

Patented Aug. 1, 1865

Fig. 1.

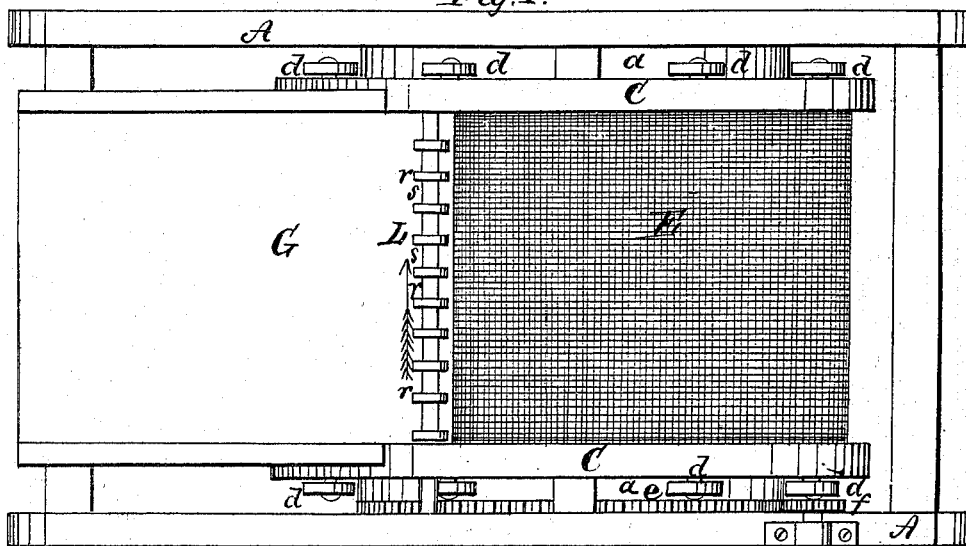
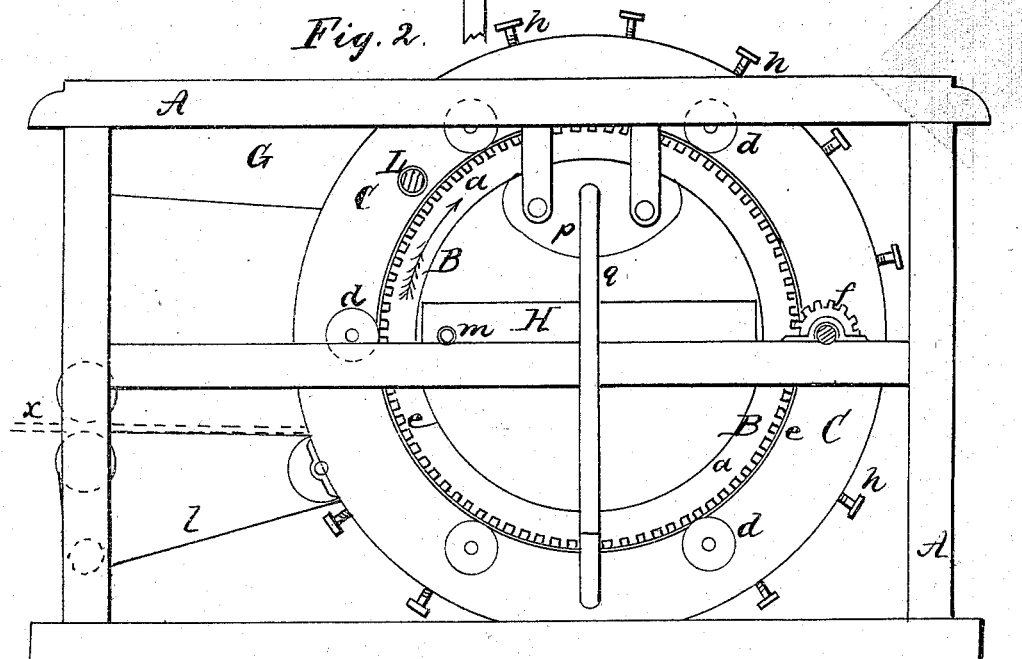


Fig. 2.



