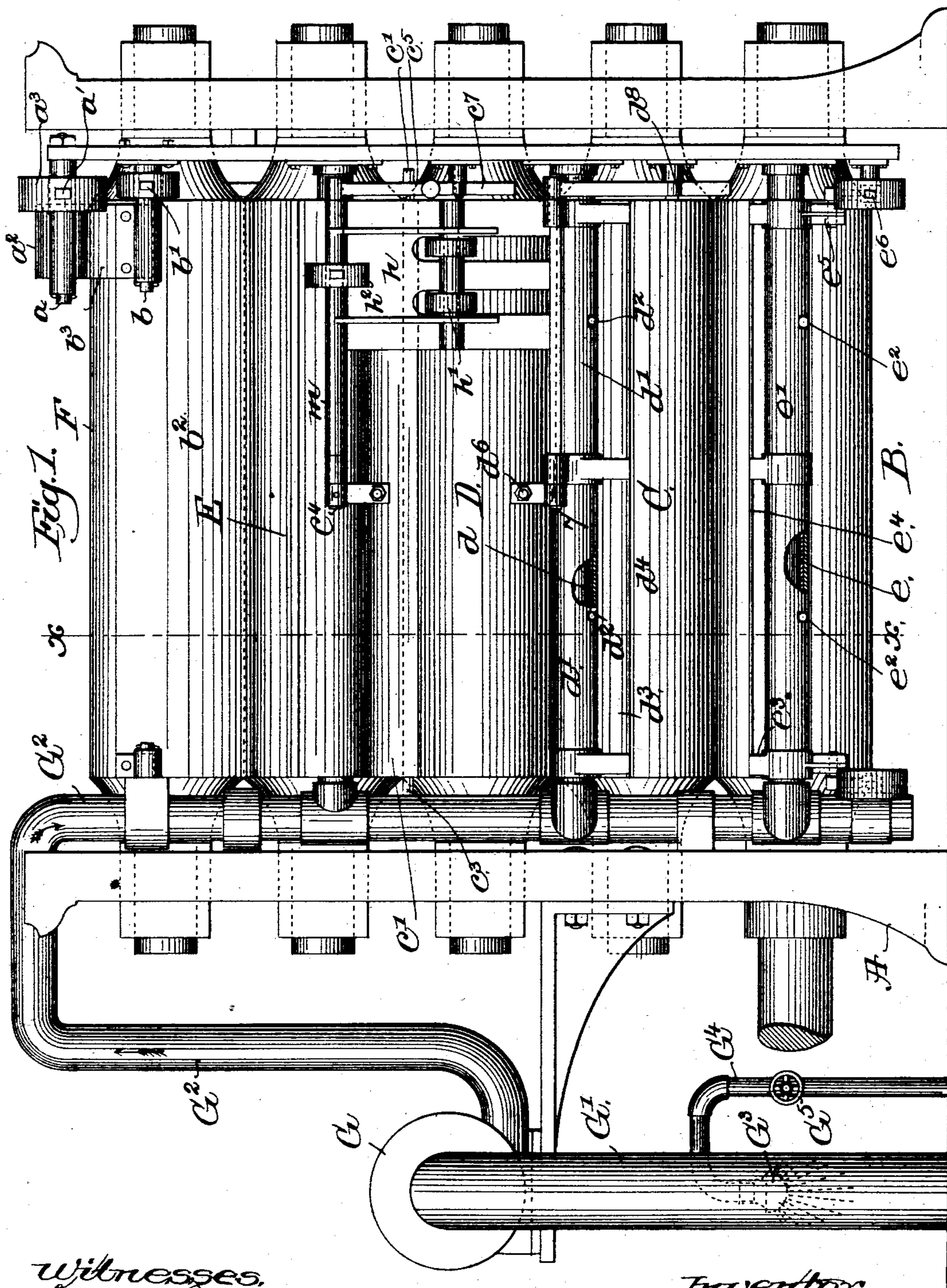


2 Sheets—Sheet 1.

No. 525,679.

Patented Sept. 4, 1894.



Witnesses,
Edward F. Allen.
Louis N. Howell

Inventor:
Peter Dillon
by Crosby & Gregory attys.

