(No Model.) 2 Sheets—Sheet 1.

P. DILLON.

PAPER CALENDERING MACHINE.

No. 485,534. Patented Nov. 1, 1892.

Fig. 3a.

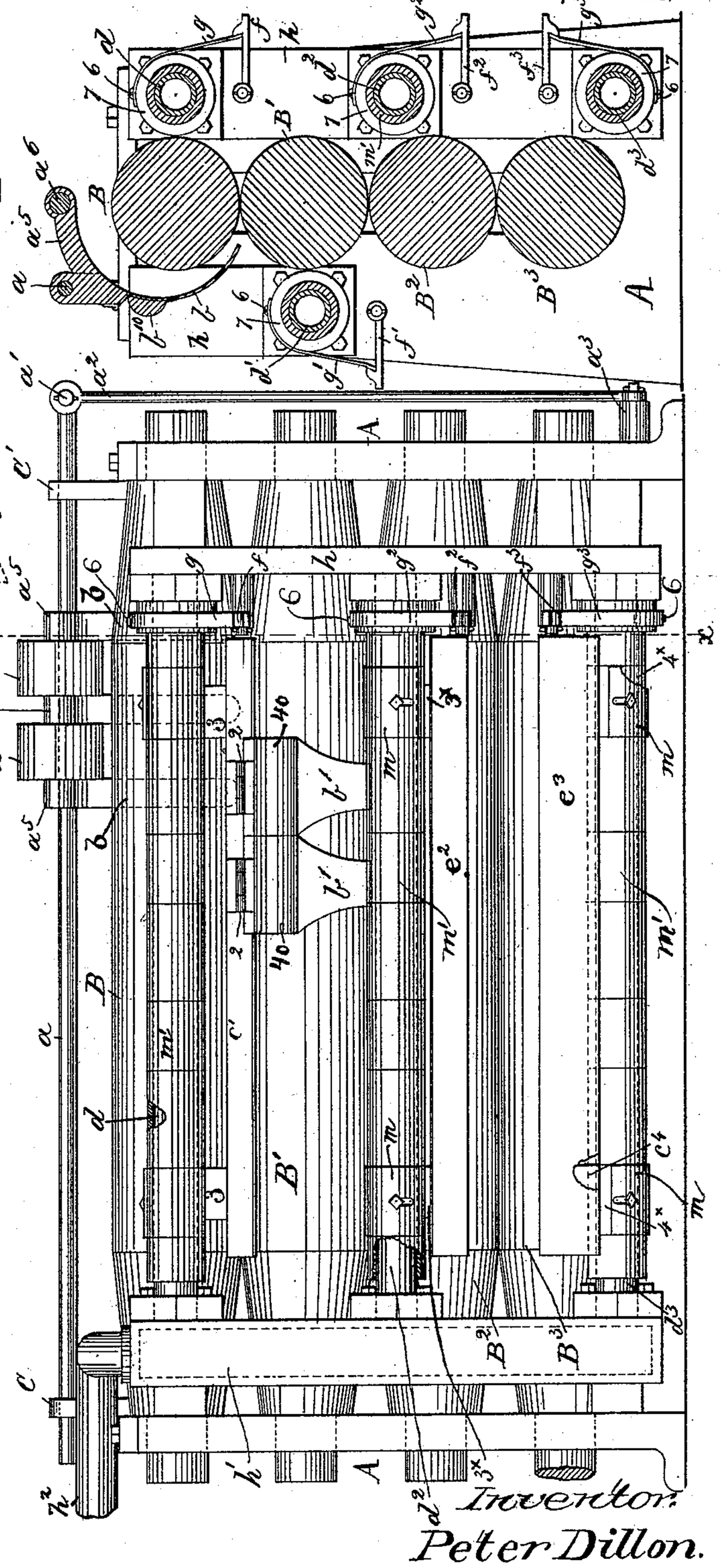

Fig. 9.