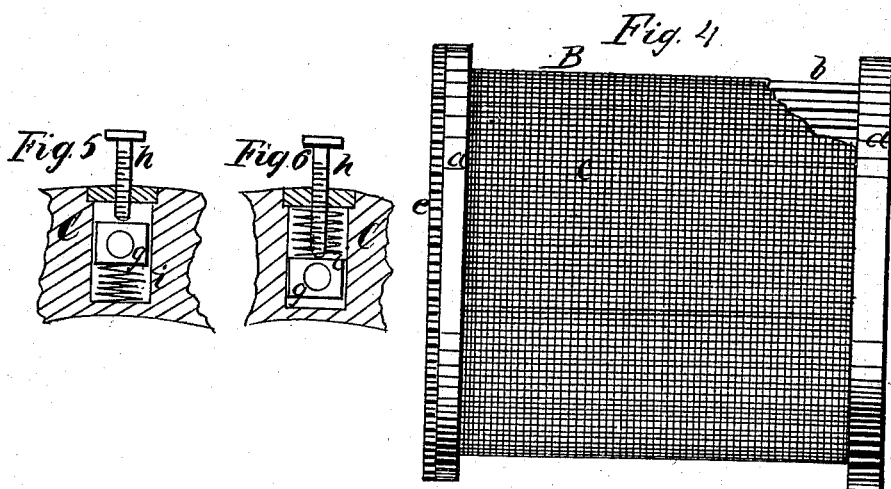
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MACHINES FOR MAKING PAPER BOARD.

Specification forming part of Letters Patent No. 49,119, dated August 1, 1865.

To all whom it may concern:

Be it known that I, JOHN FRANKLIN JONES, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Machines for Making Paper Board; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a plan of my improved machine; Fig. 2, a side elevation thereof; Fig. 3, a central longitudinal vertical section; Fig. 4, a plan of the cylinder detached; Figs. 5 and 6, views showing the method of adjusting the boxes that support the pressing-rollers.

Like letters of reference indicate corresponding parts in all the figures.

The object of my improvement is to produce paper board in a continuous or indefinite length; and the invention consists, first, in the employment of a perforated cylinder, in combination with an endless wire-mesh apron and pressure-rollers, for forming paper board in a continuous or indefinite length; second, in the employment of a suction box or boxes within the cylinder formed of rollers that act in connection with the cylinder to draw the water from the web above.

In paper-making, two distinct classes of machines are employed: first, the cylinder-machine, in which a cylinder takes the pulp from a vat in which it runs and deposits it upon a felt that passes between press-rollers; and, second, the Fourdrinier machine, in which a wire-cloth apron is employed, which receives the layer of pulp and deposits it upon the felt, to be run through the press-rollers in the same manner. My present improved machine combines in a degree the qualities of both these classes of machines.

As represented in the drawings, a suitable frame, A, is employed, having mounted in it, in any desirable manner, a large hollow cylinder, B, that is preferably composed of two end rims or rings, *a a*, Fig. 4, connected by longitudinal rods *b b*, situated at suitable distance apart, over which rests a covering, *c*, of wire-cloth, filling the whole space between the rings.

In order to admit the discharge of water from a receptacle or trough within the cylinder (presently to be described) I prefer to leave the ends of the cylinder entirely open, and to support said cylinder on friction-rollers *d d*,

resting under its rims *a a* at each end, said friction-rollers being pivoted on circular stationary bearings C C, connected with the frame on each side of the machine, within which the cylinder revolves; but any equivalent means of supporting the cylinder and allowing it a free revolving motion may be employed.

The cylinder may receive motion by any desirable means, that represented in the drawings being a spur-gear, *e*, on one of its rims, into which meshes a pinion, *f*.

Around the cylinder B, in a circle and at suitable distance therefrom, are situated pressing-rollers D D D, whose journals rest in boxes *g g*, Figs. 5 and 6, which in turn rest in the bearings C C, or equivalent, and are adjusted up and down, to separate the rollers more or less from the cylinder, by means of pressure-screws *h h* and coiled springs *i i*, or some equivalent device.

The device in Fig. 5 represents that connected with the first or induction roller at the top, and in this case the spring *i* is under the box *g*, so as to force the roller upward to allow the entrance of the pulp between it and the cylinder or bed.

The device in Fig. 6 represents that connected with the other rollers, the springs *i* being on top of the boxes to force the rollers down to their work, and the screws being used to hold the boxes when the pressure is great. The series of rollers may extend around the cylinder to as great an extent as desired, but in the drawings they are shown as extending only about three-quarters the distance. I prefer to make two or three of the rollers at the top dipping-rollers, provided with dippers *k k*, substantially of the form shown in Fig. 3, which discharge the water that rises around them outward through their hollow journals. To this end each cylinder or roller is hollow, and is covered with wire-cloth or equivalent, to allow the water to enter and still produce the necessary pressure on the pulp. The dippers are so formed and curved as to carry the water out endwise.

