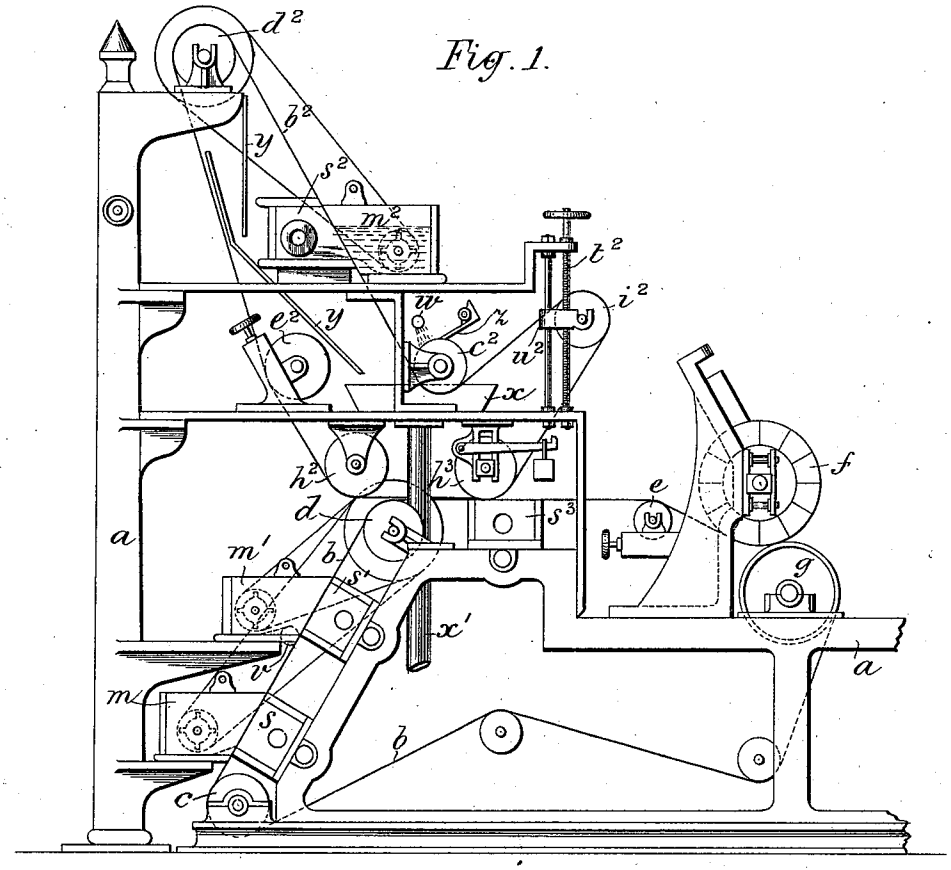
(No Model.) 2 Sheets—Sheet 1.

G. P. BARNES.

PAPER MAKING MACHINE.

No. 507,643. Patented Oct. 31, 1893.

Fig. 1.



WITNESSES:

Fred White

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INVENTOR:

George Planta Barnes,

By his Attorneys:

Arthur G. Fraser & Co

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

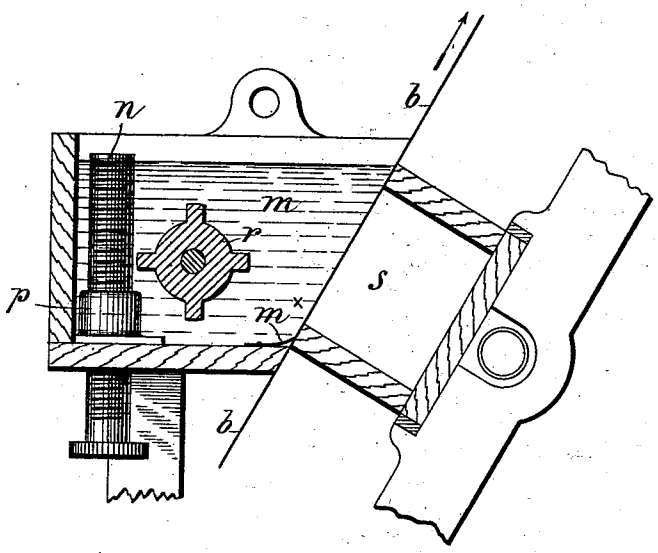
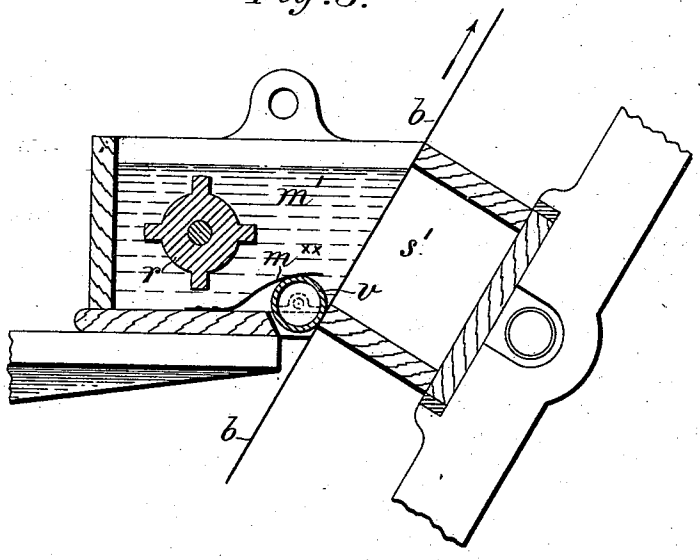