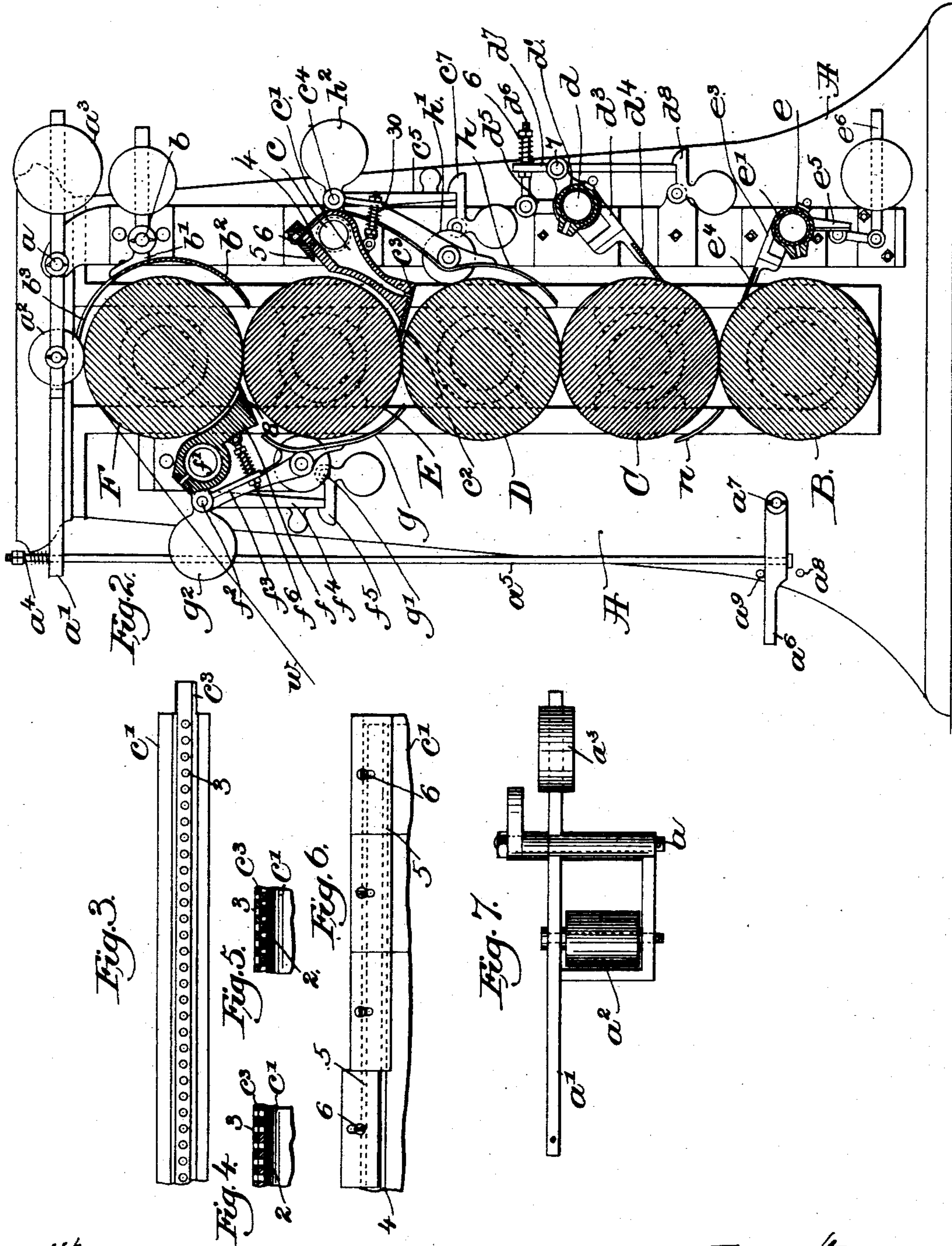
(No Model.)

2 Sheets—Sheet 2.

P. DILLON.
CALENDERING MACHINE.

No. 525,679.

Patented Sept. 4, 1894.



Witnesses.
Edward F. Allen.
Louis M. Howell

Inventor:
Peter Dillon
by Emory & Gregory attys.

UNITED STATES PATENT OFFICE.

PETER DILLON, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO JOHN HENRY HORNE, OF SAME PLACE.

CALENDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 525,679, dated September 4, 1894.

Application filed June 6, 1892. Serial No. 435,604. (No model.)

To all whom it may concern:

Be it known that I, PETER DILLON, a subject of the Queen of Great Britain, but residing at Lawrence, Essex county, State of Massachusetts, have invented an Improvement in Calendering-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention is intended as an improvement on that described in my Patent No. 485,534, dated November 1, 1892.

In this my present invention I have improved the construction of the guides for directing the free or leading end of the web of paper between the rolls; and have provided means for dampening the web.

Figure 1 in side elevation represents a sufficient portion of a calendering machine to enable my invention to be understood. Fig. 2, is a vertical section on the line $x-x$, Fig. 1. Fig. 3, is a lower end view of the shell plate for directing moist air against the web being calendered. Fig. 4 is a sectional elevation of parts of the throat of the shell plate, showing the delivery orifices open. Fig. 5 is a sectional elevation of parts of the throat of the shell plate, showing the delivery orifices closed. Fig. 6, is a detail looking at the inner side of the shell plate at its upper end. Fig. 7, is a top or plan view of the lever and roll which aid in feeding the end of the web into the machine.

