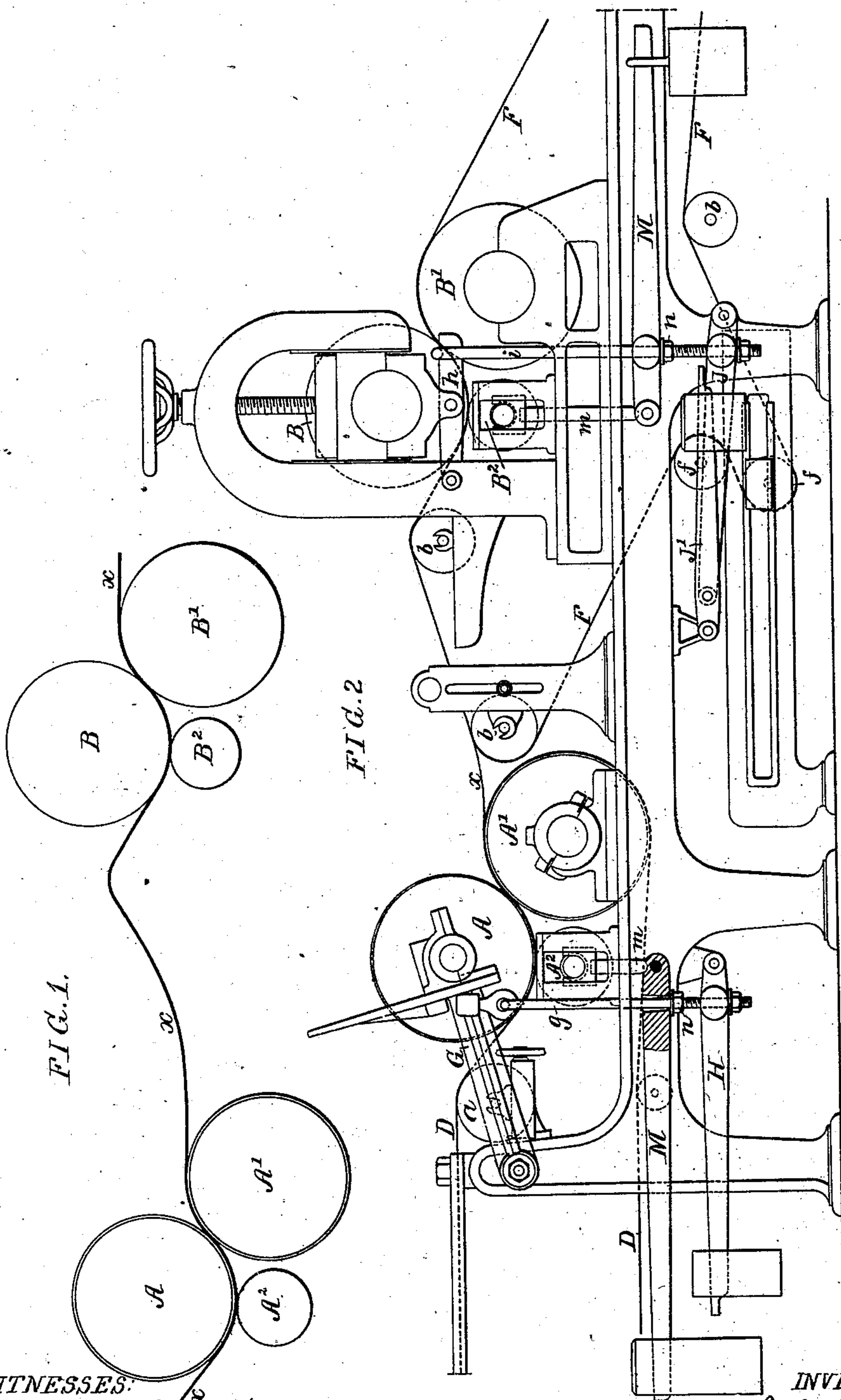


(No Model.)

J. J. HARRIS.
PAPER MAKING MACHINE.

No. 293,870.

Patented Feb. 19, 1884.



WITNESSES:

David S. Williams
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UNITED STATES PATENT OFFICE.

JOHN J. HARRIS, OF WILMINGTON, DELAWARE.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 293,870, dated February 19, 1884.

Application filed November 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. HARRIS, a citizen of the United States, and a resident of Wilmington, Delaware, have invented certain
5 Improvements in Paper-Making Machines, of which the following is a specification.

One object of my invention is to effect such a drying of the web of paper before it reaches the first press-rolls that the breaking of said
10 web by its adhesion to one of said press-rolls will be prevented. A further object is to render said press-rolls more effective in their action than usual. These objects I attain in the manner hereinafter set forth, reference being
15 had to the accompanying drawings, in which—

Figure 1 is a diagram showing the rolls of a paper-making machine to which my invention relates, the web of paper also being shown, but without its supporting-felts; and Fig. 2 is
20 a side view of part of the complete machine, illustrating other features of my invention.

