

(No Model.)

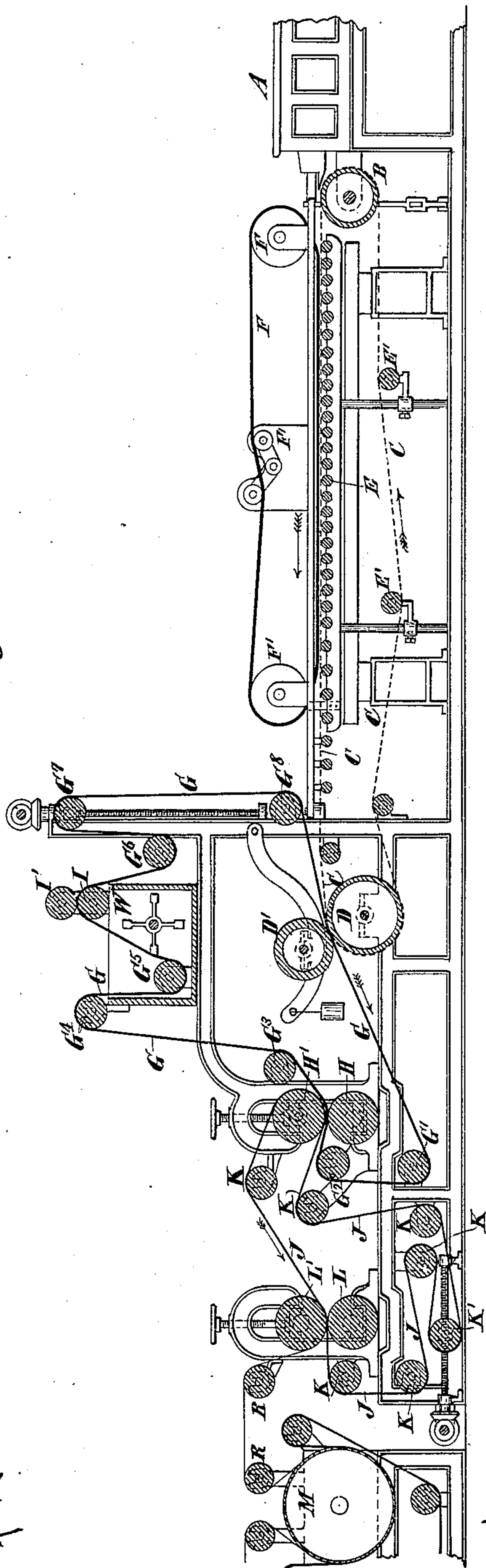
2 Sheets—Sheet 1.

W. F. EDWARDS.  
PAPER MAKING MACHINE.

No. 334,072.

Patented Jan. 12, 1886.

Fig. 1



Witnesses  
Wm. G. Lipsey  
J. M. Bowen

Inventor  
W. F. Edwards  
by his attys,  
Gifford & Brown

(No Model.)

2 Sheets—Sheet 2.

W. F. EDWARDS.  
PAPER MAKING MACHINE.

No. 334,072.

Patented Jan. 12, 1886.

