No. 629,937. Patented Aug. 1, 1899.

W. K. TROTMAN.

MANUFACTURE OF PAPER.

(Application filed Sept. 9, 1898.)

(No Model.)

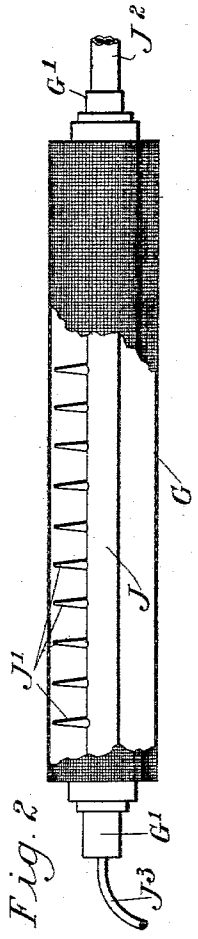


Fig. 2

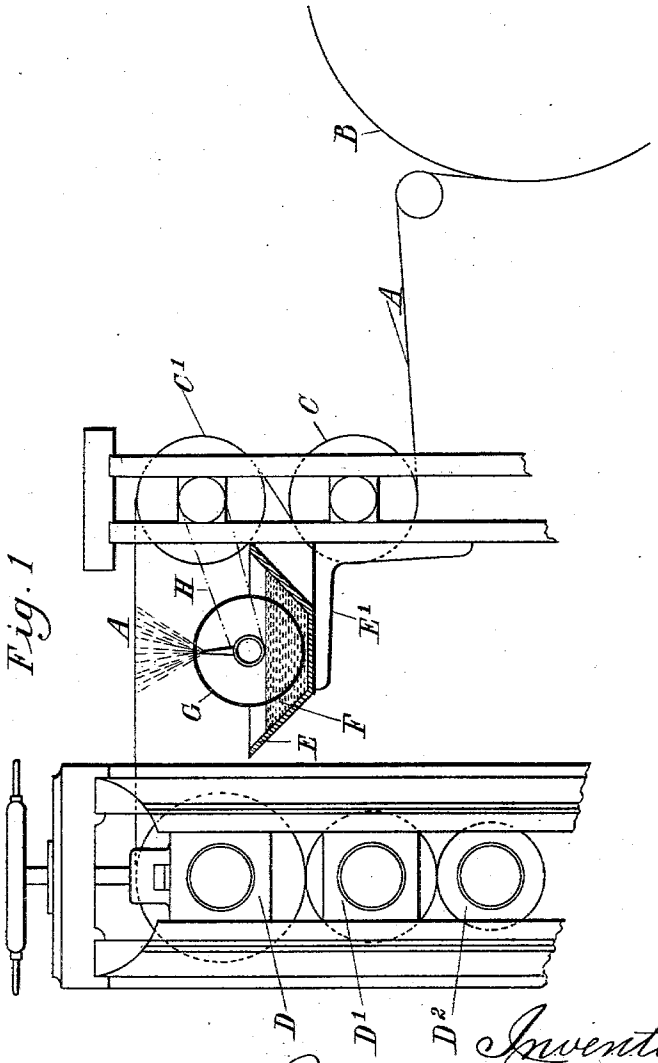


Fig. 1

Witnesses:
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UNITED STATES PATENT OFFICE.

WALTER KNOWLES TROTMAN, OF LONDON, ENGLAND.

MANUFACTURE OF PAPER.

SPECIFICATION forming part of Letters Patent No. 629,937, dated August 1, 1899.

Application filed September 9, 1898. Serial No. 690,553. (No model.)

To all whom it may concern:

Be it known that I, WALTER KNOWLES TROTMAN, a subject of the Queen of England, residing at Stoke Newington, London, Middlesex county, England, have invented certain new and useful Improvements in or Relating to the Manufacture of Paper, of which the following is a specification.

This invention relates to the manufacture of paper, and has for its object to cause both sides of the paper to have the same surface, the under side being softened with water, size, gum, or the like to enable the wire marks to be taken out by the pressure of the calender-rolls.

According to this invention the paper may be treated on its upper surface in the ordinary manner; but to enable the under surface to be similarly treated I cause the paper to pass over or above a specially arranged and constructed damping-roll. This damping-roll comprises a rotatable cylinder of wire-gauze or similar material having a tube running axially through it and partially immersed in a trough containing water, size, gum, or other substances in solution, with which the paper is to be treated. A series of jets projecting from the upper side of the axial tube enables steam or air to be driven through the wire cylinder, so as to transfer the liquid retained in the meshes of the wire onto the under surface of the paper as the cylinder rotates.