The frame work A, the positively rotated bottom roll B and the rolls C, D, E, F, above it one lying on the other and all rotated from the bottom roll, are and may be all as common in calendering machines.

At the top of the frame work I have pivoted at a , a lever a' having a feeding roll a^2 and provided with a counterbalance a^3 which normally keeps the roll a^2 lifted from contact with the roll F. The outer end of lever a' supports a spring a^4 through which is extended a rod a^5 connected with a treadle a^6 pivoted at a^7 , and working between two stops a^8, a^9 , the spring a^4 being strong enough to sustain the weight of the rod and treadle.

When it is desired that the roller a^2 co-operate with the moving roll F to grasp and feed

the end of the web w into the machine the operator will put his foot on the treadle a^6 and depress the lever a' , the contact of the roller a^2 with the paper being a yielding one through the spring a^4 .

Immediately below the lever a' and at the farthest side of the roll F at b , I have pivoted a cross-bar b' , provided with a guide b^2 , and a finger b^3 , the latter substantially touching the roll a^2 and preventing any possibility of the leading end of the web getting over the guide b^2 .

At one side the calendering machine rolls I have located a blower or fan G which may be of any usual or suitable construction, said fan having an inlet pipe G' and a delivery pipe G^2 . In the inlet pipe I have mounted an atomizing or spraying nozzle G^3 connected to a pipe G^4 having a suitable valve G^5 by which to regulate the quantity of water to be sprayed and taken up and held in suspension by the air on its way to the blower.

This invention is not to be limited, however, to the particular construction shown for the nozzle or atomizer, as there are numerous devices for such purpose any one of which may be used to advantage according to the fineness desired for the spray. The water might be sprayed directly upon the paper were it not for the fact that such spraying cannot divide the particles of water with sufficient fineness to prevent the independent particles dampening the paper in separated spots, giving to fine grades of paper a pitted appearance, which is very objectionable. I have found in practice, however, that by spraying the water into the current of air first, as described, the air holds the water in suspension and causes still finer division of the particles, acting as a vehicle therefor, so that when the moisture laden air, as it may be called, is directed against the paper it will be evenly moistened or dampened. The pipe G^2 standing near the rolls B, C, is in communication with a series of branch pipes c, d, e . The pipe c enters loosely, but air tight, one end of a shell plate c' to the lower end of which is attached a clearer c^2 to co-operate with roll E, the opposite end of the shell plate being pivoted on the frame work. The lower end of the shell plate has a series of holes 2,

see Figs. 4 and 5, and co-operating with this part of the plate is a valve c^3 , shown as a slide bar having a series of holes 3. When these holes 2, 3, are in line, the moist air is delivered against the paper lying on the roll D, but when the holes are out of line the out-flow of moist air is checked. At its upper end the shell plate has a long slot 4, covered by a series of movable valve plates 5, held in adjusted position by set screws 6, and by adjusting these valves to cover, or more or less uncover said slot 4, more or less air may be discharged against the roll E at a point where the paper is not in contact with it. It is thus possible to cool the roll E, for the moisture laden air coming in contact with the warm roll is partially dried thereby, and consequently heat must be abstracted from the roll by the operation.

The pipes d and e are extended across the frame-work, and each pipe has a longitudinal slot, see Figs. 1 and 2, and on these pipes are arranged a series of throated sleeves d' , e' , which may be turned on the shafts to more or less close the slots in the pipes and thus regulate the discharge of moisture laden air onto the rolls C, B. These throated sleeves are kept in adjusted position by suitable set screws d^2 , e^2 . The pipes d and e have mounted on them bars d^3 , e^3 , to which are connected suitable clearers d^4 , e^4 . The bars d^3 , e^3 have respectively arms d^5 , e^5 . The arm d^5 has a rod d^6 which is extended through a lever d^7 pivoted at 7, and through a spring 6. The lower end of the lever d^7 is engaged by a weighted latch d^8 , and while the latch holds the lever the latter acting on the spring 6, pushes its opposite end against a nut on the rod, and thus keeps the clearer d^4 against the roll C, in a yielding manner. The arm e^5 is acted upon by one arm of the weighted lever e^6 and the clearer e^4 is kept against roll B in a yielding manner. The roll F is acted upon by a clearer 8 attached to a bar f mounted on a pipe or rod f' . This bar, as well as the shell c' has suitable ears to receive respectively the rock-shafts f^2 and c^4 .

The shaft f^2 has two arms f^3 , f^4 , the arm f^4 being normally acted upon and held by a catch f^5 , while the arm f^3 receives through it loosely one end of a spring encircled rod f^6 jointed to the bar f having the clearer 8, the arm f^3 by acting on the spring or rod f^6 keeping the said clearers held to the roll in a yielding manner.

