W. E. METCALF.

PAPER MAKING MACHINE

APPLICATION FILED MAR. 9, 1915.

1,152,747.

Patented Sept. 7, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

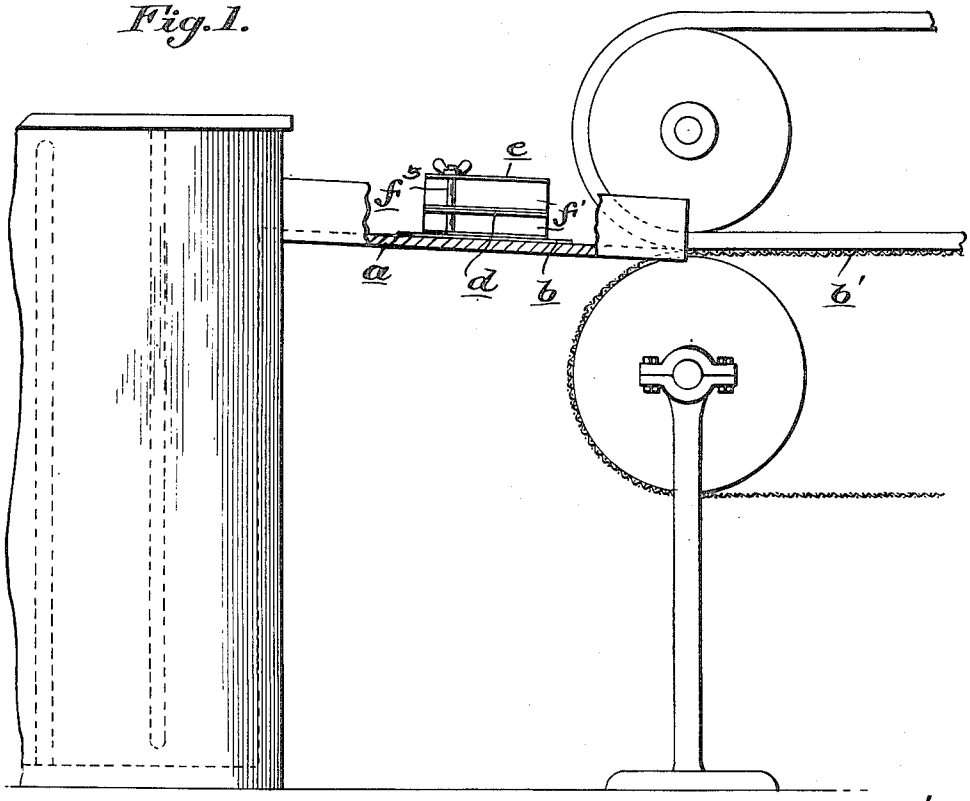
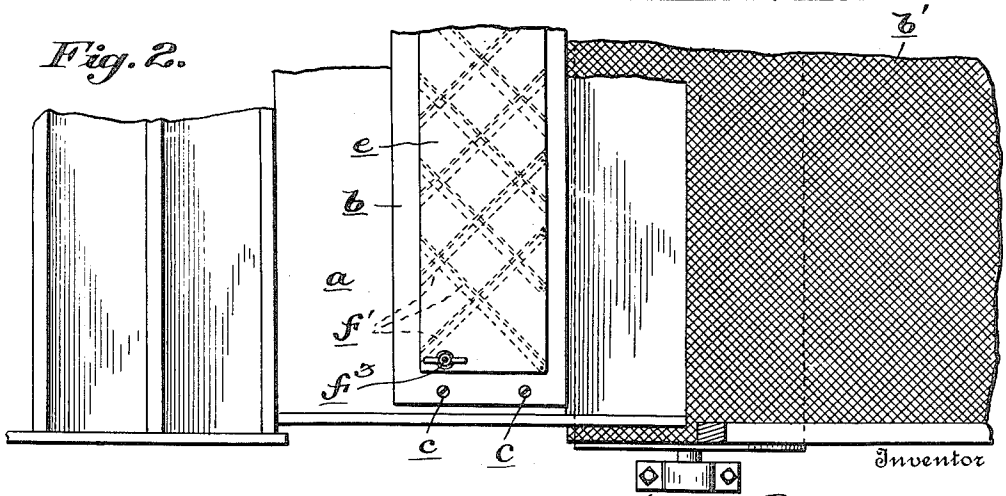


Fig. 2.



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Witnesses

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2 SHEETS—SHEET 2.

