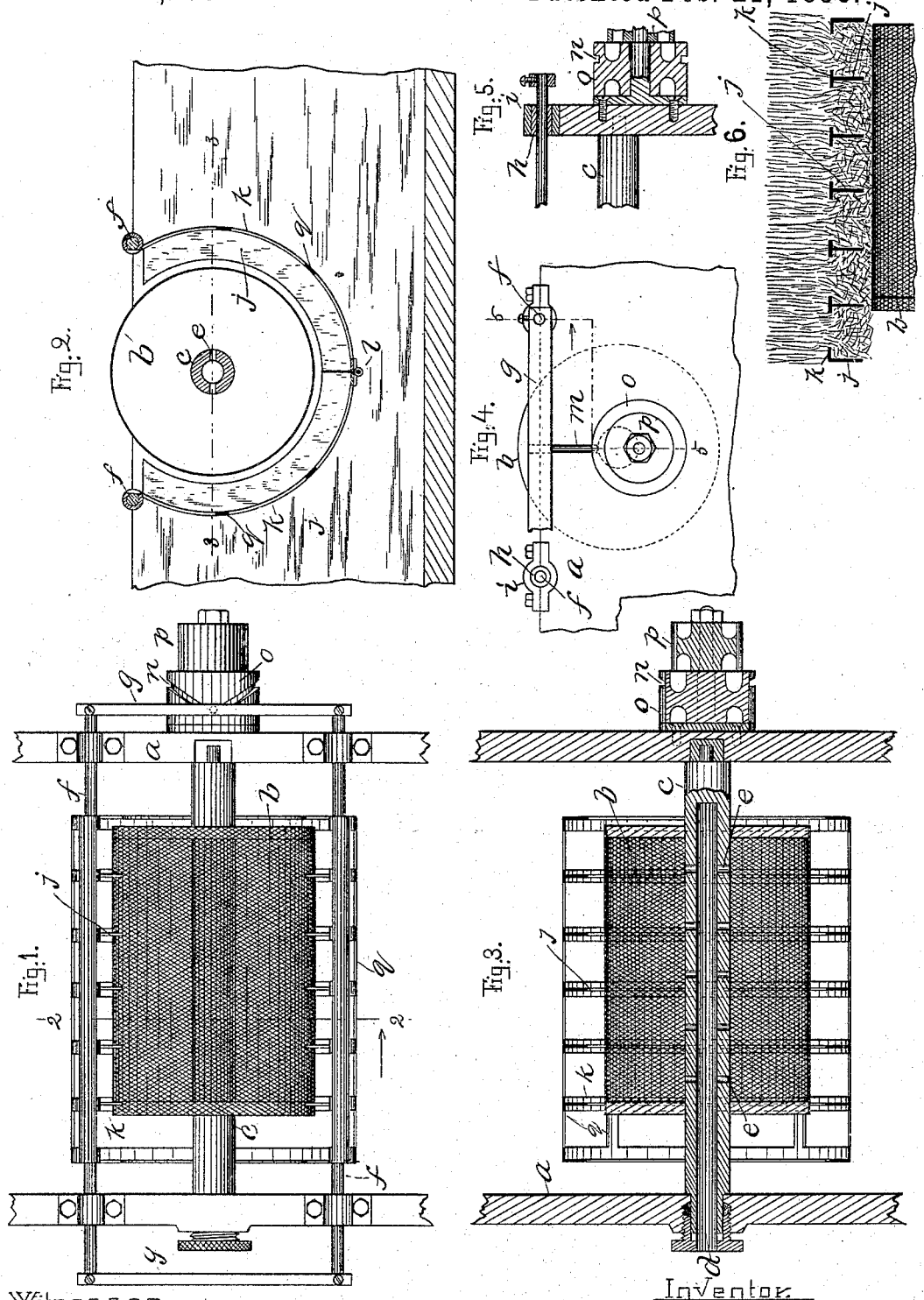
(No Model.)

A. N. KIDDER.

PAPER MAKING MACHINE.

No. 492,209. Patented Feb. 21, 1893.



Witnesses.
Horace Brown.
E. L. Macdonald

Inventor.
by A. N. Kidder
Wright, Brown & Quinby.
Attys.

UNITED STATES PATENT OFFICE.

AMASA NATHANIEL KIDDER, OF CHELMSFORD, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO AMASA HOWARD, OF SAME PLACE.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 492,209, dated February 21, 1893.

Application filed March 12, 1892. Serial No. 424,676. (No model.) Patented in Canada April 27, 1892, No. 38,815.

To all whom it may concern:

Be it known that I, AMASA NATHANIEL KIDDER, of Chelmsford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Paper-Making Machines, (for which I have obtained Letters Patent in Canada, dated April 27, 1892, No. 38,815,) of which the following is a specification.

My invention has relation to the art of making paper on cylinder machines, so called, in which wood, jute, linen and cotton fiber held in suspension in water and forming what is known as pulp, flows into a vat in which revolves a cylinder covered with fine wire cloth or netting. The cylinder is hollow and is provided with a hollow shaft or opening about the shaft, out of which flows the water drained from the pulp proper, which latter from the pressure of the water within the tank is collected upon the wire cloth of the cylinder and is taken off on a felt, and when pressed and dried forms the paper. In consequence of the motion of the cylinder and the current of the water which runs in a line parallel to the motion of the cylinder, the fibers tend to lay themselves upon the cylinder in the same direction which in the manufactured paper is longitudinal of the sheet, so that the paper is strong and not easily torn when tension is brought thereon across the fibers, but weak and easily torn in the direction of its length and in line with the direction of the fibers. It is very desirable that the fibers should be made to form on the wire cloth of the cylinder in all directions, so that the same may be, in a sense, felted or intertwined in order that the paper may be rendered equally strong in all directions. I have discovered that if the pulp in the vat is agitated in close proximity to the cylinder on a line at a right angle to the motion of the same, the objections mentioned may be overcome and the desired end obtained.

