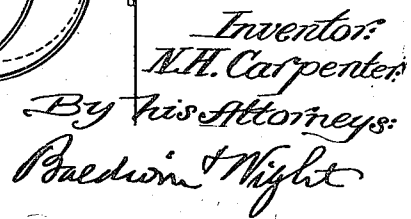


1,153,892.

3 SHEETS—SHEET 1.



N. H. CARPENTER.
MACHINE FOR MAKING PAPER.
APPLICATION FILED MAY 28, 1915.

1,153,892.

Patented Sept. 21, 1915.

3 SHEETS—SHEET 2.

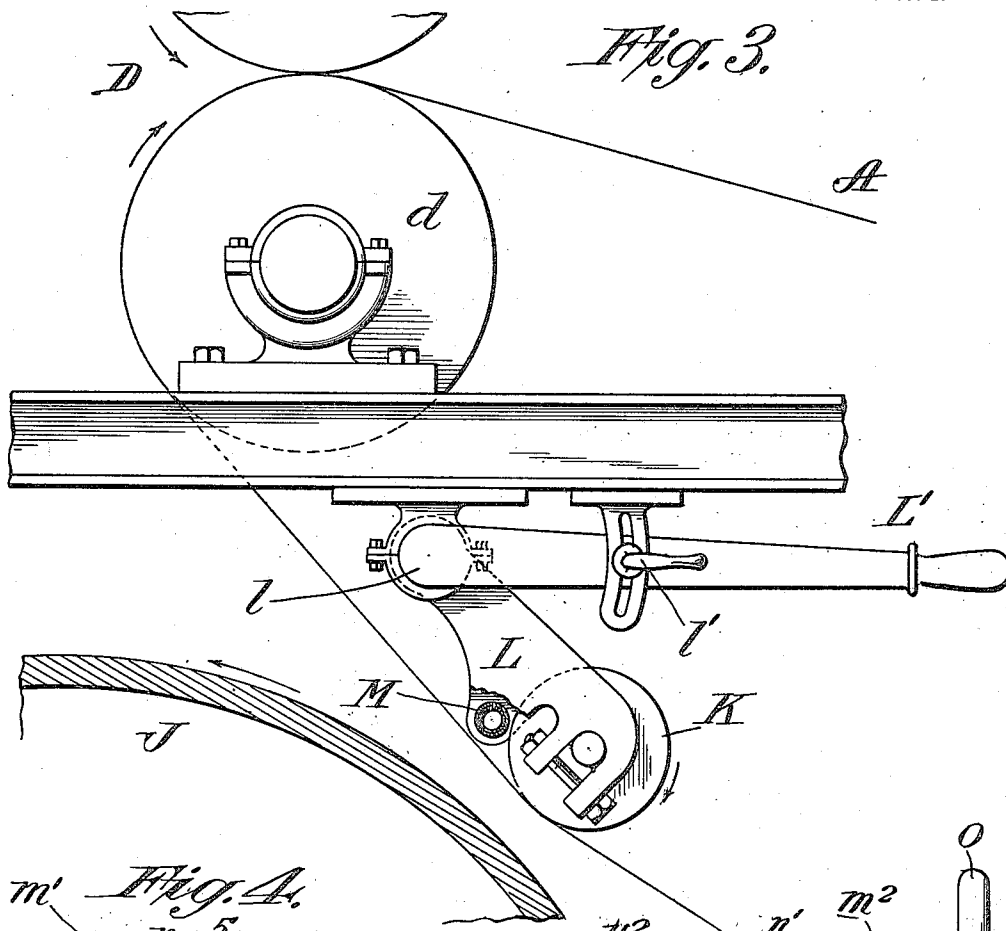
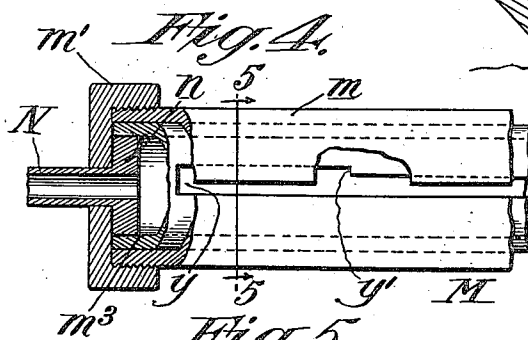


Fig. 5.