Fig. 3.



WITNESSES:
Fred. White
G. K. Fraser.

INVENTOR:
George Planta Barnes.
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UNITED STATES PATENT OFFICE.

GEORGE PLANTA BARNES, OF LONDON, ENGLAND.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,643, dated October 31, 1893.

Application filed June 28, 1892. Serial No. 438,297. (No model.)

To all whom it may concern:

Be it known that I, GEORGE PLANTA BARNES, of London, England, have invented certain new and useful Improvements in Paper-Making Machines, of which the following is a specification.

This invention has reference to paper making machines in which the paper is formed upon an endless paper machine wire or sieve. Heretofore such machines have consisted of a pulp box having one side open, with an endless traveling paper machine wire which in a part of its travel in which it moves upward is in close contact with the open side of the box, whereby pulp is directly deposited upon said wire from the box during said upward movement, and a vacuum box in contact with the under side of said wire.

According to my invention I employ in a paper making machine having a pulp box having one side open, and an endless traveling paper machine wire which in a part of its travel in which it moves upward is in close contact with the open side of said box, a second and upper pulp box having one side open and in close contact with said wire, and a roller across the bottom edge of the open side of said second box, whereby a second thickness of paper becomes deposited upon the wet web of paper formed on the wire by the pulp from the first box, and said wet web is enabled to enter the second box without being disturbed on the wire.

In the accompanying drawings:—Figure 1 is a side elevation of a paper making machine constructed according to the preferred form of my invention, the machine being one in which there are two endless wires, two pulp boxes being arranged in connection with the one wire and one pulp box being arranged in connection with the other wire, and the two wires being adapted to superpose the two wet webs of paper which are respectively formed thereon. Fig. 2 is a vertical section on a larger scale of the pulp box *m*, vacuum box *s* and part of the endless wire *b* shown in Fig. 1. Fig. 3 is a vertical section on a large scale of the second and upper pulp box *m'*, vacuum box *s'* and part of the endless wire *b* shown in Fig. 1.

Referring to Figs. 1, 2 and 3, *a a* are side frames carrying bearings for the shafts of the various rolls and rollers hereinafter described; *b* is the endless wire; it passes from the roller *c* at the bottom up to and over the roller *d*, then over the guide roller *e* and between the upper and lower couching rolls *f g*, which are of ordinary construction; from the lower roller *g* the wire goes around the usual guide rollers and back to the roller *c*. The wire preferably receives its motion from the lower couching roll, this roll *g* being driven in the ordinary manner from any prime mover.

m is the usual lower pulp box which can be supplied with pulp from any suitable source. An open side of the box *m* is in close contact with one side of the endless wire *b* at a point where this travels upward, and there is a lip $m^{\times}$ of leather or other suitable material at the bottom of the box to prevent the pulp escaping there.

The depth of the pulp in the box *m* and consequently its pressure upon the wire *b* is regulated by means of one or more of the usual overflow pipes *n*, see Fig. 2, the height of which can be adjusted; the adjustment is preferably effected as heretofore by forming the pipes *n* with an external screw thread to work in a female screw *p* in the bottom of the box *m*.

In order to keep the pulp in the box *m* at uniform consistency the usual revolving agitator *r* is fitted in the box.

s is a vacuum box of ordinary construction in contact with the under side of the wire, immediately opposite the pulp box *m*.

The wire *b* is shown as traveling at an angle of about thirty degrees from the vertical between the rollers *c* and *d*. This angle is that which I consider the most suitable, but it can be very considerably varied. An important point in such machines is that the wire *b* should be in close contact with and in fact constitute one side of the pulp box so that the paper may be at once formed from the box on the wire; thus the tendency of the fibers to get laid or placed parallel with the line of travel is avoided.

