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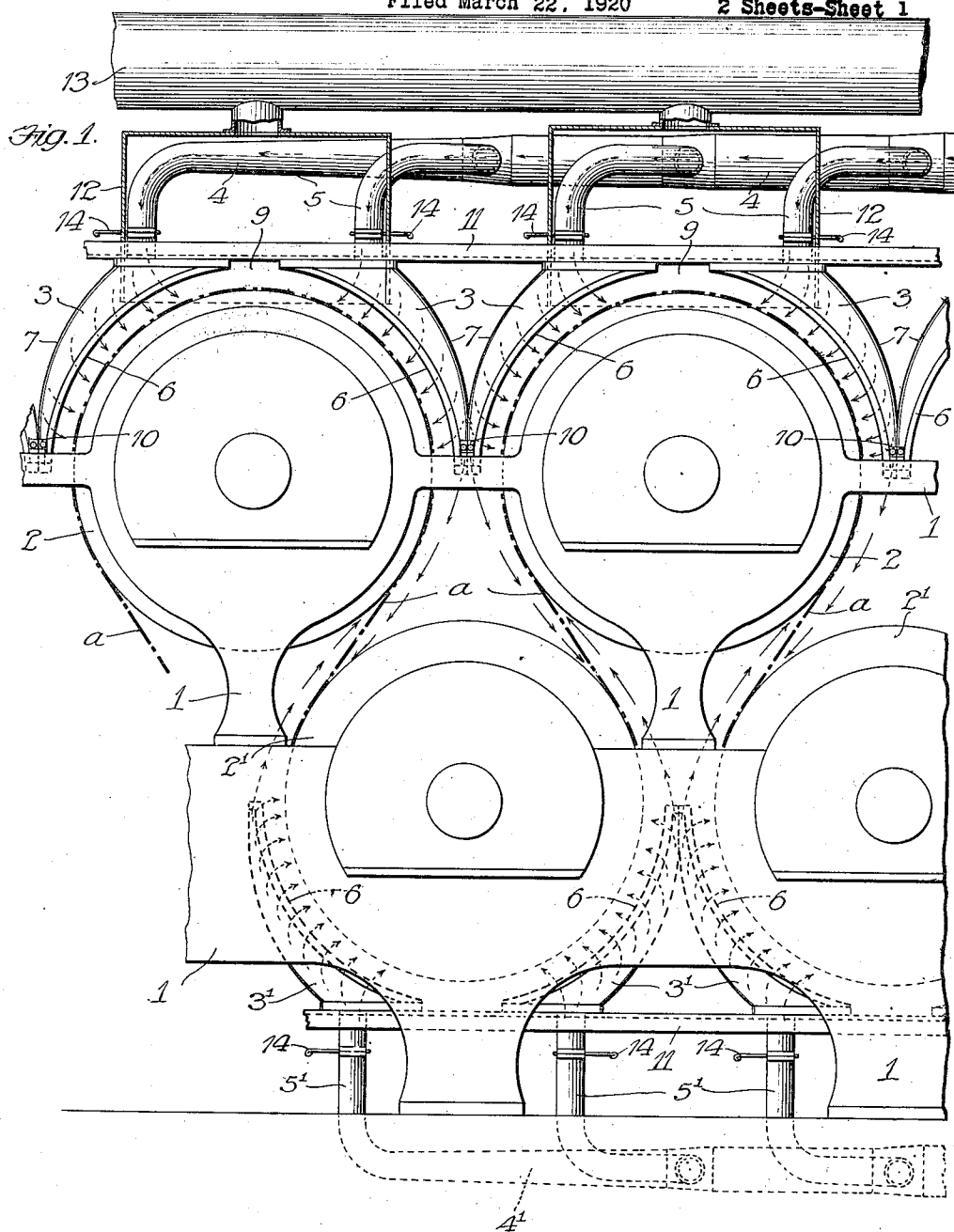
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E. M. BASSLER

PAPER MAKING MACHINE

Filed March 22, 1920

2 Sheets-Sheet 1



Witness
Martin H. Olsen.

