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W. M. BARBER.

# APPARATUS FOR DRYING COATED PAPERS.

APPLICATION FILED MAY 2, 1902.

NO MODEL.

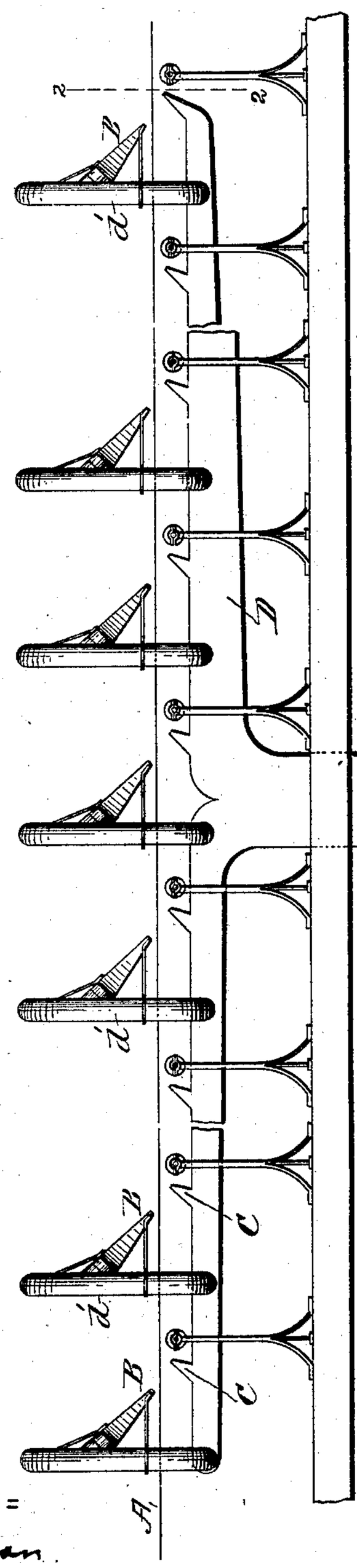
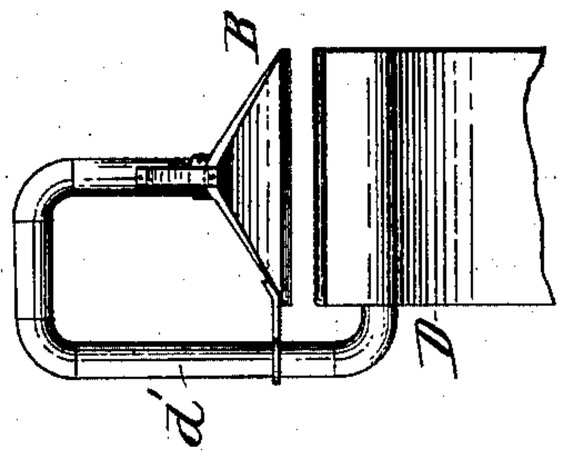



Fig. 2.



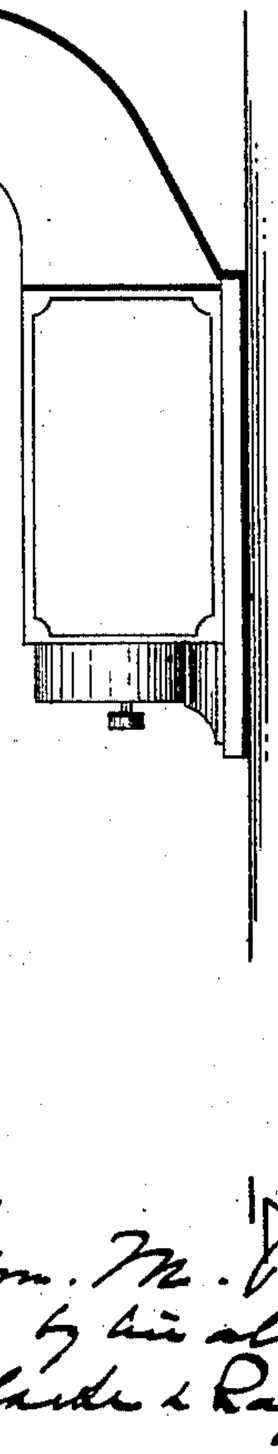




Fig. 1.

WITNESSES:
J. M. Dolan
Saml Sippenstein

INVENTOR:
Wm. M. Barber
by his attys
Clarke & Raymond

# UNITED STATES PATENT OFFICE.

WILLIAM M. BARBER, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO SMITH & ANTHONY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## APPARATUS FOR DRYING COATED PAPERS.

SPECIFICATION forming part of Letters Patent No. 719,931, dated February 3, 1903.

Application filed May 2, 1902. Serial No. 105,591. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. BARBER, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Apparatus for Drying Coated Papers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to means for drying coated papers in the web. Certain types of paper are finished with a surface covering or coating of such a nature that it is easily marred or injured if it comes into contact with anything before it is completely and thoroughly dried into the web, and it is desirable for the purpose of drying such coatings into webs of paper that the web during the drying operation be so sustained as not to be brought into contact with any support or rest.

My invention consists in means whereby this result may be secured; and it comprises the employment of the drying medium in an additional capacity as a support for the traveling web of paper, whereby it is sustained while the coating is being dried from touching any surface or object below or above it.

I will now describe the invention in conjunction with the drawings, forming a part of this specification, wherein—

Figure 1 is a view, principally in side elevation, of enough of my improved apparatus to illustrate my invention. Fig. 2 is a view in vertical cross-section upon the dotted line 2 2 of Fig. 1.

