Dec. 16, 1924. 1,519,696

E. NISHINA

PAPER MACHINE

Filed July 19, 1922

Fig. 1.

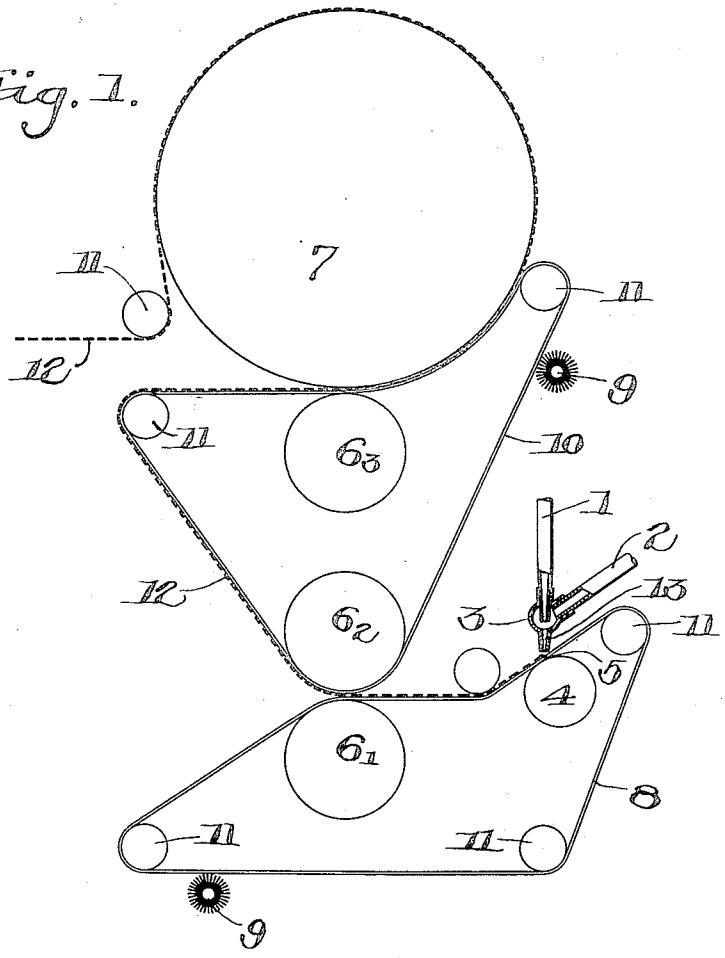


Fig. 2.

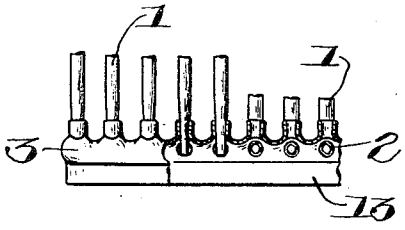
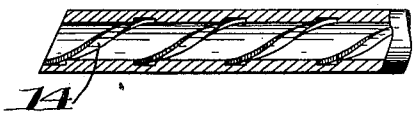


Fig. 3.



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UNITED STATES PATENT OFFICE.

ENPEI NISHINA, OF TOKYO-FU, JAPAN.

PAPER MACHINE.

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To all whom it may concern:

Be it known that I, ENPEI NISHINA, subject of the Emperor of Japan, residing at No. 833 Oaza-nakameguro, Meguro-mura, Ebara-gun, Tokyo-fu, Japan, have invented certain new and useful Improvements in a Paper Machine, of which the following is a specification.

The present invention relates to improvements in a paper machine, consisting of an endless band very rapidly travelling over a rotating roller, and an ejector for projecting pulp upon the said endless band, the ejector so mounted that its spout lies closely opposite the endless band at a place a little removed from the top of the roller toward the direction in which the endless band travels and the projection is made obliquely against the band at about 45°. The object of the invention is to facilitate draining off of water from the web of pulp formed on the endless band and to prevent any possible damages to the said band and the roller carrying it.

Fig. 1 is a diagrammatic representation of the present invention.

Fig. 2 is a side view, part sectional, of the ejector.

Fig. 3 is a sectional view of a pulp feeding pipe, enlarged.

Instead of the "long net" or the "round net" as now generally used for paper manufacture, if an endless band of woolen cloth or metallic net is employed, and the pulp is projected thereupon with a great force, a tougher kind of paper will be obtained, but such process is liable to cause damages to the band or receiver on which web of paper is to be formed, owing to the force with which the pulp is projected. The present invention obviates this inconvenience by arranging an endless band on which web of paper is to be formed in such a way that it travels very rapidly by means of a rotating cylinder or roller and by projecting the pulp thereupon obliquely by means of compressed air from an ejector mounted in a specially convenient position, at the same time facilitating drying of the web formed.