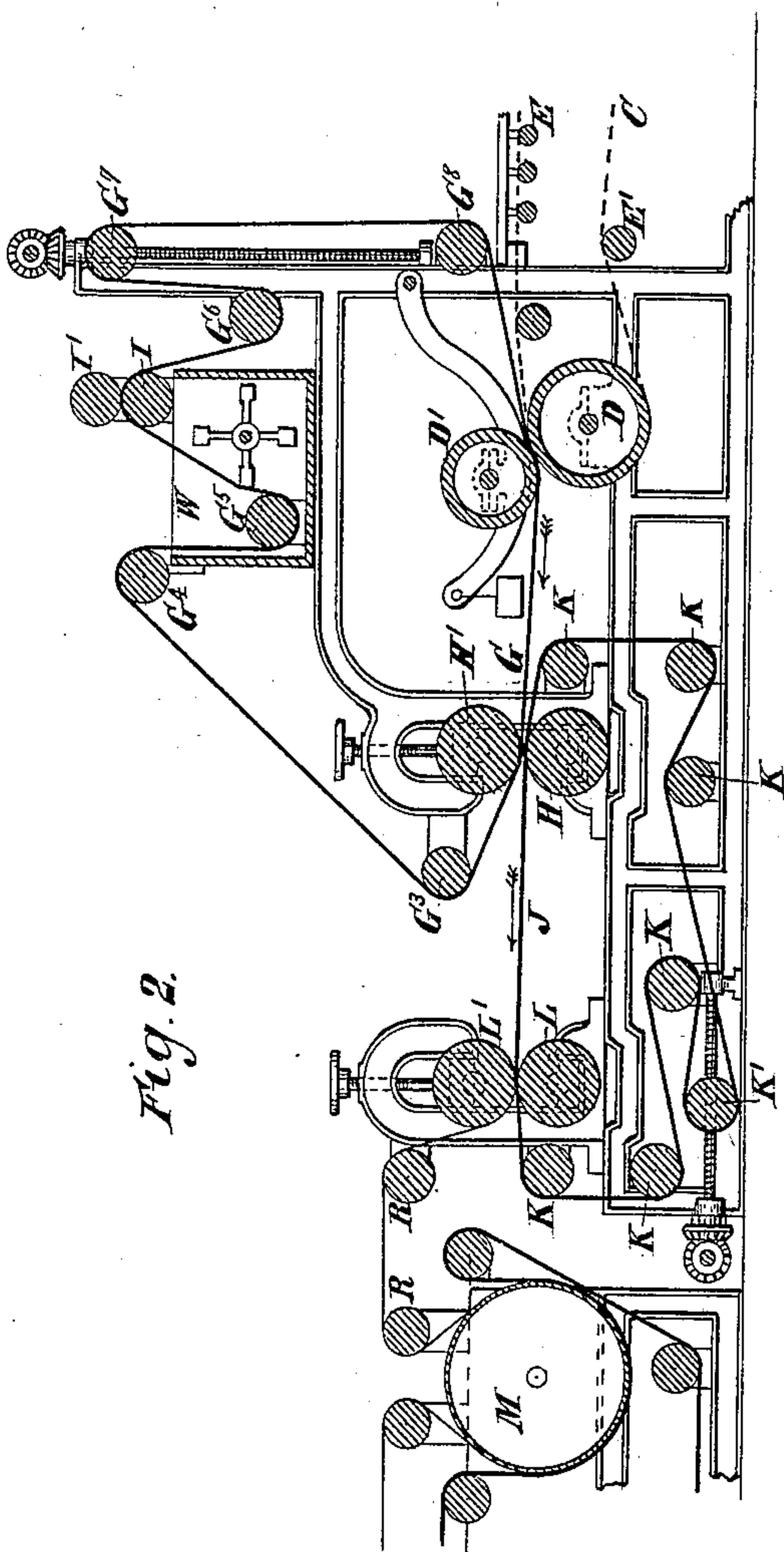


Fig. 2.