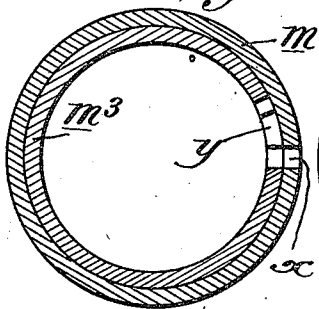
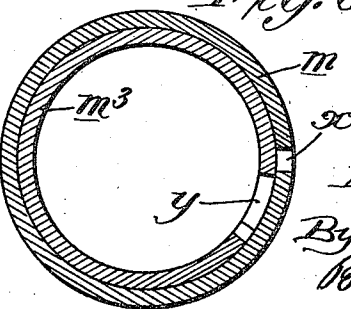
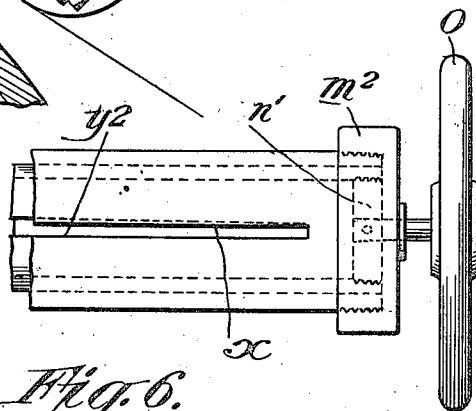


Fig. 6.



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3 SHEETS—SHEET 3.

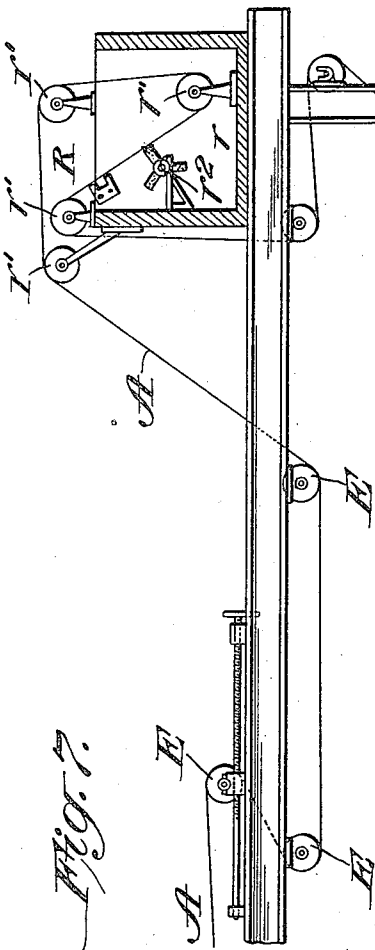


Fig. 7.

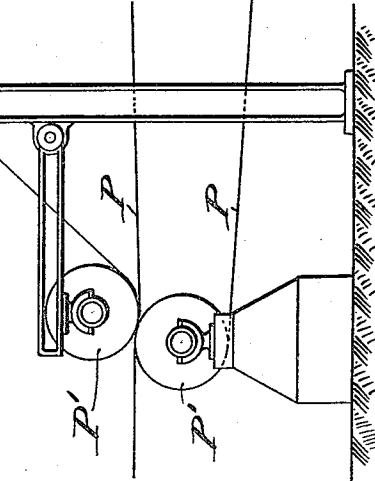
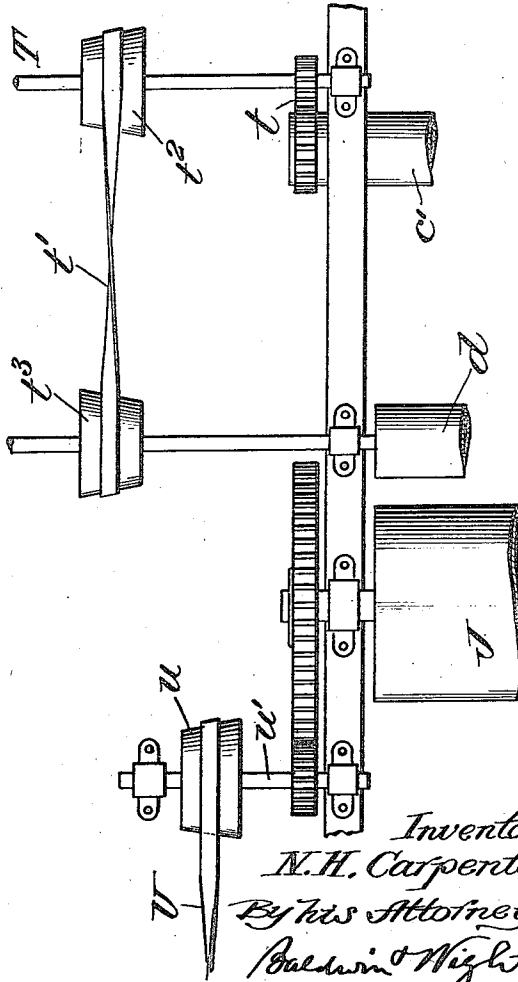