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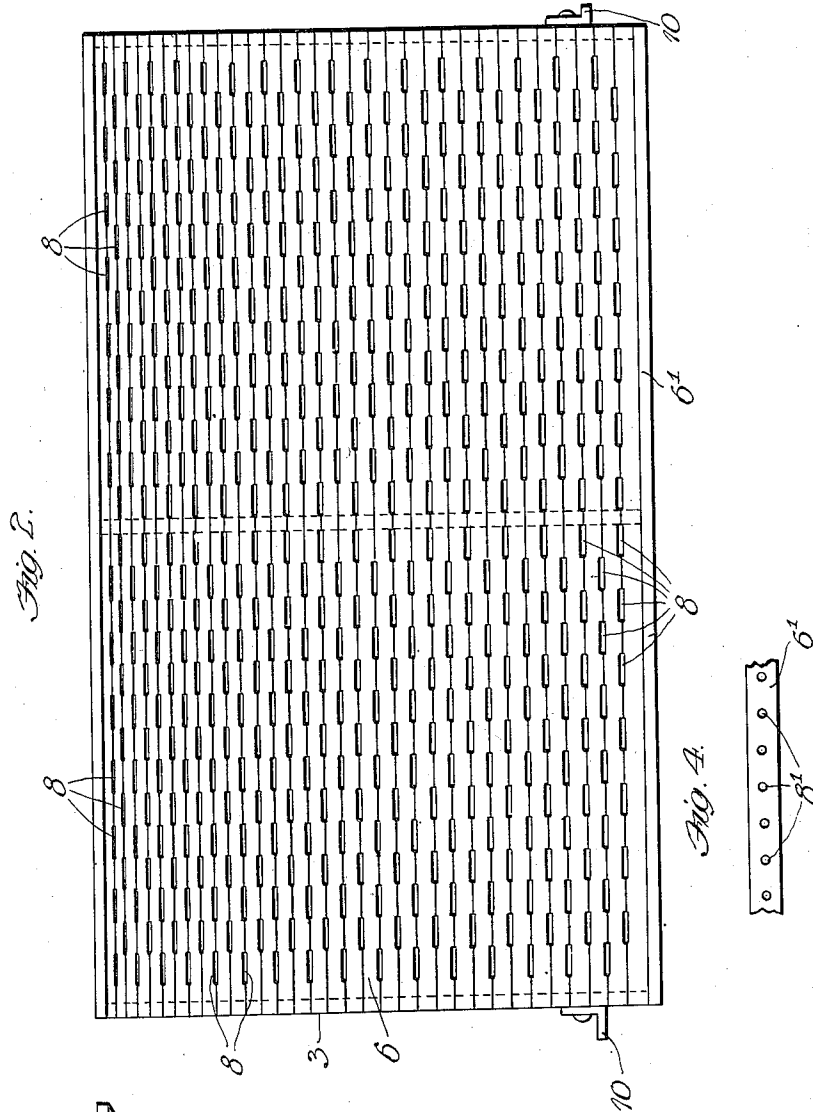
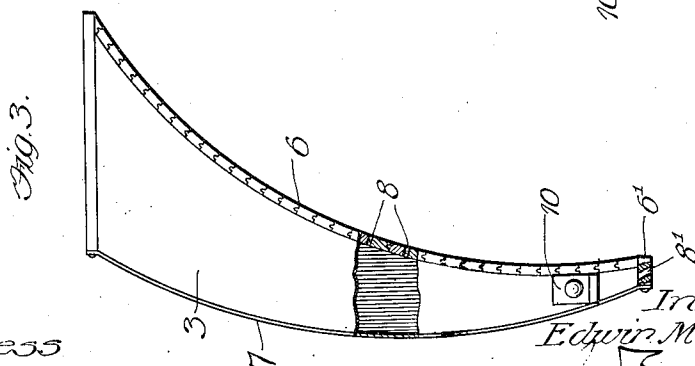
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

EDWIN M. BASSLER, OF MILWAUKEE, WISCONSIN.

