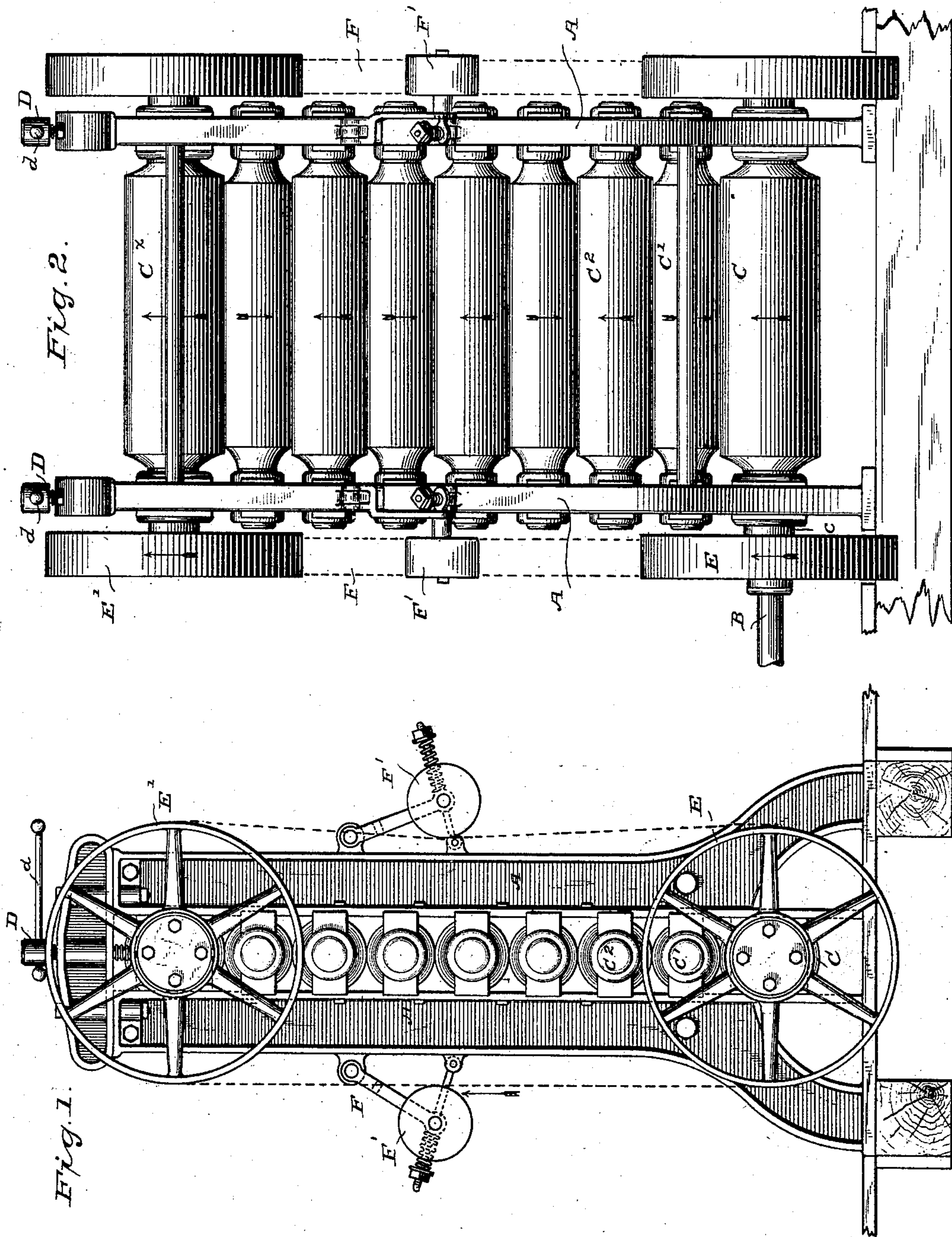


(No Model.)

P. R. THOM.
PAPER CALENDERING MACHINE.

No. 359,294.

Patented Mar. 15, 1887.



Witnesses

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UNITED STATES PATENT OFFICE.

PETER R. THOM, OF APPLETON, WISCONSIN.

PAPER-CALENDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 359,294, dated March 15, 1887.

Application filed July 10, 1886. Serial No. 207,681. (No model.)

To all whom it may concern:

Be it known that I, PETER R. THOM, a citizen of the United States, residing at Appleton, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Paper - Calendering Machines, of which the following is a specification.

In calendering paper it is customary to use a stack of superposed rollers alternately of iron and of paper, all driven from the bottom roll or calender by the frictional contact of their peripheries. There might be a pile of nine rolls arranged vertically, one above the other—the first a metal roll of comparatively large diameter, the second a paper roll of smaller diameter, the third a metal roll of somewhat larger diameter than the paper roll, and so on—and the bottom roll was the only one driven, motion being imparted to all the others by frictional contact with the one immediately beneath. The bottom roll, therefore, being the driver, was speedily worn out, and so were the ones adjacent to it in proportion to the labor placed upon them in driving those above. Besides this, through slip, the imparted motion diminished gradually from the lower rolls to the upper roll, which would go slightly slower, at least at times, than the bottom roll. The sheet or web to be calendered, entering at the top, would therefore be fed slower than the possible feed at the bottom, and the pull at the bottom would impart a greater strain than might be desirable.