The following is an example of carrying my invention into practice:—

An endless band (8) of woolen cloth or metallic net of fine meshes on which web of paper is to be formed, is run over a rotating cylinder (4), a press roll (6_1) and a number of guide rolls (11) so as the band is able to travel very rapidly. An ejector (3) is installed above the rotating roller (4), its spout (13) lying close to the belt a little removed from the top point of the roller toward the direction of the travel of the belt as at (5), and making therewith an angle of about 45°. The ejector (3) may be of any suitable form, but as shown in the accompanying drawing, it is a kind of a long, irregular box with a spout (13) of narrow slit extending across nearly the whole breadth of the traveling band. Through the upper part of this box, or ejector, several air tubes (1) are introduced, terminating at about middle of the box through which tubes (1) the air compressed to a pressure of several thousand pounds per square inch, is forced, and which by its force project upon the traveling band the pulp introduced into the box through pipes (2) which enters the box also at its upper part. These pulp feeding pipes (2) are rifled with shallow spiral (14) or divergent grooves for the purpose of well intermingling the fibres of pulp there. There are also provided on both sides of the traveling band boards which serve as rims and prevent scattering away of pulp. The web of pulp thus formed upon the traveling band is then taken up by another endless belt (10), passes between the press rolls (6_1) (6_2) and over the guide roll (11). The pulp film then goes round the drying drum (7), gets dried there and comes out of the machine. It is necessary to keep the surface of the bands (8) and (10) always clean, and for this purpose brush rolls or cleaning apparatus (9) are mounted at suitable places.

To operate my machine, the air compressed to a pressure of several thousand pounds per square inch is sent through the air tubes (1). By the force of this compressed air, the soft pulp suspended in the water is projected upon the very rapidly travelling endless band (8) at a place as at (5) at an angle of about 45°. Part of the water contained in the pulp film is drained away by the force with which the pulp projected and the rest is squeezed out while it passes between the press rolls (6_1) (6_2). The film is then transferred to another endless band (10). On passing between the press roll (6_3) and the drying drum (7), the pulp film is taken up by the latter, and while going round it, it gets quite dried. The process after drying is carried on in an ordinary manner.

As it must have been seen from the above description, the main feature of the present

invention consists in causing an endless band to travel very rapidly and projecting pulp thereon with a great force at a place a little removed from the top point of the rotating roller toward the travelling direction of the band at an angle of about 45°. The several advantages of my invention are;—The progress of the band is never hindered; no damages occur to the band or the roller; drying of the pulp web is facilitated; and the motive power to propel the band is much saved.

Claims:

1. A paper manufacturing machine including a high pressure operable pulp ejector, a high speed operable endless band and the ejector and the band being arranged in close relation and at 45° with respect to each other, substantially as and for the purposes set forth.

2. A paper manufacturing machine including a high pressure operable pulp ejector and a high speed operable endless band having a portion arranged in close relation and at an angle of 45° to the mouth of the ejector, substantially as and for the purposes set forth.

3. A paper manufacturing machine including an endless band operable at a high speed and an ejector including a box-like body, a spout formed across the lower portion thereof and having a relatively narrow mouth, pulp conducting pipes connected with the body of the ejector, compressed air conducting pipes communicating with the body of the ejector and adapted to force pulp through the mouth of the ejector, and the endless band and the ejector being arranged in close relation and at 45° with respect to each other.

4. An arrangement as claimed in claim 3, wherein the inner surfaces of the pulp conducting tubes are rifled to provide grooves for facilitating forcing of the pulp.

5. An arrangement as claimed in claim 3, wherein the inner surfaces of the pulp conducting tubes are provided with spiral grooves, substantially as and for the purposes set forth.

6. A paper manufacturing machine including a compressed air operable pulp ejector, an endless band operating at a higher rate of speed beneath the ejector and at an angle 45° thereto for receiving a web-like layer of pulp, another endless band arranged above the first mentioned endless band to which the web of pulp is transferred, a drying drum arranged above the last mentioned endless band for receiving the pulp web from the second mentioned endless band, and press rolls operably mounted within the endless bands and coacting respectively with the bands and with the second mentioned band and the drum, substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature.

ENPEI NISHINA.