PAPER-MAKING MACHINE.

Application filed March 22, 1920. Serial No. 367,623.

To all whom it may concern:

Be it known that I, EDWIN M. BASSLER, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Paper-Making Machines, of which the following is a specification.

This invention relates to paper making machinery and relates particularly to the driers thereof.

In accordance with the present practice of manufacture, many kinds and grades of paper are made in the form of continuous webs which pass over one or more drying rolls, said rolls being hollow and being heated by steam admitted to the interiors thereof through a hollow supporting trunnion, the paper being dried to such an extent that it is ready for packing, either in the form of sheets—into which it may be cut—or in rolls consisting of continuous webs.

Heretofore, in order to properly dry the paper, it has been found necessary either to run the machine at a very slow rate of speed, thus very materially reducing the capacity of the machine, or, when it is desired to operate the machine at a rate of speed which will produce a large output, a series of rolls is required, the number varying with the speed at which it is desired to operate the machine. In some cases as many as forty drying rolls are used arranged in the form of upper and lower series, the paper passing alternately and successively around the remote sides of rolls of different series.

As it is necessary that the surfaces of said rolls over which the paper passes shall be finished and all of said rolls made of exactly the same diameter, and as said rolls are often very large, it is obvious that the cost of said drying rolls represents a considerable part of the cost of the paper machine.

The object of the present invention is to provide means, in association with the drying rolls, for facilitating the drying of the paper, thus providing for increasing the speed of the machine up to the capacity of the forming section of the machine to "lay" the paper, and insuring operation of the machine at its maximum capacity. Also, as the speed of the machine is limited by the capacity of the forming section of the machine to lay the paper, it may be possible, by the use of the improvements forming my

invention, to operate the machine at its maximum capacity and at the same time to reduce the number of drying rolls necessary for drying the paper, thereby not only insuring a maximum output, but materially reducing the initial cost of the machine.

In accordance with my invention, I effect the foregoing objects by mounting headers adjacent to the drying rolls, which preferably surround the surfaces thereof in contact with which the paper runs to as great an extent as practicable, without seriously interfering with adjusting the web of paper thereto, said headers being hollow and being connected with a source of supply of heated air under pressure, and said headers being also provided with perforations in the sides thereof adjacent to the feed rolls, so that jets of heated air will be discharged therefrom against a web of paper adjusted to the feed rolls, said heated air operating not only to promote evaporation of the moisture contained in the web of paper, but also forming a vehicle which will carry off the evaporated water, thus rendering the application of the heat for drying the paper more effective.

Preferably, also, to facilitate the escape of the moist air, holes or openings are formed at the upper sides of the top drying roll or rolls, thereby further increasing the effectiveness of the currents of warm air discharged from said headers. Said openings can be conveniently formed by making said headers in two sections separated at the vertical centers of the rolls by continuous spaces or openings of desired width.

My invention also comprises the various other features, combinations of features and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully illustrated,

Figure 1 is a diagrammatic side view of a portion of the drying section of a paper machine equipped with my improved drying means.

Figure 2 is a view of the perforated side of one of the headers.

Figure 3 is an end view of said header, showing parts thereof in section; and

Figure 4 is a fragmentary view of the side of the header which extends between the drying rolls.

Referring now to the drawings, 1 designates the frame of the drier section of a

paper making machine, rotatably mounted in which are drying rolls comprising top and bottom series designated, respectively, 2, 2'.

5 In the operation of the machine, the web of paper, indicated at *a*, having been formed on the forming section of the machine, is passed alternately around the remote sides of said drying rolls 2, 2'.

10 The drying rolls 2, 2' are hollow and are heated by steam admitted thereto from a source of steam supply by means of suitable pipe connections which communicate therewith through axial openings formed in the supporting trunnions of said drying rolls, all in a familiar manner.

All of the foregoing features are old and well known in the art and will be readily understood by persons skilled in the art without a description thereof in detail.