The rock-shafts f^2 and c^4 have mounted on them respectively like sleeves m , but one of which is shown fully, viz: in Fig. 1, each sleeve, however, having depending from it a guide-plate as g , h , the said guide plates being represented, see Fig. 1, as slotted to present a series of fingers and in the slots between these fingers of whatever form, whether flat or round in cross-section, are rollers g' , h' , said rollers being normally kept in contact with the rolls of paper being fed through the calendering machine by weights as g^2 , h^2 , con-

nected with the said sleeves. These rolls g' , h' , act to aid in feeding the paper through the machine, they impinging the paper against the calendering rolls thus insuring greater friction than otherwise, which aids in feeding.

In practice whenever it is desired to turn the clearers away from the rolls, the latches as at f^5 , c^7 , d^8 , may be turned to release the arms held by them, and whenever it is desired to pull away from the calendering rolls the guides g , h , to gain access to the paper on the parts of the rolls covered by said guides, this may be easily done by engaging the guides by hand and overcoming the weights g^2 , h^2 .

The guides g , h , are extended, as shown in the drawings, along but a portion of the length of the rolls, the guides acting to properly control the paper without being extended throughout the length of the rolls.

Viewing Fig. 2 at the left I have shown only the lower end of a guide n it in practice being supposed to be the same as the guide g immediately above it, but herein I have omitted from the drawing all the remaining portion of the guide for the reason that it will be just the same as the guide g and its supporting parts above it.

It will be understood in the use of calendering machines for calendering paper that the rolls expand inwardly at times and pinch the paper at some points harder than at others and injure the paper. Herein it is possible, by means of the air pipe and the blower, and the valves, to deliver the moisture laden air which may be more or less cool, directly upon the warm rolls at such points it is desired to cool, the cooling being accomplished as described, thus overcoming the excessive expansion. The paper is readily moistened on both sides during its travel through the calendering machine, for as it enters the machine it is moistened on its under side by the moisture laden air from pipe f' , and on its opposite side by said air from the lower end of shell plate c' , and also from pipe d , if desired.

In the use of calendering machines it is well known that in dry weather considerable difficulty is experienced by the rapid generation of electricity due to friction. I have discovered that this difficulty due to electricity is completely obviated by the employment of air having water atomized into it.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the upper roll F, of a calendering machine, and a lever a' having a feed roll as a^2 with a shield or guide mounted upon an independent pivot and partially surrounding said calender roll near the throat next the calender roll below it, substantially as described.

2. In a calendering machine, a plurality of calender rolls, each provided with a bar having a clearer, and with a rock-shaft having

arms and a latch to hold the said rock-shaft in place, and a spring interposed between one arm of the said rock-shaft and the bar carrying the clearer, substantially as described.

5 3. The combination with a calender roll of a calendering machine, of a guide partially surrounding the said roll, and a roll carried by said guide and adapted to contact with the paper upon the calender roll, substantially as described.

10 4. The combination with a calender roll of a calendering machine, of a shell plate having an attached clearer to contact with a calendering roll, and provided with a transverse air delivery passage, and a valve for said passage to regulate throughout its length the exit of air therefrom at desired times upon the paper passing over another roll of the series of rolls, substantially as described.

20 5. In a calendering machine, two calender rolls, a hollow shell plate, a clearer carried thereby to act against one of the said rolls and valves connected with said shell plate and adapted to permit the passage of air against one of the said rolls and against the paper passing over another of said rolls, substantially as described.

30 6. In a calendering machine, a series of calender rolls, a series of pipes arranged near but parallel to said rolls, and suitable independent delivery valves for each pipe, whereby air may be directed upon the rolls at particular points between their ends, combined with a blower, and means to discharge water in fine particles into the air going to said

blower, whereby the latter is adapted to blow moisture laden air through said pipes against the paper being calendered, substantially as described.

7. In a calendering machine, the combination with the rolls, of air-delivery means for each roll, a clearer for each roll and movable independently of said air-delivery means, and a yielding device to hold each clearer to its roll, substantially as described.

8. In a calendering machine, the combination with the rolls, of means for moistening air, and means for delivering such moisture laden air upon such rolls and upon the paper being calendered, substantially as described.

9. The method of calendering paper consisting in subjecting the paper to the action of calendering surfaces upon which and the paper a constant supply of cool moisture laden air is delivered, substantially as described.

10. In a calendering machine, a calender roll, and a bar having an attached clearer, combined with a rock-shaft, connections between said rock-shaft and bar whereby the latter is normally pressed toward the roll, and means to hold the rock-shaft against rotation, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PETER DILLON.

Witnesses:

FRED. W. COLMAN,
JOHN W. BOLTON.