

(No Model.)

W. N. CORNELL.  
MEANS FOR COLORING PAPER.

No. 486,629.

Patented Nov. 22, 1892.

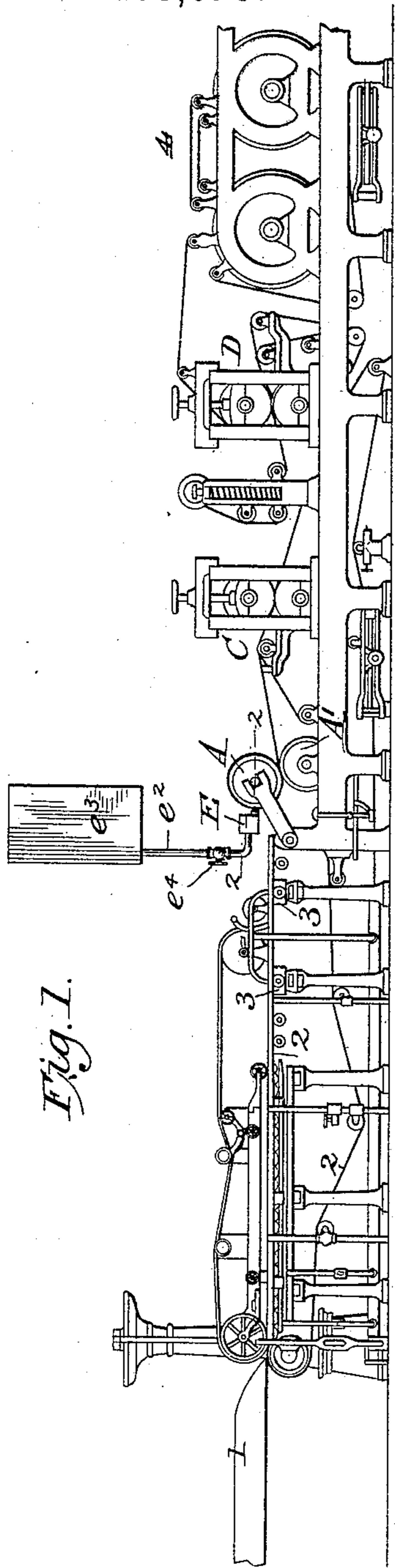


Fig. 1.