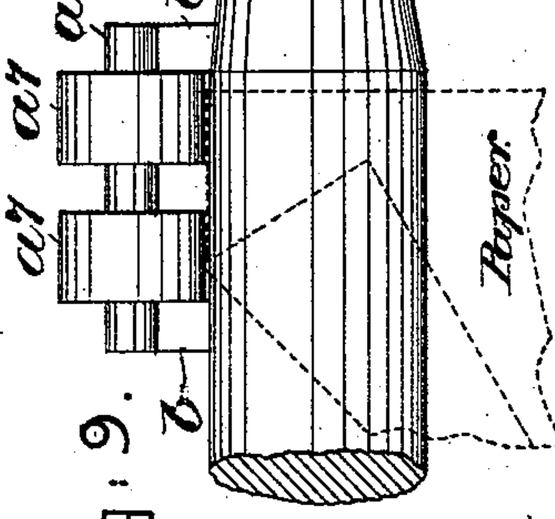

Fig. 8.

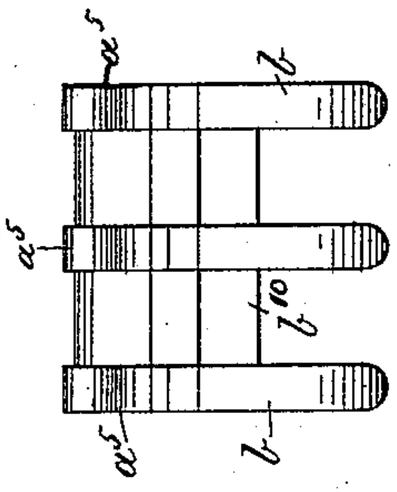

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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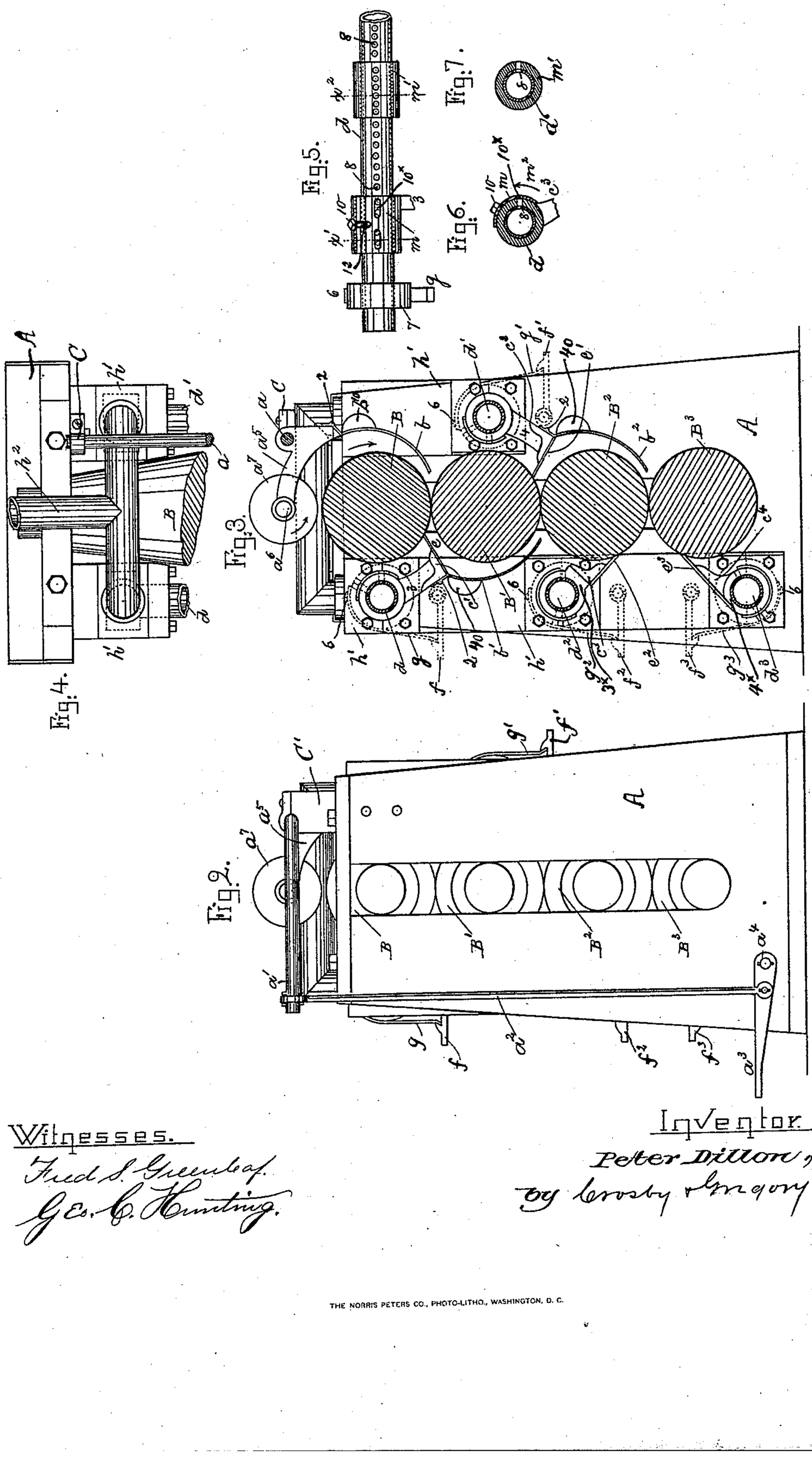