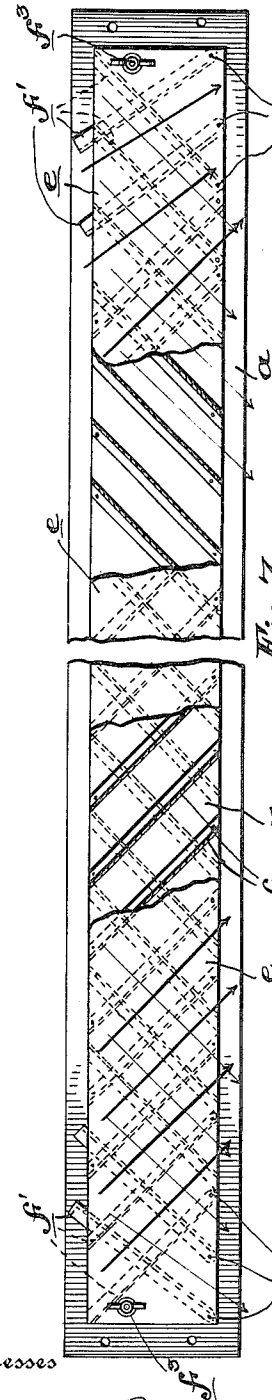


Fig. 3.

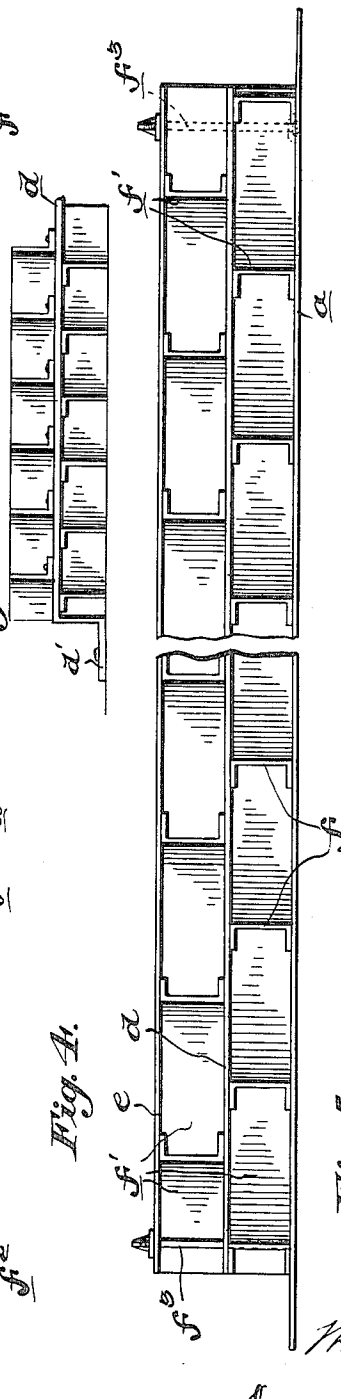


Fig. 4.

Fig. 7.

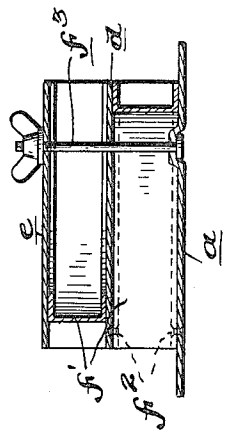


Fig. 6.

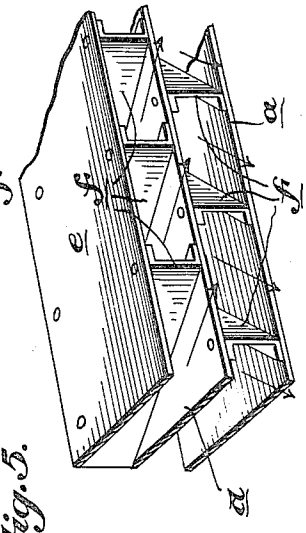


Fig. 5.

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UNITED STATES PATENT OFFICE.

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PAPER-MAKING MACHINE.

1,152,747. Specification of Letters Patent. Patented Sept. 7, 1915.

Application filed March 9, 1915. Serial No. 13,142.

To all whom it may concern:

Be it known that I, WALTER E. METCALF, a citizen of the United States of America, and a resident of Hudson Falls, county of Washington, State of New York, have invented certain new and useful Improvements in Paper-Making Machines, of which the following is a full and clear specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a sufficient number of parts of a Fourdrinier machine to illustrate the location of my device; Fig. 2 a plan view thereof with the deckle pulley and slices removed and the deckle strap in section; Figs. 3, 4, 5 and 6 detail views of my attachment; and Fig. 7 a side elevation of a device embodying a modification of my invention.

The object of this invention is to provide a very simple and inexpensive attachment to Fourdrinier machines and Harper Fourdrinier machines whereby crossing of the fibers of the paper web as the same is being formed on the Fourdrinier wire is brought about, thereby producing a paper which shall have as great a degree of strength transversely as longitudinally, which shall be of uniform thickness, which shall have very desirable tearing and bending qualities, and which shall insure certain valuable economies in the manufacture of the paper more particularly hereinafter set forth.

My attachment is affixed to the bottom of the apron *a*, down which the stock runs to the slices (not shown); that is to say, it is located in the "pond" back of the slices.