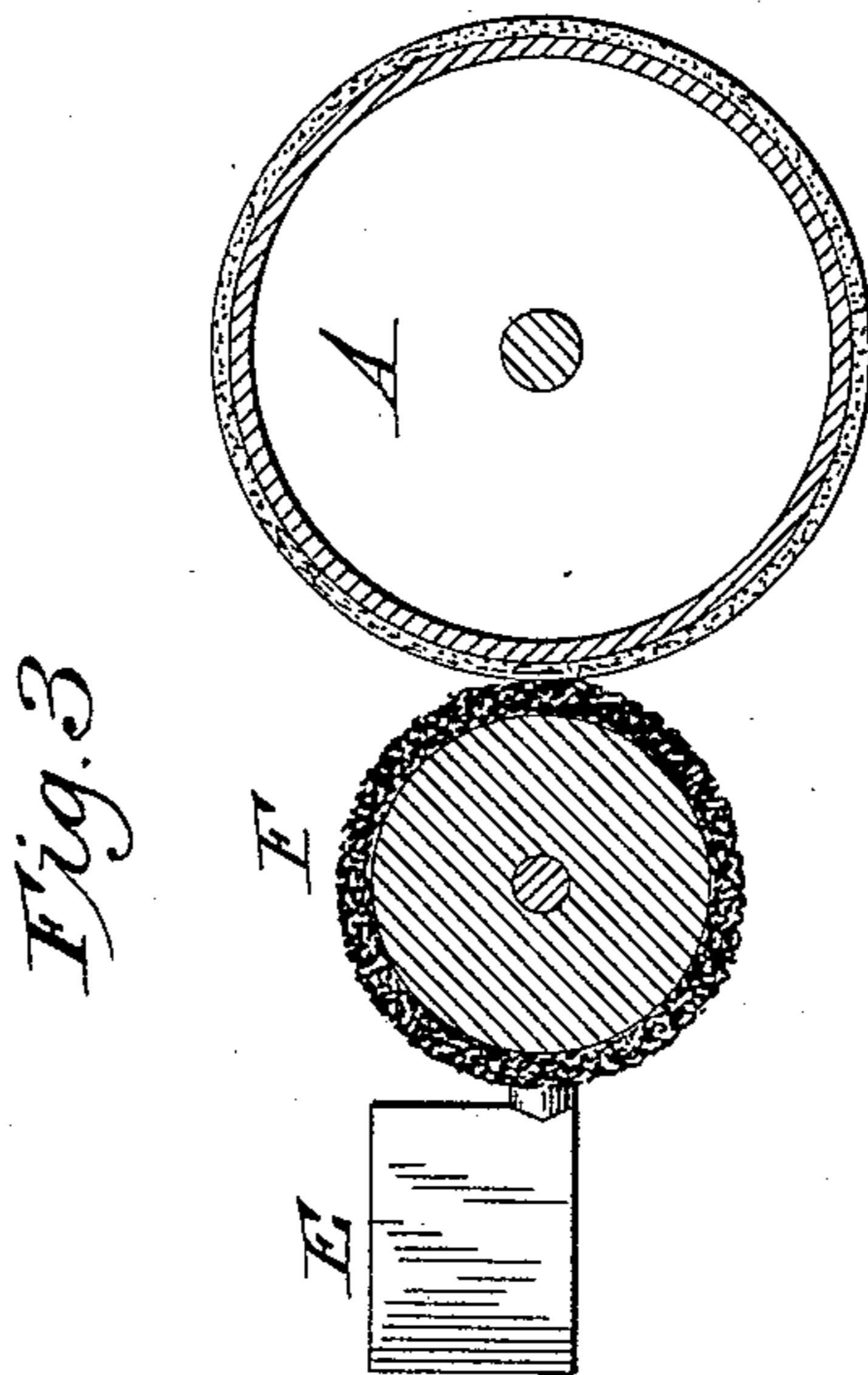


Fig. 3

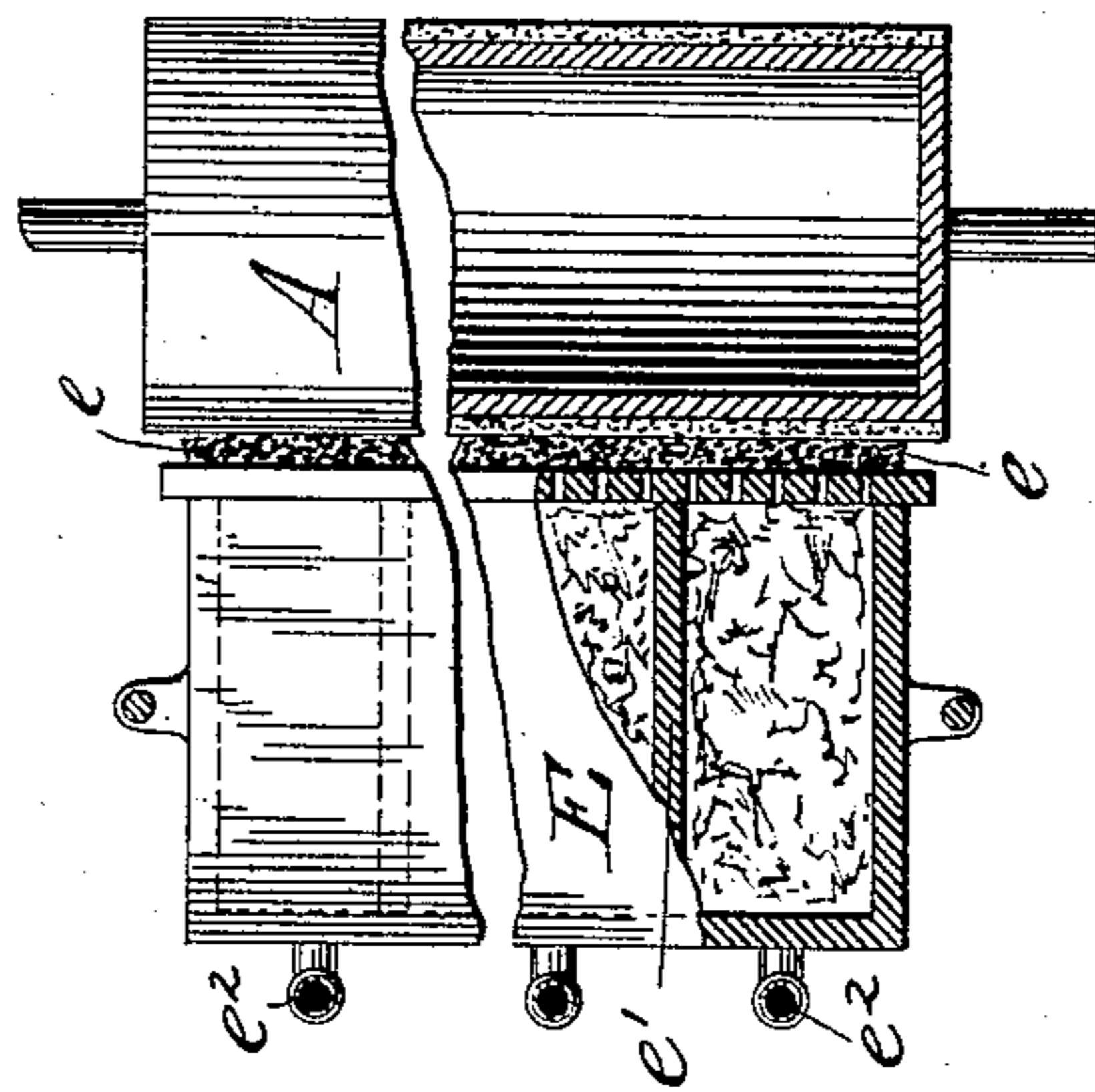


Fig. 2  
ON LINE 2-2

Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM N. CORNELL, OF BROWNSVILLE, NEW YORK.

## MEANS FOR COLORING PAPER.

SPECIFICATION forming part of Letters Patent No. 486,629, dated November 22, 1892.

Application filed October 29, 1890. Serial No. 369,684. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM N. CORNELL, of Brownsville, in the county of Jefferson and State of New York, have invented certain Improvements in Means for Coloring Paper, of which the following is a specification.

The object of my invention is to economically color paper; and it consists in an improved mechanism for coloring the same in the course of its manufacture.

In practicing my invention the stock or pulp is first deprived of its surplus water and partly formed into a web or sheet. This web is then subjected to a slight pressure against a textile surface, to which is applied a coloring liquid, which latter is in turn transferred to the web as it receives this slight pressure. The web is then subjected to further pressure and finally dried. By applying the color at this particular stage in the course of its manufacture while the sheet is soft and absorbent and charged with moisture, which aids in the distribution of the color, I am enabled to obtain results which are satisfactory in all respects and differ from those which would follow its application at an earlier or later stage by reason of the excess of moisture which the stock contains in the first instance and the density and comparative dryness in the latter. Either a single color may be applied to the sheet or it may receive a series of distinct longitudinal stripes of different colors, as the fancy may dictate and by means of the mechanism hereinafter described.

I have represented in the drawings as suitable for carrying into practice my invention an ordinary Fourdrinier paper-making machine and an attachment for applying to the couch-roll the coloring liquid; but it is to be understood that other and modified mechanisms may be employed for this purpose, provided the stock is first deprived of its surplus moisture and partly formed into a sheet, then subjected to a slight pressure against the textile surface, by which the coloring liquid is applied, and finally pressed and dried.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section through an ordinary Fourdrinier paper-machine with attachments thereto suitable for carrying into effect my invention. Fig. 2 is a sectional elevation of the color-distributing apparatus and

the adjacent textile-covered couch-roll on the line 2 2 of the preceding figure. Fig. 3 is a vertical section through the color-distributing devices and the adjacent couch-roll with a roll in place of the stationary distributor.