20 In accordance with the present invention, headers 3, 3' are mounted adjacent to the surfaces of the rolls 2, 2', said headers being hollow and the interiors thereof being connected with a source of supply of warm air under pressure by means of suitable pipe connections comprising trunks 4, 4' and branch pipes 5, 5', which connect said trunks directly with said headers. For purposes of economy, the size of the air trunks 4, 4' decreases progressively towards their ends remote from the sources of supply.

30 In the preferable construction shown, the sides 6 of the headers 3, 3' adjacent to the drying rolls 2, 2' are curved so that they will extend substantially parallel with the surfaces of said drying rolls, and said headers are supported upon the machine frame with their curved sides concentric with the axes of the drying rolls and separated a short distance therefrom, say about six inches.

40 As preferably constructed, all sides of the headers 3, 3' will be made of lumber of suitable thickness, excepting the outer sides 7 thereof, which will preferably be made of galvanized iron.

50 In order to impart necessary strength and rigidity to said headers, the top, bottom and ends thereof are preferably made of lumber which is relatively thick, say two inches, while the curved inner faces 6 thereof are made of dressed and matched boards approximately two inches wide by one inch thick.

60 Formed in the inner sides 6 of said headers are openings 8 through which air introduced into the headers 3, 3' will be discharged directly against the surfaces of the drying rolls 2, 2' and the web of paper *a* passing around the same, and formed in the sides 6' thereof which extend between the drying rolls are openings 8', which are directed into the angular spaces between the web of paper and the surfaces of the drying

rolls where said web diverges from the surfaces of said drying rolls in passing from one to another.

70 While the number, size and shape of the openings 8 may vary within a wide range, I prefer to use slots approximately four (4) inches long and one-half ($\frac{1}{2}$) inch wide, said slots being directed so that the jets of air discharged therefrom will impinge upon the surface of the drying rolls and the web of paper passing around the same at desired angles. In what I now consider to be the preferable practice, said openings will be so directed that the impingement of said air jets against the surfaces of said rolls will be normal thereto, or substantially so.

80 In the construction and arrangement shown, also, said slots 8 are arranged in staggered rows distributed substantially uniformly over the entire sides 6 of said headers, the adjacent ends of vertical rows being substantially in line with each other and the horizontal rows being spaced approximately two inches apart. In practice, said slots will preferably be formed at the meeting edges of the boards forming the inner sides 6 of said headers, each slot being formed one-half in each board.

90 With openings 8 of the size and shape described, it is obvious that the air from said headers will be discharged against the web of paper substantially in the form of sheets extending continuously from end to end of said headers.

100 The air jets discharged from the openings 8' in the sides 6' of the headers 3, 3' into the angles between the web of paper and the surfaces of the drying rolls will operate, in an obvious manner, to carry off the moist air which would tend to collect in said angular spaces, thus correspondingly increasing the effectiveness of the apparatus.

110 While the openings 8' may be of any desired shape, for convenience in forming them, they will preferably be made round.

120 Said headers 3, 3' preferably enclose as much of the surfaces of the drying rolls 2, 2' as practicable without interfering with passing the paper around said drying rolls and otherwise giving necessary access thereto. Their dimensions circumferentially of the drying rolls will, of course, vary with the size of the drying rolls and the type of machine, but the relation, substantially as shown in Fig. 1 of the drawings, may be considered as typical.

130 In order to permit the free escape of the moist air discharged from the headers 3, 3' against the web of paper passing over the drying rolls 2, 2', holes or openings are preferably formed between the sections of said headers supported at opposite sides of each drying roll, substantially in line with the centers of said drying rolls. In practice, said openings are formed by making the

headers applied to each roll in separate sections and mounting them upon the machine frame in such positions that spaces 9 will be formed between the sections of said headers centrally above each of said drying rolls.

In the preferable construction shown, the headers 3, 3' are supported upon the machine frame by means of brackets or angles 10 on the ends thereof which are bolted or otherwise secured to rigid parts of the frame 1 of the drier section of the machine, and the sections of the headers for each series of rolls are rigidly connected by angle bars 11 or otherwise.

