J. O. ROSS.

PAPER MAKING.

APPLICATION FILED DEC. 11, 1913.

1,290,360.

Patented Jan. 7, 1919.

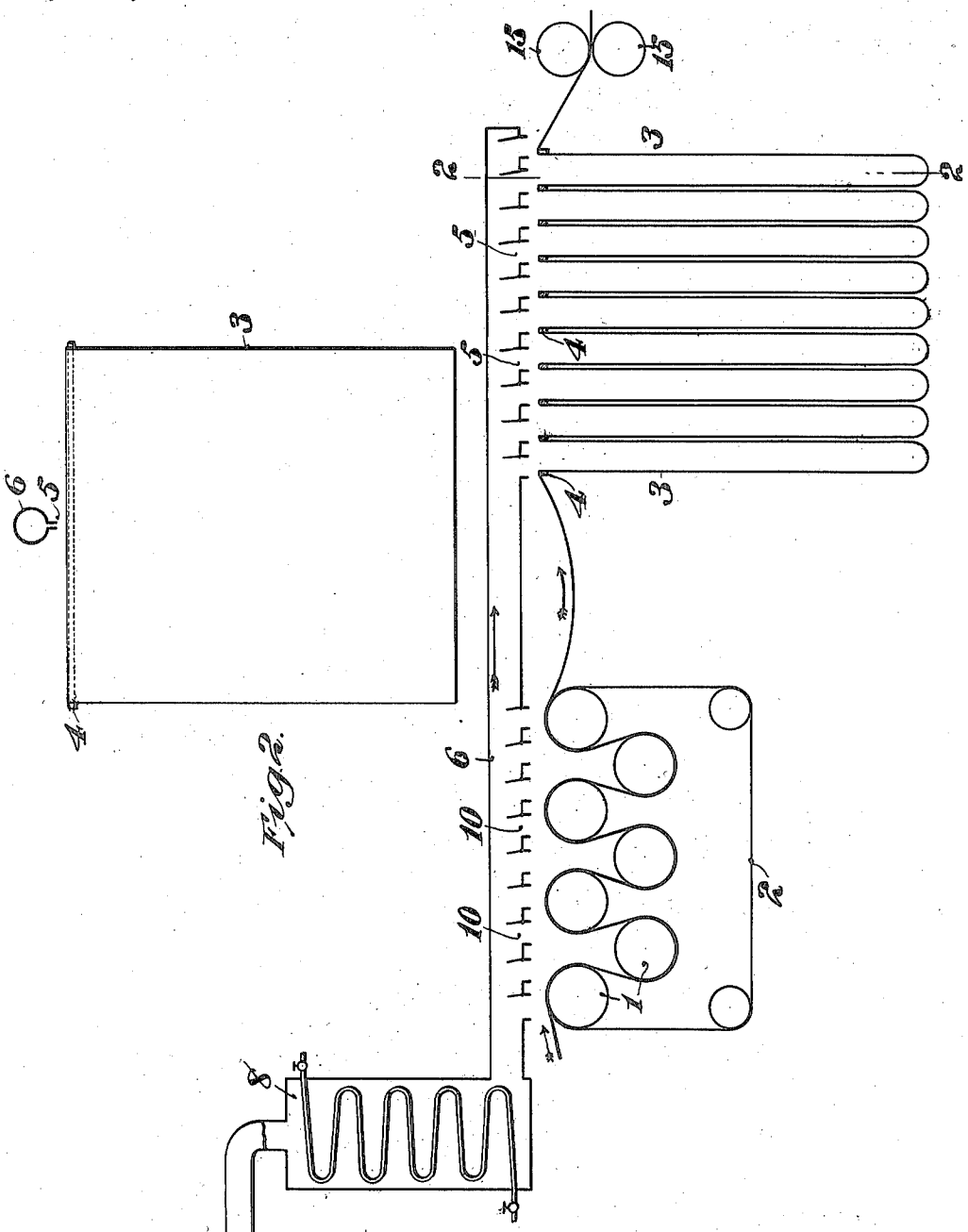

Fig. 2.

Fig. 1.

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PAPER-MAKING.

1,290,360. Specification of Letters Patent. Patented Jan. 7, 1919.

Application filed December 11, 1913. Serial No. 805,917.

To all whom it may concern:

Be it known that I, JOHN O. Ross, a citizen of the United States, residing at Roslindale, Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Paper-Making; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to paper making and more particularly to the drying of the wet web of paper formed in a paper making machine.

In the drawings which illustrate the preferred embodiment of the present invention, Figure 1 is a diagrammatic view of the drying apparatus; and Fig. 2 is a section taken along the line 2—2 of Fig. 1.