Fig. 8.



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UNITED STATES PATENT OFFICE.

NATHAN H. CARPENTER, OF COSHOCTON, OHIO.

MACHINE FOR MAKING PAPER.

1,153,892.

Specification of Letters Patent.

Patented Sept. 21, 1915.

Application filed May 28, 1915. Serial No. 31,001.

To all whom it may concern:

Be it known that I, NATHAN H. CARPENTER, a citizen of the United States, residing in Coshocton, in the county of Coshocton and State of Ohio, have invented certain new and useful Improvements in Machines for Making Paper, of which the following is a specification.

This invention relates to paper making machines in which the wet paper pulp is received from a making wire or from a making cylinder by a felt or apron which conveys it through press rolls and suction apparatus to a drier, and the object of the invention is to provide press rolls and suction apparatus of improved construction, and improved apparatus for holding the felt and paper carried thereby in proper relation to the drier, and for transferring the paper web from the felt to the drier.

The invention especially relates to machines for making crape paper and other light weight papers, in the manufacture of which heretofore considerable difficulty has been experienced in conducting the wet web of paper from the Fourdrinier wire or from the making cylinder to the drier.

In carrying out my invention I provide a felt or apron which is led through press rolls one of which is rubber covered and is held adjustably and with yielding pressure against the other roll which is mounted in stationary bearings and is provided with suction devices for exhausting the water from the paper web. From the combined press and suction rolls the felt passes to a pair of drawing rolls, one of which is mounted yieldingly in adjustable bearings and from the draw rolls the felt passes over guides which are made adjustable to vary the tension of the felt. From these adjustable guide rolls the felt passes to suitable whipping or cleaning devices and then proceeds back to that part of the machine from which it receives paper pulp. The paper leaves the felt before the latter passes through the draw rolls, and in order to facilitate the transfer of the wet paper web to the first drying cylinder, I provide a tension roll, mounted in suitable bearings, and provided with a lever or handle, by means of which it may be moved toward and from the drier and so held as to properly present the paper web to the drier near its point of transfer to the first drying cylinder. In

order to facilitate in this transfer, I provide a blow-pipe which is carried by the frame in which the tension roller is mounted and which is supplied with compressed air which is forced through a slot or opening in the pipe and through the felt in such manner as to force the paper web from the felt toward the drying cylinder.

In the accompanying drawings:—Figure 1 is a side elevation of so much of a paper making machine embodying my invention as is necessary to illustrate my improvements. Fig. 2 is a detail view, in section, and with parts broken away, of the combined press and suction rolls. Fig. 3 is a detail view, on an enlarged scale, showing the mechanism for holding the felt in proper relation with the first drying cylinder and the devices for transferring the paper web to the drier. Fig. 4 is a detail view, partly in elevation, partly in section, and with parts broken away, of the blow-pipe employed by me for transferring the paper web to the drier. Fig. 5 is a view on an enlarged scale, and in section on the line 5—5 of Fig. 4, showing the blow-pipe slot open. Fig. 6 is a similar view with the blow-pipe slot closed. Fig. 7 is a detail view, showing how my improvements are applied to a machine of the Fourdrinier type. Fig. 8 is a detail view in plan, showing the mechanism for varying the speeds of the press rolls, drawing rolls, and driers.