It will be seen that the amount of surfacing-liquid applied to the paper can be regulated by adjusting the speed of rotation of the wire cylinder, more liquid being carried up as the speed of rotation is increased or by varying the pressure of air or steam.

The improved damping-roll is situated beneath the paper web as it passes from the cooling to the calendering rolls.

The cylinder may be driven by suitable mechanism and the bearings upon the steam or air tube on which the roll rotates may be constructed as found most convenient.

The wire-gauze or other material employed on the rotary cylinder may be mounted upon some form of frame such as is usually employed for this purpose.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of the improved damping apparatus. Fig. 2 is an elevation, partly broken away, of the damping-roll.

Like letters indicate like parts throughout the drawings.

The paper A comes off the deckle-machine and travels along while in a warm condition until it reaches the cooling-roll and on leaving the cooling-roll B is led over rollers C C′ and thence to the calendering-rolls D D′ D^2. Between the rolls C C′ and the calendering-rolls is situated a trough E, carried upon some suitable form of bracket E′. The trough contains a liquid F, which may be water, size, gum, or other substance or substances in solution, with which the paper is to be treated. Within the trough a cylinder G of wire-gauze is carried in bearings so situated that the cylinder is partly immersed in the liquid F contained in the trough E. The cylinder G is rotated by band or other gear connected to some rotating part of the paper-making mechanism. In the example illustrated a band H passes around a pulley on the spindle of the roll C′ and around a second pulley on the spindle of the cylinder G.

Running axially through the cylinder G is a pipe J, from which projects a series of nozzles J′, the orifices of the latter being situated a short distance from the inner surface of the wire-gauze circumference of the cylinder G. Steam or air is led through the pipe J^2 through the center of one of the journals G′ of the cylinder G to the pipe J. The steam or air issuing from the nozzles J′ transfers the liquid retained in the meshes of the wire of the cylinder G onto the under surface of the paper A, which passes above it.

As a means of regulating the blast from the nozzles J′ a pipe may be carried from the end of the tube J opposite to that at which the steam or air is admitted. This pipe J^3 is smaller than the pipe J^2 and may be left open or be more or less closed by means of a cock, which thus allows the pressure within the tube J to be varied.

The gearing for bringing about the rotation of the cylinder G may be so arranged that the speed of the latter can be varied in order to vary the quantity of liquid carried around by the cylinder as it rotates, and consequently the quantity of liquid transferred to the under surface of the paper.

I claim—

1. The combination with cooling and calendering rolls, of a rotatable perforated cylinder, a trough situated between the cooling and calendering rolls and beneath the paper-web, the said cylinder being adapted to be partially immersed in a liquid contained in said trough, guide-rolls arranged intermediate the cooling-roll and the perforated cylinder, an axial tube within the cylinder and a series of upwardly-directed nozzles carried by said tube, all arranged as and for the purpose set forth.

2. The combination with a trough containing liquid, of a rotatable perforated cylinder partially immersed in the liquid, an axial tube arranged within the cylinder and a series of nozzles projecting from said tube.

3. The combination with a trough containing liquid, of cooling and calendering rolls, a rotatable perforated cylinder partially immersed in the liquid, and adapted when rotated to take up some of the liquid and retain the same in its mesh, a tube arranged axially within the cylinder, a series of nozzles projecting from said tube and adapted to direct jets of air or steam against the liquid in the mesh of the cylinder and drive it against the surface of the paper during the rotation of the cylinder, and inlet and outlet pipes at the ends of said tube.

4. The combination with a perforated cylinder, of a tube arranged axially within the cylinder, a series of nozzles projecting from said tube, an inlet-pipe communicating with one end of the cylinder, and an outlet-pipe communicating with the opposite end thereof, said outlet-pipe being smaller than the inlet-pipe.

5. In a damping device, the combination with cooling and calendering rolls, of a trough containing liquid arranged between the cooling and the calendering rolls, a rotatable perforated cylinder partially immersed in the liquid, a tube arranged axially within the cylinder, a series of nozzles projecting from said tube, an inlet-pipe communicating with one end of the cylinder, and an outlet-pipe communicating with the opposite end thereof, said outlet-pipe being smaller than the inlet-pipe.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

WALTER KNOWLES TROTMAN.

Witnesses:

R. E. DUNBAR KILBURN,

HARRY B. BRIDGER.