reciprocating motion to the hopper G and doctors H in a direction at right angles to the fabric, thereby assisting the even distribution of the linoleum meal upon the fabric.

J is a roll of canvas backing-cloth, and K a device for varnishing or sizing the face of the cloth.

The space at L between the machine-frame and tissue-roll O is occupied by the continuous-printing machine (not shown, but of any suitable construction) for printing the tissue transfer.

When the machine is in operation, the backing-cloth Q after passing the varnishing device moves on to the machine-bed S and under the reciprocating hopper G, from which it receives a regulated amount of linoleum meal. It then passes under the doctors H, also reciprocating, where the meal is leveled down upon the fabric to a uniform depth. The coated fabric is then drawn between the rollers A B, when the composition is compressed to the necessary porous condition. The porous linoleum then travels around the periphery of the roller B till it arrives at the point R, where it meets the printed tissue T, and the two together pass between the apron D and the roller B, where they are united, then around the roller E and are finally wound upon the collecting-roller M.

Referring to Figs. 3 and 4, A' and B' are the press-plates, capable of being heated. The upper plate B' has a rising-and-falling motion derived from the rods C' C', in conjunction with the rotating shaft D' and disk-plates E' E'. The crank-pins work in slots in order that the traverse of the upper plate may be regulated. F' F' are guides. The shaft I' and the forked arms J' J' serve to

give the necessary reciprocating motion to the hopper G' and doctors H'. The feed-roller K' is covered with card-clothing and provided with a ratchet-wheel M', which is actuated in such a manner by the levers L' I' that the fabric is drawn the necessary distance forward in the direction of arrow as soon as the upper press-plate B' is raised. N' is the roll of backing-cloth and O' the varnishing device.

Fig. 5 shows a sectional elevation of a hydraulic press suitable for consolidating the linoleum and may be fixed in any convenient position near to the linoleum-machine. A² is the hydraulic-press ram; A³, the press-plate; B², the linoleum to be consolidated; C², the pressing-tissue moving around rollers D² D³ D². This tissue prevents the upper or press plate A³ from becoming soiled by the paints and colors upon the surface of the linoleum, which at this stage are not quite dry. The soiled tissue is cleansed by a suitable medium in the trough E².

What we claim is—

1. The herein-described process of producing linoleum and like fabrics consisting in applying the material to produce the fabric evenly to the surface of a backing-cloth using such pressure as to cause the material to adhere to the said backing-cloth in the form of a light porous spongy mass then applying the coloring-matter to the porous surface so that the colors are absorbed, pressing the material so as to cause the colors to penetrate to the backing, and afterward consolidating the fabric by pressure.

2. The herein-described process of producing linoleum and like fabrics consisting in applying the material to produce the fabric

evenly to the surface of a backing-cloth using such pressure as to cause the material to adhere to the said backing-cloth in the form of a light porous spongy mass then applying the coloring-matter to the porous surface so that the colors are absorbed, pressing the material so as to cause the colors to penetrate to the backing, then removing the volatile ingredients by means of heat and finally consolidating the fabric by pressure.

3. The herein-described process consisting in applying linoleum material to a backing-cloth so as to form a light porous adhesive mass then applying coloring-matter suspended in a vehicle consisting for the most part of volatile ingredients capable of being removed by stoving the fabric then subjecting it to moderate pressure to cause the colors to penetrate to the backing stoving to remove volatile ingredients and finally consolidating the fabric by pressure.

4. In a linoleum-making machine, the combination of the guiding and supporting means for the backing, means for applying the material to the backing, means for lightly pressing the linoleum material upon the backing to form a light porous and spongy mass and means for applying the colors to the porous mass and for pressing the same to cause the colors to penetrate the mass, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAMES EDWARD BEDFORD.
CHARLES SAMUEL BEDFORD.

Witnesses:

WM. PREST,
JNO. GILL.