In its preferred form, my attachment consists of a base plate *b* fastened to the apron board or slice by means of suitable fastening devices *c*, which are preferably screws, so that my attachment may be bodily adjusted closer to or farther from the slices. The base plate *b* runs substantially nearly across the pond and attached to it and spaced from it are two additional plates *d* and *e*, which are preferably parallel with each other and with the base plate, and are substantially the same in length therewith.

The plates *b*, *d* and *e* are rigidly fastened together by partitions *f*, these partitions consisting of narrow vertical plates having foot flanges riveted to the adjacent faces of the plates. The plates *f* are of substantially the same width, so that when the parts are assembled the plate *d* lies about midway between the plates *b* and *e* and is rigidly supported. The lower set of partitions *f* are all inclined in one direction, that is, obliquely to the flow of the paper stock, while the upper set of partitions are inclined in the opposite direction, the two sets of partitions lying preferably about at right angles to each other and, therefore, at a 45° angle to the line of flow of the stock. The plates *d* and *e* are about 6″ to 3′ wide, and the distance from top to bottom of the assembled device is about 4″, so that when the device is affixed to the apron bottom, it will be completely immersed in the pond, the depth of the stock in the pond being say about 5″.

It will be observed that as the stock flows through the numerous open-ended channels formed by my device, that portion of the stock flowing through the upper set of channels will be deflected toward one side edge of the Fourdrinier wire, while the stock that is flowing through the other set of channels will be deflected toward the opposite edge of the wire, thus continuously producing, during the operation of the machine, two strata of fibers, the fibers of one stratum crossing the fibers of the other stratum, this crossed relation of the fibers being maintained throughout the formation of the stock into a web. Thus providing of means for insuring the crossing of the fibers by forming superposed cross-currents in the stock as it passes onto the wire results in a number of very important advantages. It requires less shaking of the wire to properly close the fibers in the web; it makes it possible to run fibers in the stock very long, thereby preserving very desirable tearing and bending qualities of the web; it has the effect of closing up the fibers in the paper web without using a dandy roll; it has the effect of bulking the web, a characteristic very desirable in some kinds of paper, such as bag paper; it prevents the existence of thick and thin streaks in the web of paper, thereby insuring a high degree of tensile strength in all directions and also insuring even drying of the web; it avoids the web sticking to the press rolls and thus facilitates the continuous running of the paper web without breaking; and it causes the paper web to carry the water down to the first suction boxes, there-

by eliminating the necessity of using an abnormal amount of water in forming the web.

Furthermore, my attachment forms a sort of screen or guard which breaks up lumps of stuff passing onto the wire and thus causing the web to break; and, again, the use of my device avoids the necessity in fast running machines of elevating the breast roll to augment the speed of the stock as it runs down to the inclined Fourdrinier wire.

My invention also brings about other advantages which are unnecessary to recite.

A feature of importance in my device is its capacity to be adjusted bodily toward and from the slices, each adjusted position giving a little different effect to the web of paper.

It will be understood that the construction of my device may be considerably varied without departing from the spirit of the invention. For instance, I may do away with the top and bottom plates and use only the middle plate d, and provide this plate with a foot flange d' at each end for supporting it at a proper distance above the bottom board of the pond. In this modification, the deflecting blades will be supported entirely by the plate d, although the lower set may have their lower edges resting directly on the bottom of the pond.

It will be understood also that the deflectors may be arranged at any suitable angle with respect to each other and the flow of the stock, and also that some or all of the deflectors may be pivotally mounted so as to be adjusted laterally to vary their inclination. In the drawing, I have illustrated the two end deflectors f' in each series as being thus pivotally mounted, the pivots being designated by f^2. To hold these pivoted deflectors in their adjusted positions, I may employ a clamp bolt f^3, the plates a, d and e being sufficiently flexible to bring about a clamping action of the deflectors when the bolt is tightened up.

Having thus described my invention, what I claim is:

1. In combination with a Fourdrinier paper making machine, an attachment located in the pond back of the slices and provided with means for forming superposed cross-currents in the stock as it approaches the slices, said attachment consisting of an upper and a lower series of deflectors and means for supporting them, the lower set of deflectors being arranged at an angle to the deflectors of the upper set.

2. In combination with a Fourdrinier paper making machine, an attachment mounted in the pond back of the slices and extending entirely across the same and consisting of a plurality of horizontal plates connected together by vertical partitions, said partitions forming open-ended channels, the upper set of partitions being arranged at an angle to the lower set of partitions, for the purpose set forth.

3. In combination with a Fourdrinier paper making machine, an attachment mounted in the pond back of the slices and extending entirely across the same and consisting of a plurality of horizontal plates connected together by vertical partitions, said partitions forming open-ended channels, the upper set of partitions being arranged at an angle to the lower set of partitions, the partitions at the ends of the device being adjustable as to angularity.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

WALTER E. METCALF.

Witnesses:
GRENVILLE M. INGALSBE,
MARY E. LAWLER.