The machine shown in Fig. 1 is, generally speaking, of well known construction. The felt A passes from the cylinder machine B, equipped with a cylinder B' and coucher b as usual, through press rolls C to draw rolls D and thence over guide rollers E, of well known form, past a whip or cleaning device F to the cylinder machine. The guide rolls E are provided with devices G, of well known construction, for adjusting the tension of the felt. The draw rolls D comprise a lower roll d mounted in stationary bearings, and an upper roll d' mounted in bearings on levers d², pivoted at d³ and carrying adjusting screws d⁴, the lower ends of which bear on springs d⁵ which exert an upward pressure on the arm and hold the upper roll with a yielding pressure on the lower one. The lower press roll c is preferably rubber covered and is mounted in bearings on levers c², pivoted at c³, and carrying adjusting screws c⁴, which extend into spring boxes

H containing springs h which are so connected with the screws as to pull downward on the levers and hold the lower press roll with a yielding pressure against the upper one, which latter is mounted in stationary bearings and is provided with a suction device c^5 of well known form. These press rolls, through which the paper passes from the making machine, remove sufficient water from the wet paper web to prepare it for the drier. The rubber covered press roll presses the wet felt and the wet web firmly against the upper press roll and serves to squeeze out some of the water and moisture and to most efficiently present the wet web to the suction apparatus.

From the press rolls the felt carries the paper to the driers J, which may be of any usual form. Between the press rolls and the drying cylinders is interposed an adjustable tension roll K which serves to hold the felt in proper relation to the first drying cylinder to permit the transfer of the paper to said cylinder. The roll K is mounted in bearings in a frame consisting of swinging arms L attached to a shaft l from which extends a lever or handle L' equipped with adjusting devices l' by means of which it may be held in any desired position. As shown in Fig. 3 the roller K serves to bend the felt opposite the first drier and there hold it at the desired distance from the drier. For the purpose of transferring the paper web from the felt to the drier, I provide a blow-pipe M which is mounted in the frame of the tension roll K and is movable therewith toward and from the drier. This pipe serves to blow the paper away from the felt into contact with the drier. It is preferably of the construction shown in Figs. 4, 5 and 6, for a purpose hereinafter to be explained. An outer pipe member m is closed at opposite ends by screw caps m' m^2 and it incloses an inner pipe member m^3 , the ends of which are also closed by said caps.

N indicates an air supply pipe which extends into the inner pipe member and is provided with a retaining head n . The opposite end of the inner pipe member is provided with a head n' carrying the stem of a hand-wheel O which is used to turn and thus adjust the inner pipe member relatively to the outer one. The outer pipe member is formed with a slot x which may be of uniform width, while the inner pipe member is formed with a slot of varying width, one portion y being relatively wide and terminating in a shoulder y' , while the remaining portion y^2 of the slot is tapered. By this arrangement the size of the air passage from the blow-pipe may be varied. By this construction the blow-pipe may be adjusted to operate on paper webs of different widths or on the comparatively narrow "end" of the paper web when starting the

operation. The construction is also such that the width of the air opening may be varied at will and the length of this opening can be adjusted to suit all conditions.

In Fig. 1 I have shown my improvements applied to a cylinder machine.

In Fig. 7, I have shown how they may be applied to a Fourdrinier machine. In this case the felt A takes the paper web from the making wire P and couchers P' and passes to the press rolls. The felt is shown as passing from the tension guide rolls E to a cleaner R of well known construction, comprising a vat r , guide rollers r' and a whip or cleaner r^2 . In order to adjust the speeds of the different rolls I provide a driving shaft T, geared to the upper press roll at t and belted to the lower draw roll at t' . The belt passes around a cone pulley t^2 on the shaft T and around a cone pulley t^3 on the shaft to the lower draw roll. By this well known mechanism the speed of the draw roll relatively to that of the press roll may be varied. The variable speed drier is driven by a belt U, passing over a cone pulley u on a shaft u' , geared to the drying cylinder J. By means of this mechanism the speed of the drier may be varied to suit any conditions which may exist at any time.