Witnesses.
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UNITED STATES PATENT OFFICE.

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

PAPER-CALENDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 485,534, dated November 1, 1892.

Application filed September 19, 1890. Serial No. 365,523. (No model.)

To all whom it may concern:

Be it known that I, PETER DILLON, a subject of the Queen of Great Britain, but at present residing at Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Paper-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 has for its object more especially to improve machines for calendering paper and the like.

My improvements relate to means for insuring the introduction of the leading end of the web between the bite of the successive calendering-rolls of the series. I have also devised means by which to keep the surfaces of the rolls free from any adhering matter, and provision has also been made for cooling the rolls as may be needed, the cooling medium being, preferably, cold air or air at any desired temperature.

These improvements will be hereinafter more fully described, and specifically defined in the claims at the end of the specification.

Figure 1 in side elevation represents a paper-calendering machine embodying my invention; Fig. 2, a right-hand end view of the machine shown in Fig. 1; Fig. 3, a section in the dotted line x, Fig. 1, looking toward the left; Fig. 3^a, a section looking to the right of said line. Fig. 4 is a partial plan view of the left-hand end of the machine; Fig. 5, a detail showing one of the hollow shafts and co-operating valves thereon, some of the valves being omitted from a part of the shaft to better show the holes in the shaft. Figs. 6 and 7 are sections in the dotted lines x' x^2, respectively, Fig. 5. Fig. 8 is a detail showing the arms a^5 and their attached plates detached from the machine. Fig. 9 is a diagram, on a smaller scale, showing by dotted lines the end of the web of paper turned over diagonally, as is the common practice when introducing the leading end of the web into the machine, the width of the leading end of the triangular portion of the web being sufficient to be engaged by the feeding roll or rolls.

Referring to the drawings, A are uprights of usual shape to receive and guide the journals of the calendering-rolls B B′ B^2 B^3 of usual construction. The calendering-rolls may be rotated in any usual way. (Not necessary to be herein shown.) Usually the power is applied to the shaft or journal of the bottom roll. As herein shown, the shaft is broken from the journal of the bottom roll. The framework has two bearings C C′, in which is mounted a rock-shaft a, having a forwardly-extended arm a', jointed to a rod a^2, represented as connected to a foot-treadle a^3, pivoted at a^4. The rock-shaft a carries, as shown, three arms a^5, having at their ends immediately over the roll B and near one end thereof suitable bearings for the journals a^6 of one or more feed-rolls a^7, which latter normally stand with their peripheries just above the periphery of the calendering-roll B, but out of contact therewith. In the drawings I have shown two feed-rolls at a^7; but one feed-roll will answer the purpose. Each arm a^5 below the rock-shaft a has hinged or jointed to it a narrow directing plate or finger b, (shown by full lines in Figs. 3, 3^a, and 8 and by dotted lines in Fig. 1,) said directing-plates being concaved to partially surround the roll B near one end, suitable weights b^{10}, applied to the arms, acting not only to normally keep the feed roll or rolls a^7 elevated a little above the top of the roll B, as in Fig. 2, but also to keep the directing-plates pressed by gravity toward the roll B.