I have not in the drawings shown the means for applying the coating to the web of paper or the device for providing it with movement, as such are well known in the art.

A illustrates so much of the web of paper as it is necessary to represent. It is shown as running horizontally between the series B of overhead air-feeding nozzles and the series C of underneath air-feeding nozzles. These nozzles are arranged so that all the upper ones reach the same line and all of the lower ones another line parallel with the first, but removed from it to leave a clear unobstructed space of about inches through which the web of paper travels. The upper nozzles are also arranged to point in the same direction, so that the air which they feed or discharge is caused to move in the direction in which the web is moving. The lower nozzles also point in one direction and that in which the paper is moving. They are, however, somewhat less inclined than are the upper nozzles. The upper and lower nozzles are also preferably arranged in pairs, the outlet of the upper nozzle being somewhat in advance of the outlet of the lower nozzle. There is also used, preferably, in connection with each lower nozzle a means for holding the web of paper when it is at rest or in case it should become broken. I prefer that these supports be in the form of rolls mounted upon standards to extend crosswise the apparatus and of a length greater than the width of the web. I also prefer that they be arranged just beyond each lower nozzle and so that their upper surfaces shall be somewhat above the outlet line of the lower nozzles, as by so arranging them the web of paper is held when at rest from coming into contact with the lower nozzles, which it is desirable it should not do, as it may then be covered with the coating which might lodge in the nozzles.

The upper and lower lines of air-feeding nozzles are supplied with air of any degree of dryness and temperature by means of a suitable blower, preferably located in an apartment below and which is connected with a distributing-trunk D by means of a passage *d*. This trunk is represented as in two branches, one running forward and the other backward, and also as diminishing in area or capacity toward its outer ends, and also as having the lower nozzles opening from its upper surface and the upper nozzles as fed therefrom by means of the short connecting-pipes *d'*, which extend from one side of the trunk upward over the web and then downward to the center of each upper nozzle. (See Fig. 2.)

The lower nozzles on account of their shortness and direct connection with the trunk and also on account of their inclination cause

the currents or blasts of air which they direct against the web of paper to have sufficient force to sustain or hold the paper from dropping upon them or upon the rails in front of them, and they bear such relation to the rails as to cause the sustaining air-pressure to be applied very nearly over the rails or at the points where it is most necessary that there be air-pressure to prevent the web from touching a surface.

The upper air-nozzles are more remote from the trunk and are more inclined and therefore the blasts or currents of air emitted by them do not strike the web of paper with as great a pressure as do the lower blasts or currents. Moreover, the nozzles are so placed as to cause these currents or blasts to strike the paper in advance of the places where the lower currents or blasts come into contact with it, so that they do not operate to act materially against the sustaining effect of the under currents or blasts.

All of the nozzles are preferably of the width of the web of paper, and all of the nozzles of each line are so proportioned with respect to each other and to their supply-ducts as to each deliver its blast or current of air at substantially the same degree of pressure or force, although the pressure of the lower line of nozzles, as above indicated, is somewhat greater than that of the upper line.

The two sets of currents or blasts coming from the two lines of nozzles, while having the same general forward movement, also have such an opposed relation to each other that the lifting tendency of the lower ones is counteracted by the downward pressure of the upper ones, and thus the two acting together serve to hold the web of paper between the two lines of nozzles and without forcing it into contact with any of them or with the web-supports, and so long as a suitable air-pressure is maintained the paper web will be so held from contact with the nozzles and with the supports while it is being fed through the apparatus, the currents or blasts of air thus thrown against both surfaces of the web of paper serving at the same time to dry or set into it the composition with which it is coated.

The machine is of sufficient length to cause the coating to be sufficiently set or dried to permit the web to be rolled upon a receiving-roller or to be otherwise manipulated before it comes into contact with anything.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In an apparatus for drying coated papers, the combination of an upper set or line of air-feeding nozzles, a lower set or line of air-feeding nozzles separated from the upper by a clear unobstructed space in which a web of paper is adapted to travel, the two sets of nozzles being associated together in pairs, the upper nozzles being slightly in advance of the lower ones, rests for the web of paper when stationary placed beyond each lower nozzle, and means for forcing air under pressure from said nozzles against both surfaces of the web of paper and in the direction in which it travels, whereby the said web is caused to be borne by the air from contact with the nozzles or rests and is at the same time subjected to a drying means.

2. In an apparatus of the character specified, the combination of two lines of air supplying and directing nozzles, one line being separated from the other by an unobstructed space in which the paper moves, the said nozzles being arranged in pairs, an upper nozzle being slightly in advance of a lower nozzle, each lower nozzle being less inclined than the upper nozzles whereby the air-pressure from them is exerted with greater stress upon the under surface of the web than is the air-pressure from the upper nozzles against the upper surface of the web, and stationary rests beyond said lower nozzles for supporting the web of paper when stationary.

3. The combination in an apparatus of the character specified of an air-distributing trunk, air-feeding nozzles rising directly from the upper surface thereof and extending backward therefrom, forming a lower line of air-supply, an upper line of nozzles separated from the lower line by an unobstructed space and each of which is connected with the trunk by a passage extending around said space and a rest slightly beyond each lower nozzle, the said nozzles being associated with each other in pairs and acting to direct the currents of air upon the web in such a manner as to cause it to be held from both lines of nozzles and from the rests while it is passing between them.

WILLIAM M. BARBER.

In presence of—
J. M. DOLAN,
SAUL SIPPERSTEIN.