In the manufacture of crape paper, the web of paper pulp is allowed to pass with the felt to the adjustable draw rolls D and at the point of contact between said rolls the web of paper leaves the felt and sticks to the top metal draw roll, and passes around said roll until it comes in contact with a doctor plate V which serves to crinkle the paper web and causes it to slide off of the draw roll and descend by gravity to the variable speed drier which by the mechanism before described can be adjusted to run at any desired speed to stretch the paper web before it is dried.

It will be observed that in my machine a single felt is employed which simplifies and cheapens the construction and facilitates in the operation of the mechanism. The combined press and suction rolls have been found to be most efficient in preparing the paper web for the drawing operation, while the adjustable tension roll associated with the first drier cylinder is most useful in properly locating the paper web relatively to the first drier at the point of transfer, and the blow-pipe operates with certainty to move the paper toward the drier during the transferring operation.

I claim as my invention:

1. In a paper-making machine, the combination of an endless felt or apron which receives the wet pulp, draw rolls engaging the felt and driving it, and a pair of press rolls between which the felt passes with the paper web, one of which is provided with suction mechanism for drawing

water from the felt and pulp, and the other of which is pressed yieldingly against the combined press and suction roll.

2. In a paper-making machine, the combination of an endless felt or apron which receives the wet pulp, draw rolls engaging the felt and driving it, means for adjusting the pressure of the draw rolls, a pair of press rolls between which the wet felt passes with the pulp, one of which is provided with suction mechanism for drawing water from the felt and pulp, and the other of which is pressed yieldingly against the combined press and suction rolls, and means for adjusting the pressure exerted by said rolls on the felt and paper.

3. In a paper-making machine, the combination of an endless felt which receives the wet pulp, draw rolls engaging the felt and driving it, a pair of press rolls between which the wet felt passes with the paper, means for adjusting the pressure exerted between the press rolls, means for adjusting the pressure exerted between the draw rolls, and mechanism for driving the press rolls and draw rolls provided with devices for varying the speed of the draw rolls relatively to that of the press rolls.

4. In a paper-making machine, the combination of an endless felt which receives the wet pulp, draw rolls engaging the felt and driving it, press rolls between which the felt passes with the paper, a drier interposed between the draw rolls and press rolls, and an adjustable tension roll bearing on the felt near the drier for varying the position of the felt relatively to the drier.

5. In a paper-making machine, the combination of a felt, a drier mounted to move in proximity to the felt, a roller engaging the felt near the drier, and means for adjusting the position of said roller to vary the distance between the felt and the drier at the point of transfer of the paper from the felt to the drier.

6. In a paper-making machine, the combination of a felt, a drier, a blow-pipe asso-

ciated with the drier and serving to blow through the felt and cause the paper web to move therefrom into contact with the drier.

7. In a paper-making machine, the combination of a felt, a drier, a blow-pipe associated with the drier and serving to blow through the felt and cause the paper to pass therefrom to the drier, and means for adjusting the position of the blow-pipe relatively to the drier.

8. In a paper-making machine, the combination with the felt of a drier, a roller bearing on the felt near the drier, means for adjusting the position of said roller relatively to the drier, and a blow-pipe movable coincidently with the roller for blowing through the felt and causing the paper web to engage the drier.

9. In a paper-making machine, the combination with the felt, of a drier, a blow-pipe associated with the drier and serving to blow through the felt and cause the paper web to be transferred to the drier, and means for adjusting said blow-pipe to vary the area of its active opening.

10. In a paper-making machine, the combination with a felt of a drier, and a blow-pipe associated with the felt and drier to cause the paper web to pass from the felt to the drier, said blow-pipe being provided with a slotted opening and equipped with means for varying the width and length of said opening for the purpose specified.

11. In a paper-making machine, the combination of combined press and suction rolls, draw rolls, a felt conveying the paper web from the press rolls to the draw rolls, a variable speed drier and a doctor blade operating to strip the paper web from the draw rolls, crinkle it and deliver it to the variable speed drier.

In testimony whereof, I have hereunto subscribed my name.

NATHAN H. CARPENTER.

Witnesses:

MARY WIMMER,

MADLINE SCHAEFFLER.