In the illustrated apparatus, there are a number of hot drying rolls or cylinders 1. These drying rolls are the usual steam heated drying rolls of paper making machines and are provided with the usual drier-felt 2 which supports the wet paper as it is carried over the hot drying rolls. The wet web of paper, as it comes from the press rolls, is usually not strong enough to support its own weight so that it is carried by the drier-felt. The parts of the paper making machine for forming the paper stock into a sheet, expelling the surplus water from the sheet and leading the wet paper to the hot drying rolls are not illustrated as they form no part of the present invention and are old and well-known in the art of paper making.

The number of hot drying rolls 1 is considerably less than that of the usual paper making machine so that the paper, as it leaves the hot drying rolls, although strong enough to support its own weight without the support of the drier-felt 2, is only partially dried.

The paper after leaving the drying rolls is received by a conveyer 3 which is preferably a festooning apparatus. This festooning apparatus comprises a number of bars or rods 4 which support the paper in festoons or loops and are continuously moved to the right so as to feed the paper along. The construction of such festooning apparatus is old and well-known and need not be here described in detail.

Dry heated air is blown upon the paper as it is carried along by the festooning apparatus through a number of nozzles 5 opening from the bottom of an air conduit 6. The air in the conduit 6 is supplied by means of a blower 7 and is heated and dried by passing over a steam coil 8. The conduit 6 runs longitudinally over the festooning apparatus and serves to discharge the air against the middle of the web of paper. The paper tends to dry more rapidly at its edges than at its middle portion and, therefore, it is advantageous to direct the air against the middle of the web so as to dry it more evenly throughout its width, as described in my copending application for drying apparatus and method of drying, Serial No. 805,429, filed December 8, 1913.

There are also a number of air nozzles 10 over the steam heated drying rolls which assist in drying the paper on the rolls. These air nozzles 10 are not an essential part of the apparatus and may be omitted if desired.

The paper, after leaving the festooning apparatus, passes between calender rolls 15 which calender the paper in the usual manner. Under some circumstances it is advantageous to not entirely complete the drying of the paper on the festooning apparatus, but to complete the final stages of the drying on additional hot drying rolls. These hot drying rolls are placed between the festooning apparatus and the calender rolls and serve to very effectually take out any wrinkles or warped places in the paper which may result from the treatment of the paper on the festooning apparatus.

According to the present invention viewed in its broader aspects, the further drying of the partially dried paper coming from the drying rolls, which is had by blowing air against the paper while on the conveyer 3, may complete the drying of the paper as illustrated in the drawing, or this further drying may not entirely complete the drying of the paper which may be completed by some other form of drying apparatus, such as additional hot drying rolls.

The present invention is not limited to the use of a festooning apparatus for the conveyer for carrying the paper while it is dried by the air, but other forms of conveying apparatus may be used. The form of conveying apparatus is preferably one in

which both sides of the paper are exposed to the atmosphere so that the moisture more readily evaporates. By the use of such a conveyer, the paper is more readily dried than it is when one side of the paper is in contact with a drier-felt as is commonly done in paper making machines during substantially the entire drying of the paper.

In the machine of the present invention, the number of the expensive steam heated drying rolls is materially redueed. It is to be noted that the conveyer itself is not steam heated, the air blown against the paper while on the conveyer constituting the sole drying means. It is more economical to dry the paper by means of blowing hot air against it while it is supported on a conveyer than it is to carry out the entire drying operation on the steam heated drying rolls and the present invention effects a substantial economy in the operation of paper making machines.

The present invention is not limited to its illustrated and described embodiment, but may be embodied in other constructions within the scope of the invention as particularly pointed out in the following claims.

I claim—

1. The method of making paper which consists in carrying a soft wet web of paper formed in a paper making machine over heated drying rolls and supporting the web during the passage through the rolls, removing the web of paper from the rolls as soon as the paper is sufficiently dry to support its own weight, and thereafter drying the web of paper off the drying rolls by means of air blown against the surface of the paper.

2. The method of making paper which consists in carrying a soft wet web of paper formed in a paper making machine over heated drying rolls and supporting the paper by a drier-felt during its passage through the rolls, removing the web of paper from the rolls as soon as it is sufficiently dry to support its own weight, and thereafter supporting the web of paper on a conveyer in which both sides of the paper are exposed to the atmosphere and further drying the paper while on the conveyer by means of air blown against the surface of the paper.

3. The method of making paper which consists in carrying a soft wet web of paper formed in a paper making machine over heated drying rolls by means of a drier-felt to dry the paper sufficiently to support its own weight, and thereafter receiving the paper on a conveyer upon which it is supported in loops so as to expose both sides of the paper to the atmosphere, and in further drying the paper while on the conveyer by means of air blown against the paper.

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