As thus far described the machine is of known construction and its operation is the usual one of depositing a layer of pulp on the wire *b* as it passes upwardly in contact with the pulp box *m*. This pulp is drawn or

sucked onto the wire by the combined effect of gravitation and of the vacuum in the suction-box *s*. Part of the water in the pulp passes through the wire into the vacuum box, and paper is at once formed on the wire. This paper travels as a continuous web, and is then usually carried upwardly by the wire *b* to the couching rolls *f g*, where it is couched in the usual manner. After passing the couching rolls the paper and wire separate, the wire going over guiding rollers to the roller *c* and the web passing onto the ordinary appliances for effecting the pressing, drying or other subsequent operations usual, and which form no part of my invention.

According to my invention I provide a second pulp box above the first for applying a second layer of pulp on that first deposited, and I provide improved means for facilitating the passage of the first web into contact with this second box. This is preferably accomplished as shown in the drawings, in which m' is a second pulp box placed above the first pulp box m so as to lay a second thickness of paper upon the wet web of paper formed by the pulp from the first box m. The upper box m' can contain the same grade of pulp as or a different grade of pulp from that in the box m. An upper vacuum box s' is placed opposite the upper pulp box m'.

v is a roller placed across the bottom edge of the open side of the upper box m' and free to turn in bearings in the end of said box. The wet web of paper in its upward travel with the wire *b* passes under, and presses against the roller *v*, and as this roller is thereby caused to turn on its axis the said wet web is not disturbed as would be the case if the bottom edge of the open side of the box were fixed.

m^{xx} is a strip of leather or other like suitable material to prevent the pulp escaping from the box behind the roller *v*. The said strip is fixed along one edge of the bottom of the box m', while its other edge overlaps the roller *v* as shown. By the use of this upper box the paper formed on the wire *b* at the lower box can be thickened, or it can be coated with an enamel or other surface, or in the case where another web of paper is to be superposed as about to be described the said upper box m' can supply a pulp of stronger or different fiber to constitute the middle layer of a triplex paper.

With the machine as described the wire with the duplex or coated wet web of paper passes over the upper roller *d* and guide roller *e* to the couching rolls *f g*, but when it is required to make a triplex paper a second web of paper is formed by means of the endless wire b^2, pulp box m^2 and vacuum box s^2; the wire b^2 passes from the roller c^2 up to the roller d^2 and then over the guide rollers e^2 h^2, press roller h^3 and guide roller i^2 back to the roller c^2, its tension being regulated by raising or lowering the brackets u^2 carrying the roller i^2 by means of screw shafts t^2. The two wires with their respective wet webs of paper meet on passing the roller *d* and travel together between the roller h^3 and the vacuum box s^3 receiving suitable pressure from the roller h^3, which is an ordinary weight roller; the upper wire then rises to the roller i^2 while the lower wire with the two superimposed webs passes on to the couching rolls *f g*.

w is a pipe for supplying a stream of water to wash the upper wire b^2 before it again reaches the pulp box m^2; this water falls through the wire into a receiver *x* with outlet pipe x' and the same receiver collects the water which falls through the wire b^2 after it passes the vacuum box s^2 this water being directed by the guides *y y*.

z is a doctor or scraper to clean the roller c^2.

It will be seen that my invention provides an improvement in paper making apparatus which can be readily availed of, and which will facilitate the making of paper composed of superposed webs, and it will be understood that the invention is not limited in its application to a machine having the particular details of construction and arrangement described and shown, as it may be employed as the circumstances may dictate without departing from the essential features of the invention.

What I claim is—

In a paper making machine, the combination with a pulp box having one side open, and an endless traveling paper machine wire which in a part of its travel in which it moves upward is in close contact with the open side of said box, whereby a wet web of pulp is deposited on said wire as it passes said box, of a second and upper pulp box having one side open and in close contact with the side of said wire on which said wet web of pulp is deposited, and a roller across the bottom edge of the open side of said second box, constructed to bear against the side of said wire on which said wet web of pulp is deposited and revolve as said wire enters said second box, whereby said wet web is enabled to enter the second box without being disturbed on the wire, and a second thickness of paper may become deposited in said second box upon the wet web of paper formed on the wire by the pulp from the first box, substantially as set forth and shown.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE PLANTA BARNES.

Witnesses:

JOHN C. NEWBURN,

GEORGE C. BACON.