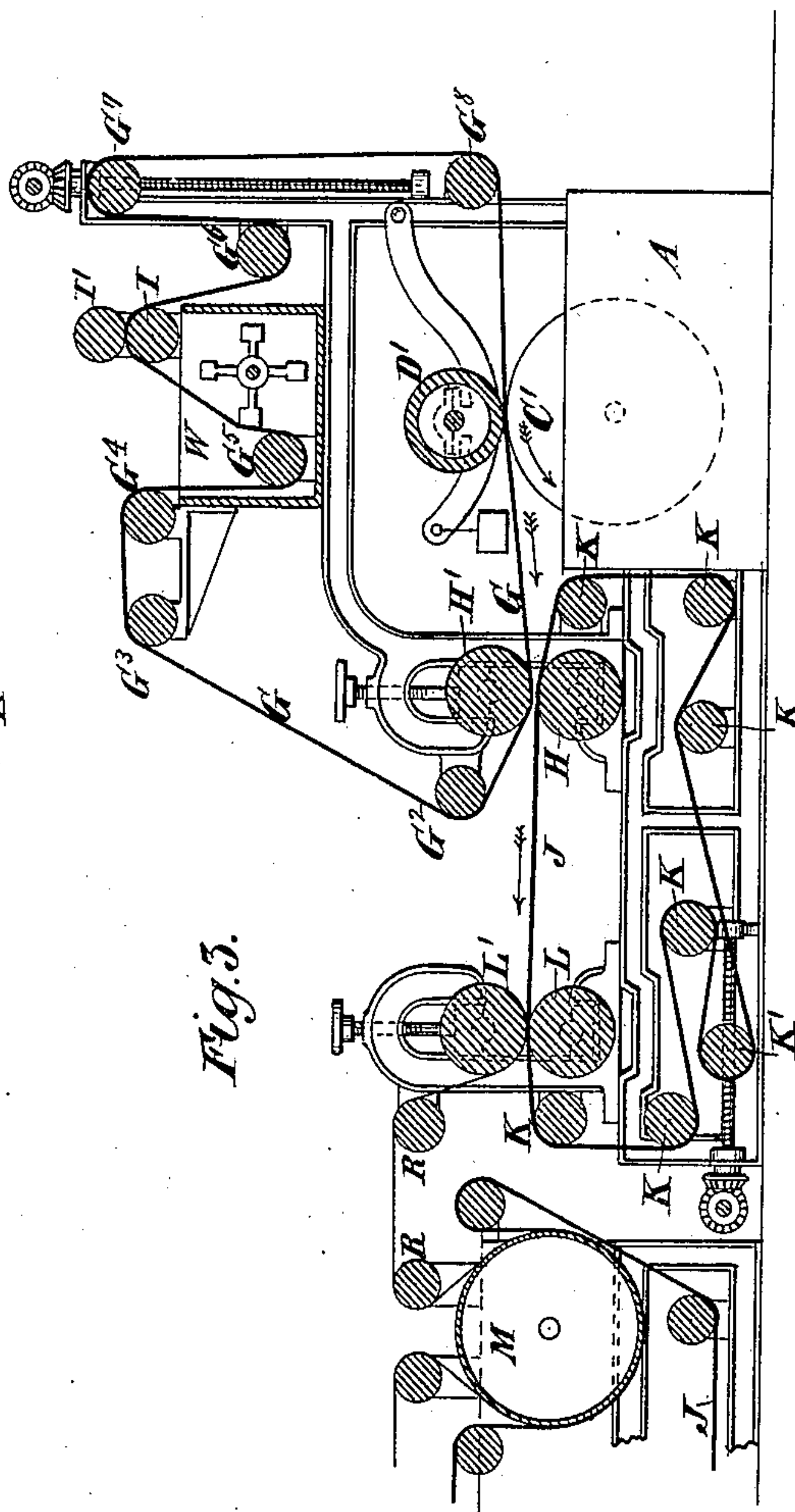


Fig. 3.

Witnesses  
W. L. Lacey  
J. R. Bowen.

Inventor  
William F. Edwards  
by his attorneys,  
Gifford & Brown.



# UNITED STATES PATENT OFFICE.

WILLIAM F. EDWARDS, OF SUMMIT, NEW JERSEY.

## PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 334,072, dated January 12, 1886.

Application filed May 8, 1885. Serial No. 164,770. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM F. EDWARDS, of Summit, in the county of Union and State of New Jersey, have invented a certain new and useful Improvement in Paper-Making Machines, of which the following is a specification.

I will describe a paper-making machine embodying my improvement, and then point out the various features in the claims.

In the accompanying drawings, Figure 1 is an elevation of a machine embodying my improvement. Fig. 2 is an elevation of a portion of the machine embodying a modification of a certain feature of my improvement. Fig. 3 is an elevation of a machine of a different style embodying my improvement.

Similar letters of reference designate corresponding parts in all the figures.

I will first describe the machine shown in Fig. 1.

A designates the pulp-vat. It may be of ordinary construction.

B designates the breast roll. It may be supported in any suitable bearings so as to be free to rotate. Around it passes an endless apron, C, which may be made of wire and reticulated, as usual. This apron constitutes the former for the paper-pulp, the paper-pulp attaining the initial form or dimensions upon it. This apron also passes around the lower couch-roll, D, of a pair of couch-rolls, D D'. The pressure of the upper couch-roll may be produced in the ordinary way. The upper portion of the apron, extending between the breast-roll and the couch-roll D, is supported by numerous small rollers, E. The lower portion of the apron passes around rollers E', which may be adjustable to vary the tension of the apron. The couch-rolls D D', the rollers E, and the rollers E' may be supported in bearings provided in any suitable frame. The breast-roll B and the couch-rolls D D' may have rotary motion imparted to them in any desirable manner.

The pulp flows from the pulp-vat onto the apron C. The apron has a shaking motion imparted to it, as usual, for distributing and felting the pulp upon it. Dekle-straps F, operating in conjunction with the upper portion of the apron, govern the width to which the

pulp is distributed. These dekle-straps pass around rollers F', suitably journaled, and their tension may be varied by adjusting certain of the rollers in a well-known manner. Liquid drains from the pulp through the apron.

G designates an endless apron, made preferably of felt. It passes between the couch-rolls D D', above the apron C. It also passes around rollers G' G<sup>2</sup>, between press-rolls H H', and around rollers G<sup>3</sup> G<sup>4</sup> G<sup>5</sup>, through a wash-box, W, between squeezing-rolls I I', and around rollers G<sup>6</sup>, G<sup>7</sup>, and G<sup>8</sup>. These rollers G' G<sup>2</sup> G<sup>3</sup> G<sup>4</sup> G<sup>5</sup> G<sup>6</sup> G<sup>7</sup> G<sup>8</sup> I I' and rolls H H' are journaled in suitable bearings in the frame of the machine. Provision may be made for adjusting one of the press-rolls toward its fellow in the ordinary way. The squeezing-rolls express liquid from the apron G before it returns to the couch-rolls.

Motion may be imparted to the apron G and the press rolls H H', and the squeezing-rolls I I' may be operated in any desirable manner.