Around the rollers D D D passes an endless wire-mesh apron, E, as represented most clearly in Fig. 3, the distance between it and the cylinder or bed B being sufficient to allow the necessary depth of pulp to form board of the desired thickness. It will be seen that the screws and springs *h i* allow the thickness of board to be varied at pleasure. The pulp enters through

a hopper or trough, G, and is carried between the cylinder or bed B and the endless wire-mesh apron E, where, by the revolving motion of said cylinder and the rollers D D D, it is compressed into a web, *x*, (shown in dotted lines,) and is carried round to the opposite end of the apron, where it is taken off by a felt, *l*, and conveyed between suitable press-rollers, drying-cylinders, &c., in the usual way. By this means I am enabled to form paper board in a continuous or indefinite length and of any desired thickness, instead of in separate sheets of limited size, as in ordinary machines now in use.

There are several obvious advantages in the arrangement above described.

First. The circumference of the cylinder B, which forms the bed on which the web is pressed, is equal in extent to the same length in the form of an endless apron, (as in the Fourdrinier machine,) but in the form of a cylinder it is much more compact and less bulky than in the form of an apron, and therefore the frame-work and machinery, instead of occupying many feet in length, as usual, occupy a very small compass, which not only insures economy in cost of building, but saves labor in operating and attending.

Second. The wire cloth *c* being rigidly secured to the cylinder, and the latter revolving instead of the wire itself receiving an independent motion, the great friction and wear and the irregular motion that attends the employment of an independently traveling wire apron are obviated. In the use of the apron it is necessary, in order to insure its running easily, to allow it a certain degree of looseness, to pass round its rollers. This of course makes its action irregular, and the web cannot be pressed so perfectly upon it as would be the case if it were taut. In my device the wire can be made as taut as desired around the cylinder. In the use of the apron the wear soon renders it useless, while in my device, there being no friction of the wire and consequently not much wear, the same is very enduring.

Third. The employment of the endless apron E and the rollers D, in connection with the cylinder, enables me to form board of any desired thickness and in a continuous length very rapidly, while the water that is expressed is allowed to escape through between the rods *bb*.

Within the hollow cylinder B is situated a shallow receptacle or trough, H, preferably occupying the whole diameter of the interior, and having a suitable discharge-spout, *m*, passing out at one end, as clearly represented in Figs. 2 and 3. This receptacle or trough catches such water as is expressed from the pulp at the top of the cylinder and passes through between its rods *bb*. Its employment is absolutely essential, for otherwise the water

would pass through to the bottom of the cylinder and rewet the web below.

As the ordinary suction-boxes, such as are employed in the Fourdrinier machine, cannot be used in connection with the cylinder I have described, I employ one of a peculiar arrangement and construction. It consists of three grooved or corrugated rollers, I I K, situated within the cylinder at its top and having end bearings, *p p*, and so arranged as to inclose a space, *n*, from which opens an escape-pipe, *q*. The upper rollers, I I, reach to the surface of the wire *c*, and the lower roller, K, meshes with the two upper rollers, I I, in order to keep the inclosed space tight. I prefer to use india-rubber rollers, but any other that will accomplish the same purpose may be employed. It will be seen that by the use of this arrangement I accomplish the same effect as in the ordinary suction-box, while my device is adapted to the special use of the cylinder B.

I employ a vibrating or reciprocating bar, L, Figs. 1 and 3, in a suitable position in the hopper for the purpose of interweaving the fibers of the pulp and properly feeding the same into the space between the cylinder and endless apron. I prefer to form this bar with alternate ribs or rings *r r* and intermediate spaces, *s s*, as shown, so as to catch and hold the fibers; but, if desired, this arrangement may be modified and still produce the same result. This bar receives an end motion by any desirable means, that represented in the drawings being a pitman, jointed thereto outside the frame, and operated by being connected with suitable mechanism. The action of this bar is somewhat similar to felting, the object being to interweave or intertwine the fibers so as to make the web as strong in one direction as another. In the ordinary Fourdrinier machine this effect is accomplished by giving a lateral shake to the endless apron, but in my present machine this cannot be done, as the cylinder B is stationary. The employment of the vibrating bar L accomplishes the effect perfectly, while the device itself is of the simplest character.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of an open-wire mesh or perforated cylinder, B, wire apron E, and pressure-rollers D, for forming paper board in a continuous or indefinite length, substantially as herein set forth.

2. In paper-making machines, the combination of the suction box or boxes composed of the rollers I I and K, operating substantially in the manner and for the purpose herein set forth.

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