In my invention it is proposed to drive the bottom and the top rolls both positively at equal peripheral speed, they being of the same diameter, or at such peripheral speed as shall make the one equal to the other, or establish the desired relation in their movement, all the intermediate rolls being driven from these two, the bottom roll driving upward and the top roll driving downward. This diminishes the labor of the lower roll or diminishes the wear upon its periphery and upon the periphery of those adjacent to it, because the upper roll takes its own share. It also equalizes the speed from top to bottom and avoids slip. Second, I propose as the preferable method of accomplishing this driving of top and bottom rolls simultaneously to place a pulley on the

gudgeon of the lower roll and a pulley on the gudgeon of the upper roll, and connect the two by a belt driving the lower roll by connection with a suitable engine, and transmitting motion to the upper by the belt. Third, in order to prevent the strain of the belt from causing greater pressure on one end of the series of rolls than on the other, and also to enable me to reduce the face of the pulleys, I deem it advisable to locate the latter at both ends of the lower and upper rolls or calenders, using two belts.

In the drawings, Figure 1 is a side elevation of a stack of calender-rolls embodying my invention, and Fig. 2 a rear elevation thereof.

A represents the housings for the journal-boxes of the series of rolls, and B a shaft by which motion is communicated from any suitable source to the lower roll or calender. This shaft is connected by a face or clutch coupling, c, with the gudgeon of the lower roll, C, and upon said lower roll is superposed a roll, C', of less diameter and formed of paper. Next above this is another roll, C², of iron, and herein shown as of greater diameter than the paper-roll, but not equal to the diameter of the bottom roll, as customary in these machines. Following these in regular order are superposed alternately paper and iron rolls or calenders, until the upper iron roll, C^x, is reached, which is properly of the same diameter as the bottommost roll. Screws D, passing through the cap-plates of the housings and provided with levers or hand-holds d, enable the pressure of the calenders, one upon the other, to be increased or diminished at pleasure.

Now, as already intimated, stacks or series of superposed calenders, as just described and illustrated, have commonly been driven from the lower roll or calender by the frictional contact of the face of that roll with the face of the roll next above it, and in turn of the latter roll with the next superposed one, and so on to the top of the series. In my invention, however, I drive both the upper and lower rolls positively, and at such peripheral speed that the upper roll imparts motion to the one beneath it by frictional contact co-ordinately with or in a defined relation with the motion imparted by the lower roll to the one above it by like contact, and thus the series are driven

both from top and bottom, and the liability to slip, if any, is diminished to a minimum, the two driving forces meeting at the center of the stack, where they will be practically
 5 equal or retain their given relation. In accomplishing this I may use any appropriate means for imparting the positive motion to the upper roll and turning it in concord with the lower roll; but the simplest and most effective
 10 now known to me is as follows: Upon the gudgeon of the lower roll, outside of the housing, if compactness is desired, I place a pulley, E, and upon the gudgeon of the upper roll I place an equal pulley, E', provided the rolls
 15 are of equal diameter and to be driven at identical speed, and if not then one of proportionate size, and over these I throw a belt, F, applying any suitable belt-tightener, as F', to take up slack in this belt. The motion im-
 20 parted to the lower roll from the driving-shaft will therefore be at once transmitted to the upper roll by means of the belt, and this latter roll will drive downward while the other is driven up, and thus the intermediate rolls be
 25 driven both from top and bottom by frictional contact, distributing the labor throughout.

Although the pulleys can be placed at one end of the roll only, it is better to place them at both ends, as shown, employing two belts.
 30 This will enable pulleys of less face to be used, and better serve to equalize the driving-power and the pressure along the contacting-face of the rolls, and accordingly serve to keep the journals of the rolls cool and their faces of
 35 more uniform wear.

I am aware that belts have heretofore been thrown over the ends of superposed calenders, as in Letters Patent No. 124,048, granted John H. Garfield on the 27th day of February, 1872,
 40 but these were not intended for driving, but were themselves driven from the rolls, with

their faces in contact, for the purpose of aiding in the insertion of the web between the rolls after it had, through any contingency, become disconnected, and such I do not claim; 45
 but

What I do claim is—

1. The combination, substantially as hereinbefore set forth, in a stack of calender-rolls, of top and bottom rolls positively driven, and in- 50
 termediate rolls driven by frictional contact from said top and bottom rolls.

2. The combination, substantially as hereinbefore set forth, in a series of calender-rolls, of a bottom roll; connections between said bot- 55
 tom roll and a motor, a pulley on the gudgeon of said bottom roll, a top roll having an opposing pulley on its gudgeon, and a belt connecting the two pulleys, whereby the intermediate pulleys are driven from said top and bot- 60
 tom rolls.

3. The combination, substantially as hereinbefore set forth, in a stack of calender-rolls, of a bottom roll having a pulley upon each gudgeon, a connection between said bottom roll 65
 and a suitable motor, a top roll also having pulleys on each gudgeon, and belts connecting the corresponding pulleys on the top and bottom rolls, whereby the inner rolls are driven both from the top and from the bottom. 70

4. The combination, substantially as hereinbefore set forth, in a calendering-stack, of the housings, calender-boxes mounted therein, the pressure-screws abutting against the upper boxes, the pulleys upon the gudgeons on the 75
 top and bottom rolls or calenders, the belt or belts connecting said pulleys, and a tightener.

PETER R. THOM.

Witnesses:

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