In practice a feed-roll or series of rolls is needed at but one end of the roll B, for usually the operator whose duty it is to put the end of the web or end of the paper into the machine will fold or turn over the leading end of the web on the bias or diagonally, as represented by Fig. 9, thus leaving a pointed or tapered leading end for the web, which tapered portion is placed between the feed roll or rolls and the calendering-roll B. The feed-rolls co-operating with the upper calendering-roll B, having engaged the web and started it forward, the web passes between the directing plates or fingers b and is by the latter directed between the nip of the rolls B B′. If the leading upper end of the web goes into the machine properly, the main body of the web will follow correctly, so it is necessary to supply

the machine with directing-plates only at one end of the series of calendering-rolls.

The rolls B′ B^2 have co-operating with them near one end, respectively, (see Figs. 1 and 3,) suitable directing-plates b' b^2, which are represented as hinged, as at 2, respectively, to angle-bars c' c^2, the latter being extended across the machine parallel to the rolls and being attached, respectively, at their ends to the lower ends of arms 3 4, having suitable hubs or collars, which surround but are fixed to pipes d d', parallel to the rolls B B′. The directing-plates b' b^2, shaped as are the directing-plates b, are also weighted, as at 40, the weights being sufficiently heavy to keep the said plates each pressed by the force of gravity toward the roll next to it, as shown in Fig. 3. By hinging the directing-plates b b' b^2 to the angle-bars, as described, any plate may be turned back and away from the roll next it if it is desired to gain access to that roll—as, for instance, should the paper for any reason become clogged at that point. The machine represented has other pipes d^2 d^3, to which are fixed hubs of other like arms $3^\times$ $4^\times$, to which are connected other angle-bars c^3 c^4. Each of these angle-bars carries one of a series of scrapers or clearer plates or blades e e' e^2 e^3, the edges of which normally bear against or stand quite close to the peripheries of the calender-rolls, said blades being kept in said position in a yielding manner by catches f f' f^2 f^3, which engage spring-arms g g' g^2 g^3, each spring being connected by a screw, as 6, to a collar, as 7, fast on one of the pipes carrying the angle-bars referred to, one of said collars being marked 7 in Fig. 5.

The machine requires catches at but one end, and as the springs are attached to the collars fast on the pipes carrying the scrapers or clearers the latter are held with their edges against the rolls under a yielding pressure. These clearers by contact with the peripheries of the rolls prevent the accumulation thereon of any dust, dirt, lint, or sizing coming from the moistened paper. To turn the scrapers fully away from the rolls for any purpose, it is only necessary to move the catches f f', &c., to release the springs engaged by them. The pipes referred to are mounted at one end in bearings in uprights h and at their other ends in bearings connected with the hollow headers h', and are free to turn therein. The headers h' are filled with preferably cold air through or by the inlet-pipe h^2, and in practice the air may be supplied to the pipe h^2 from any usual fan or pump. The hollow air-pipes d d', &c., constitute supports for the clearers, and the latter constitute supports for the directing-plates. These pipes are provided at or along their inner sides and at proper distances apart with holes or openings 8, (see Fig. 5,) and in practice these holes will be uncovered or controlled by suitable valves. The drawings show two forms of these valves. (See Figs. 6 and 7.) The hubs of the arms 3, &c., are also provided with slots or openings $10^\times$, as shown in Figs. 5 and 6, which coincide with the holes in the pipes. The hubs of the arms 3 and 4 and the other arms $3^\times$ $4^\times$, if desired, all having holes, as before referred to, are provided with valves m. The valves m, as shown, consist of thin pieces of sheet metal bent or made concavo-convex to fit the hubs, each valve having near one end suitable openings in the direction of the length of the hub upon which it is mounted, as shown best in Fig. 5, and another slot or opening 12 at right angles thereto for the reception of a screw 10, by which to confine the valve in adjusted position—as for instance, if it is desired that cold air should come out through the holes in the pipe and the holes in the hub surrounding it, which holes coincide, then the screws 10 will be loosened and the valve or sheet-metal plate m will be moved partially around the hub, so as to bring the openings in the valve opposite the openings in the hub, and of course air can then pass out against the roll; but if the valve m is moved far enough to bring the portion of it not provided with holes over the holes $10^\times$ in the hub then of course air cannot escape at that point.