When the aprons C and G pass between the couch-rolls, liquid is expressed from the pulp. Some is absorbed by the apron G. The pulp then adheres to the apron G, leaving the apron C. It is then carried along directly forward from the couch-rolls on the under side of the lower portion of the apron G. As the apron G ascends after passing around the roller G', and after passing around the roller G<sup>2</sup> moves approximately in a horizontal direction, the side to which the pulp adheres becomes the upper side before passing between the press-rolls H H'.

J designates another endless apron. It will preferably be made of felt. It passes between the press-rolls H H' above the endless apron G, around the upper press-roll H'. It also passes around guide-rollers K K' and between press-rolls L L', supported in suitable bearings in the frame of the machine. The guide-roller K' is adjustable for tightening the apron. After passing with the apron J between the press-rolls L L', the paper runs around guide-rollers R to and around a drying-cylinder M.

When the endless aprons G and J together pass between the press-rolls H H', liquid is expressed from the pulp. As the endless apron G has already become saturated, the flow of liquid will be greater into the apron



J than into the apron G. This will induce the pulp to adhere to the apron J rather than to the apron G. By making the apron J of a finer grade of felt than the apron G, I increase the tendency of the pulp to leave the apron G and adhere to the apron J. The finer grade of felt will also be better for the paper. It will be understood that the pulp is transferred from the upper side of the apron G to the under side of the apron J in this example of my invention. One side of the paper-pulp comes in contact with the endless apron G and the other side comes in contact with the endless apron J.

In Fig. 2 I have shown that the paper-pulp may be transferred from under side of the endless apron G to the upperside of the endless apron J. Here the endless apron G passes directly forward from the couch-rolls D D' to the press-rolls H H', thence around guide-rollers G<sup>2</sup> G<sup>3</sup> G<sup>4</sup> G<sup>5</sup>, through a wash-box, W, between squeezing-rolls I I', and around guide-rollers G<sup>6</sup>, G<sup>7</sup>, and G<sup>8</sup>, and back to the couch-rolls. The endless apron J passes directly forward from the press-rolls H H' to the press-rolls L L', and thence around the guide-rollers K K' back to the press-rolls H H'.

In the example of my invention shown in Fig. 3, the paper-pulp former C shown in Fig. 1 and the appurtenances thereof are omitted, and in lieu thereof a former consisting of a cylinder, C', is used. This cylinder has its periphery made of wire-cloth, and portions thereof are covered with muslin or like material to limit the width of paper-pulp which will adhere. The cylinder is journaled in a pulp-vat, A, and it is rotated therein. The lower portion runs in the pulp. A suction-pump communicates with the interior of the cylinder in a well-known manner, and by producing a flow of water to the interior of the cylinder causes the adherence of the pulp. The water received by the pump may be wholly or partly returned to the pulp-vat. Only one couch-roll, D', is used in this example of my invention. It is arranged immediately above the cylinder C'. The endless apron G passes between it and the cylinder C', and takes the paper-pulp on its under side from the cylinder and carries it directly forward. The end-

less apron G passes from the couch-roll D' to the press-rolls H H'. Turning around the upper press-roll, it passes thence around guide-rollers G<sup>2</sup> G<sup>3</sup> G<sup>4</sup> G<sup>5</sup>, through a wash-box, W, between squeezing-rolls I I', and around guide-rollers G<sup>6</sup> and G<sup>8</sup> back to the cylinder C' and couch-roll D'. The endless apron J, in this example of my invention, passes between the press-rolls H H' below the endless apron G. It passes thence directly forward to the press-rolls L L', and thence around guide-rolls K K' back to the press-rolls H H'. The paper-pulp is here transferred from the under side of the endless apron G to the upper side of the endless apron J.

It will be seen that by transferring the pulp from apron to apron in the manner described I avoid having to transfer the pulp by manual labor and the distortion incident thereto, that I avoid running the pulp backward, and that I obviate any obstruction over the wire apron C, except that offered by the dekle-straps and their appurtenances, leaving that space free for the work necessary from the attendants of the machine.

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

1. In a paper-making machine, the combination, with a former for the paper-pulp, of a couch-roll above the former and an endless apron passing above the former and below the said couch-roll, and taking the paper-pulp on its under side from the former, and carrying the same away directly forward of the couch-roll and away from over it, substantially as specified.

2. In a paper-making machine, the combination, with a former for the paper-pulp, of an endless apron for taking the paper-pulp upon its under side directly from the former and carrying it away to press-rolls, and another endless apron passing with the first endless apron between the said press-rolls, and taking the paper-pulp away to a second pair of press-rolls, substantially as specified.

WM. F. EDWARDS.

Witnesses:

J. R. BOWEN,  
W. G. LIPSEY.