Referring to the drawings, by means of the mechanism represented in the accompanying drawings the stock is deposited by the feed-apron 1 upon the making-wire 2, by which it is carried over suction-boxes 3 3. By this time the surplus water has been removed and the stock formed into a web or sheet. In this condition it is carried beneath the felt-covered couch-roll A and over the couch-roll A' and by them subjected to a slight pressure, at the same time receiving from the roll A the coloring liquid, as more fully described hereinafter. The couch-roll may be and ordinarily is saturated constantly with water on its downgoing side from an overlying pipe, as in the ordinary Fourdrinier machines. From this point the web is carried to the first press-rolls C, thence to the second press-rolls D, and finally to the drying-rolls 4, by which it is thoroughly dried.

The foregoing parts may be of usual and ordinary construction, and the steps recited, with the exception of the application of the coloring liquid, represent the treatment to which the paper is subjected in an ordinary Fourdrinier machine.

In adapting my machine to carry out my invention I arrange adjacent to the upper couch-roll A, lengthwise thereof, a box or reservoir E to contain the fluid color and provide the same on its face with a layer of sponge or other soft absorbent material *e*, bearing lightly on the surface of the couch-roll. The reservoir is provided in its front with openings, through which the color flows to the absorbent facing *e*, by which it is transferred to the wet felt surface of the couch-roll A, which in turn transfers it to the soft damp sheet of paper passing thereunder.

When a single color is to be applied throughout the width of the sheet, the reservoir may be constructed with a single chamber; but in order to adapt the machine for the application of several colors in longitudinal stripes the reservoir is divided, as shown in Fig. 2, by transverse partitions *e'* into a series of compartments, each of which may contain a

distinct color. These colors, passing through the respective compartments to different portions of the surface  $e$ , will be laid separately upon the roll in circumferential bands or stripes and laid by the roll in like manner upon the sheet. The damp surface of the roll will cause a slight blending of the colors, so that if they are judiciously selected and arranged very pleasing effects may be produced upon the sheet. The reservoir-chamber may be supplied with color from any suitable source; but I prefer to fill each chamber with sponge or other absorbent material and supply it with coloring material through a pipe  $e^2$  from an elevated tank  $e^3$ , the supply-pipe being provided with a valve  $e^4$  to control the delivery.

Instead of applying the color by means of the stationary surface  $e$  I may in some cases employ in connection with the couch-roll and as an equivalent of the stationary surface a roll  $F$ , covered with sponge or other soft material and acting against the couch-roll. This second roll  $F$  may be supplied with color through perforations from the box or reservoir  $E$  or otherwise supplied. The surface of the roll  $F$  may be provided with raised designs of any suitable character in order to secure the delivery of the color to the couch-roll and thence to the paper in ornamental designs or figures.

My manner of coloring paper by applying the coloring liquid to a textile surface against which the web is slightly pressed after the surplus water has been removed, as described,

is not to be confounded with mechanisms in which the color is applied at an earlier stage in the course of manufacture, for the reason that if applied earlier the web containing a much greater degree of moisture will not take the color freely, and where distinct colors are employed they will run and mingle, so that the results are not satisfactory; nor is it to be confounded with mechanisms in which the coloring liquid is applied at a later stage, in which cases, the web being comparatively dense and dry, the color will not be absorbed in the same manner nor will the effects and appearance be the same.

Applying the color as I do the paper is in a condition which peculiarly adapts it to receive and absorb the coloring liquid in such a manner and to such a degree that the general appearance is characteristic and different from that presented by paper colored in any other manner.

Having thus described my invention, what I claim is—

In a paper-making machine, the combination, with the making-wire and the couch-roll, of suitable mechanism for applying to the couch-roll a coloring liquid, substantially as described.

In testimony whereof I hereunto set my hand, this 8th day of October, 1890, in the presence of two attesting witnesses.

WILLIAM N. CORNELL.

Witnesses:

PHILIP T. DODGE,  
W. W. MORTIMER.