Fig. 5 shows a portion of one of the hollow pipes d with one of the separate sleeve-valves m' surrounding the said pipe loosely, a portion of the said pipe having its like valves removed to better show the openings in the same, it being understood that in practice the entire pipe will preferably be provided with holes from end to end and will be surrounded by a series of valves, as in Fig. 1. One or more or all of these valves m m' may be partially rotated by hand on the pipe to uncover more or less of the holes 8 in order to discharge cold air upon any desired point of the calendering-roll on the portion opposite the directing plates requiring cold air, while other portions next to it may not need the same.

Prior to my invention I am aware that air has been forced against a web of paper in the direction of the travel of the latter, the said air serving to carry the paper in the proper path; but in my invention it is not intended that the air be discharged upon the web at any point, and the air is solely for the purpose of keeping the rolls at the proper temperature, so that they will not become warm and thus expand unequally, unequal expansion of the rolls interfering with uniform calendering. As soon as the leading end of the web has been guided between the two rolls B B′, as described, the foot of the operator may be relieved from the treadle and the feed-rolls will rise. The directing-plates b' b^2 by their co-operation with the end of the web to direct it between the rolls b' b^2, &c., avoid hand manipulation preparatory to entering the web between each pair of rolls, such manipulation, besides requiring time, being dangerous. The clearers make it impossible for the leading end of the web to be carried about a roll, and they also act to prevent any foreign ma-

terial or lint from collecting upon the rolls. The air blown into and through the pipes may be moistened, if desired, before entering the pipes.

It is not intended to limit this invention to the exact shape of the deflecting plates or aprons *b b'*, and the machine described may be used for calendering or squeezing or drying other substances than paper.

Having described my invention, what I desire to secure by Letters Patent is—

1. A calendering-machine containing the following instrumentalities, viz: a series of calendering-rolls, a feed-roll, vibrating arms having bearings for and carrying said feed-roll, and a directing-plate connected to the said arms and adapted to direct the end of a web into the nip or bite between two of said calendering-rolls, substantially as described.

2. A calendering-machine containing the following instrumentalities, viz: a series of calendering-rolls, a feed-roll, movable arms having bearings for said feed-roll, a rocking support for said arms, a directing-plate connected to the said arms to direct the end of a web into or between the nip of two calendering-rolls, a treadle, and connecting mechanism between it and said rocking support, to operate substantially as described.

3. In a calendering-machine, a series of calendering-rolls, a rock-shaft, a treadle, connections between the said rock-shaft and treadle, and arms connected to the rock-shaft, combined with a feed-roll having its bearings in said arms and normally standing with its periphery somewhat elevated above the top calendering-roll, the said rock-shaft by its movement enabling the feed-roll to approach the top calendering-roll when it is desired to introduce a web of paper into the calendering-machine, substantially as described.

4. Calendering-rolls, rocking supports, arms connected thereto and carrying angle-bars, scrapers or clearers attached to said angle-bars, collars fixed to said supports, and springs connected to said collars, combined with catches to engage said springs, and thereby cause the scrapers to be held against the calendering-rolls, substantially as described.

5. In a calendering-machine, the following instrumentalities, viz: a series of calendering-rolls, a series of perforated air-pipes adjacent to but on opposite sides of successive calendering-rolls, valves on said pipes to control the delivery of air therefrom, and a series of directing-plates for the rolls, located opposite said pipes, the air being delivered from the pipes upon the exposed surface of the adjacent rolls at the side opposite the directing-plates to cool the rolls and prevent unequal expansion thereof, substantially as described.

6. In a calendering-machine, the following instrumentalities, viz: a series of calendering-rolls, a series of pipes, and a series of valves on said pipes, the said valves being movable independently to thereby control the discharge of air upon the rolls at any point, substantially as described.

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

PETER DILLON.

Witnesses:
GEO. W. GREGORY,
EMMA J. BENNETT.