In Fig. 1, A A' represent the ordinary couch-rolls, and B B' the usual first press-rolls, which, however, in ordinary paper-making machines
25 are not arranged as shown in the drawings, the upper press-roll, B, being directly above the lower roll, and the upper couch-roll, A, but slightly in advance of the lower roll A'. The couch-rolls A A' are covered with felt, and the
30 web *x* of paper passes between them before passing to the press-rolls, in order that the water may be expressed from the web and the latter reduced to such a firm and coherent sheet that it may be subjected to the action of the
35 metal press-rolls. It frequently happens, however, that the web in its passage between the couch-rolls is not reduced to the necessary dry and firm condition, and when it reaches the press-rolls it has a tendency to adhere to the
40 upper roll, the web being thus broken and the stoppage of the machine necessitated until the defect can be remedied. To overcome this objection, I use three couch-rolls instead of two, as usual, the extra roll A² being, by preference, of metal and of smaller diameter than
45 the others, and being arranged in advance of the lower roll A', the upper roll, A, being also advanced, as shown, so that it has a bearing upon both of the lower rolls, A' and
50 A². By this means the web of paper in passing between the couch-rolls is subjected to

then between the rolls A and A'. The first pressure serves to express the greater portion of the moisture from the web, and the second
55 pressure between the felt-covered rolls A A' effects the drying and compacting of the web to such an extent that it can be passed between the press-rolls without risk of being broken. I also use an extra press-roll, B², arranged in
60 the same relation to the rolls B B' as the couch-roll A² in respect to the rolls A A', this roll serving to impart pressure to the web before it reaches the main rolls B B', and thus cause a preliminary hardening of the web before it
65 reaches the rolls B B', and lessen the risk of the web-sticking to the upper roll, B, when it arrives at the point of discharge from between said rolls B B'.

In Fig. 2 are shown the frame of the machine, the bearings of the various rolls, and the wire-cloth and felt which carry the web of
70 paper.

D is the wire-cloth, on which the web of paper is formed, this wire-cloth passing over a
75 roller, *a*, thence between the couch rolls A A' and A A', thence round the latter roll A', and over supporting-rollers to the front end of the machine. From the wire-cloth D the web *x* passes onto the conveyer-felt F, which runs
80 over the usual carrier-rolls, *b*, and round tightening-rolls *f*, and serves to carry the web *x* between the press-rolls. Each bearing of the upper couch-roll, A, is carried by a pivoted arm, G, connected by a rod, *g*, to a weighted lever, H, hung to the frame of the machine, and the
85 bearing of the upper press-roll, B, is connected to a lever, *h*, from which a rod, *i*, extends to a compound lever, J J', as shown, these devices forming no part of my invention. The
90 bearings of the lower couch-roll A² and lower press-roll B², however, are acted upon by rods *m*, bearing upon (or they may be connected to) the short arms of levers M, the long arms of which are weighted, so that the rolls A² and
95 B² are pressed upward against the rolls A and B. In order, however, that this upward pressure may have no tendency to counteract the weight on the upper rolls, or tend to raise the same from the rolls A' B', the fulcrum of the
100 levers M are upon nuts *n*, carried by the rods *g i*, so that the effect of the weighted levers M is exerted equally upon the rolls A A² or B B², and the tendency is simply to pull these rolls

together without in any way modifying the tendency of the other weighted levers to press the rolls A B upon the rolls A' B'. While this arrangement is preferred, however, it is not absolutely necessary, as the downward pull upon the upper roll, A or B, may be so much in excess of the upward thrust upon the lower roll A² or B², that the required pressure upon the roll A' or B' will be exerted.

I claim as my invention—

1. The combination of the upper couch-roll, A, of a Fourdrinier machine, the two lower rolls, A' and A², upon both of which the upper roll has a bearing, the press-rolls, and a conveyer, whereby the web of paper is caused to pass first between the rolls A A², then between the rolls A A', and thence to the press-rolls, as set forth.

2. The combination of the couch-rolls A, A', and A², arranged as described, with the upper press-roll, B, the lower press-rolls, B' and B²,

providing a double support for said upper roll, and a conveyer, whereby the web of paper is carried first between the couch-roll A and the rolls A² and A', and then between the roll B and the rolls B² and B', as set forth.

3. The combination, in couch or press roll mechanism of a paper-machine, of the upper roll and the two lower rolls, with a weighted rod for depressing said upper roll, and a weighted lever, M, having an opening for the passage of said rod fulcrumed on a nut, *n*, thereon, and acting on a rod, *m*, which presses upward upon the bearing of one of the lower rolls, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN J. HARRIS.

Witnesses:

ALFRED J. RUMFORD,
FERDINAND CARSON.