My invention consists in the construction and combination of parts as hereinafter fully described and claimed.

In the drawings formings part of this specification: Figure 1, is a top plan view of my improved machine. Fig. 2, is a transverse sectional view thereof taken on the line 2—2, of Fig. 1. Fig. 3, is a horizontal section taken on the line 3—3, Fig. 2. Fig. 4, is a detail end view. Fig. 5, is a sectional view taken on the line 5 – 5, Fig. 4. Fig. 6, is a diagram showing the results attendant upon the employment of my improved means.

The same letters designate the same parts in all the figures.

In the said drawings: *a* designates a vat or tank, which may be of concaved or other suitable form, in which is arranged a hollow cylinder *b* covered with wire gauze or fine wire cloth. The journals of the cylinder are arranged in suitable bearings in the sides of the vat, so that the cylinder may be rotated, and the shaft *c* of the latter is made hollow with an opening at one end, as at *d*, numerous holes *e* being formed in the shaft, affording means of communication between the interior of the cylinder and the hollow of the shaft, or other suitable means may be provided, so that the water in the cylinder may flow out and be drained from the fiber collected upon the cylinder. Any desired means may be provided for rotating the cylinder at the necessary speed.

Arranged on a plane at or near the top of the cylinder is a rectangular frame consisting of the side rods *f f* and the removable connecting end bars *g g*. The rods *f* are mounted in sleeves or bushings *h* held in boxes *i*, so that the said rods may be reciprocated in their bearings.

j designates a series of blades, which are supported at their ends by the rods *f* and extend around or partially around the cylinder in the direction of its movement. The outer edges of the blades *j* are provided with flanges *k* which serve to strengthen the same and also to perform a function to be presently mentioned. The series of blades are divided centrally below the cylinder on a line coincident with the axis of the latter, and hingedly connected, as at *l*, so that the free ends of the blades may be separated to admit of the cylinder being passed therebetween, and be again adjusted in place.

One way in which the cylinder may be removed is by removing the caps of the bear-

ings of one of the rods *f*, and the shaft of the cylinder, which latter may then be lifted out of the vat.

m designates a stud connected with one of the cross-bars *g*, which extends down into a cam groove *n* formed in the periphery of a cylinder or pulley *o*, connected with which is a pulley *p* or other suitable means whereby the pulley *o* may be rotated, in order that, through the medium of the cam groove, stud *m* and rectangular frame, the blades *j* and their connected flanges *k* may be vibrated or reciprocated. Strengthening strips or bars *g* may be connected with the flanges *k* or outer edges of the blades in order to stiffen and strengthen the structure connected with the rectangular frame.

In the practice of my invention the pulp will flow into the vat, the cylinder will be revolved in the usual or any suitable way, and the rectangular frame will be reciprocated by the means explained so as to vibrate or reciprocate the blades, and their attached flanges *k* on a line substantially at a right angle to the motion of the cylinder and in the direction of its axis. By this operation the fibers, which, as before stated tend to take the line of the current and lay themselves upon the cylinder in a direction parallel to its line of motion, will be acted upon by the blades *j* and their flanges *k*, to intertwine them and lay them upon the wire fabric or netting in all directions as is clearly shown in Fig. 6. The blades *j*, being of thin metal, with their inner edges in proximity with the cylinder, and having the flanges *k*, form improved agitating devices for the pulp, owing to the irregular surfaces or angles presented during their movement as described.

By my invention, the strength of the paper manufactured being equal in all directions, the paper can be made thinner without liability of "breaking down" and occasioning the expense of "broken waste," than where the fibers are substantially all laid in parallel with the direction of the length of the sheet, so as to render the same comparatively weak in that direction. In short, by my described process I am enabled to enhance the value of the product and at the same time reduce the weight or thickness of the paper, and consequently lessen the cost of its production.

Having thus described the nature of my invention and explained a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its employment, I declare that what I claim is—

1. A machine for making paper, comprising in its construction a cylinder, a vibratory frame or support, and flat agitating blades extending in a line parallel with the movement of the cylinder connected with said frame, and located in proximity with the cylinder, as described.

2. A machine for making paper, comprising in its construction a cylinder, a vibratory frame or support, and a series of agitating devices divided centrally on a line parallel with the axis of the cylinder and hinged together, the agitating device being connected to the said frame and arranged in proximity to the cylinder, as described.

3. A machine for making paper, comprising in its construction a cylinder, a vibratory frame or support, and agitating devices connected with said frame and located in proximity with the cylinder, the said agitating devices having the form of thin, flat blades extending in a line parallel with the motion of the cylinder, and provided on their outer edges with flanges, as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 5th day of March, A. D. 1892.

AMASA NATHANIEL KIDDER.

Witnesses:

ARTHUR W. CROSSLEY,

AMASA HOWARD.