In the preferable construction shown, also, the headers 3 for the rolls 2 of the upper series are enclosed by a hood 12, which may conveniently be made of galvanized iron or the like, communicating with which is a pipe or stack 13 through which the moist air will be carried off and discharged outside of the building.

As shown, a separate hood 12 is provided for the header for each of said drying rolls 2, but it is obvious that the construction and arrangement of said hoods may be variously modified without departing from my invention.

In the operation of the machine, the paper formed on the wet end of the machine, having been conducted to and around the drying rolls, which are heated by means of steam admitted to the interior thereof, in the usual way, warm air under light pressure is admitted to the headers 3, 3', whence it will be discharged through the slots 8 against the web of paper passing around said drying rolls, the moist air from the upper series of rolls passing up through the spaces 9 between the sections of the headers 3, into the hood 12 and thence out through the stack 13, while the warm air discharged from the headers 3' against the web of paper passing around the lower series of rolls 2' will for the most part escape at the ends of the spaces between said headers and the surfaces of the drying rolls 2'.

A supply of air may be furnished to the headers 3, 3' by means of a centrifugal fan or blower and may be heated to a desired temperature by means of a usual steam coil. Combination fans and heaters suitable for the purpose are old and well known and can be readily supplied by skilled mechanics familiar with the art and need not, therefore, be described in detail, and it is, therefore, deemed unnecessary to show them in the drawings.

To provide for regulating the quantities of air supplied to the headers 3, 3', respectively, each of the branch pipes 5, 5' is provided with a gate or valve indicated at 14, by means of which the effective open area of said pipes may be adjusted as desired.

I claim:—

1. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, said header being provided with openings adapted for discharging air therefrom substantially uniformly over an area of a web of paper passing around said drying roll and extending entirely across the same, substantially as described.

2. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, the side of said header adjacent to said roll being provided with openings adapted for discharging air therefrom substantially uniformly over an area of a web of paper passing around said drying roll and extending entirely across the same, substantially as described.

3. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, the side of said header adjacent to said roll conforming to the curvature of the drying roll and being provided with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, substantially as described.

4. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, said header being provided with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, and an opening being also provided above said drying roll for the escape of moist air, substantially as described.

5. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, said header being provided with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, and an opening being also provided centrally above said drying roll for the escape of moist air, substantially as described.

6. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, said header being provided with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, and an opening being also provided above said

drying roll for the escape of moist air, a hood above said header with which said opening communicates, and a pipe for the escape of air from said hood, substantially as described.

7. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto comprising separate sections separated by a space positioned above said drying roll, pipes adapted for connecting the sections of said header with a source of supply of warm air under pressure, said header being provided with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, substantially as described.

8. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, the side of said header adjacent to said drying roll being made of relatively narrow strips and being provided at the meeting edges of said strips with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, substantially as described.

9. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, the side of said header adjacent to said drying roll being made of relatively narrow strips and being provided at the meeting edges of said

strips with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, said openings being formed partly in the meeting edges of adjacent strips, substantially as described.

10. In a paper making machine, the combination of a drying roll, a header supported adjacent thereto, a pipe adapted for connecting said header with a source of supply of warm air under pressure, the side of said header adjacent to said drying roll being made of relatively narrow dressed and matched boards and being provided at the meeting edges of said boards with openings adapted for discharging air therefrom against a web of paper passing around said drying roll, substantially as described.

11. In a paper making machine, the combination of a plurality of drying rolls, headers supported adjacent thereto, pipes adapted for connecting said headers with a source of supply of warm air under pressure, said headers being provided with openings adapted for discharging air therefrom against a web of paper passing around said drying rolls and into the angular spaces formed between the web of paper and the surfaces of said rolls where said web diverges from said rolls in passing from one roll to another, substantially as described.

In testimony that I claim the foregoing as my invention, I affix my signature this 12th day of March, 1920.

EDWIN M. BASSLER.