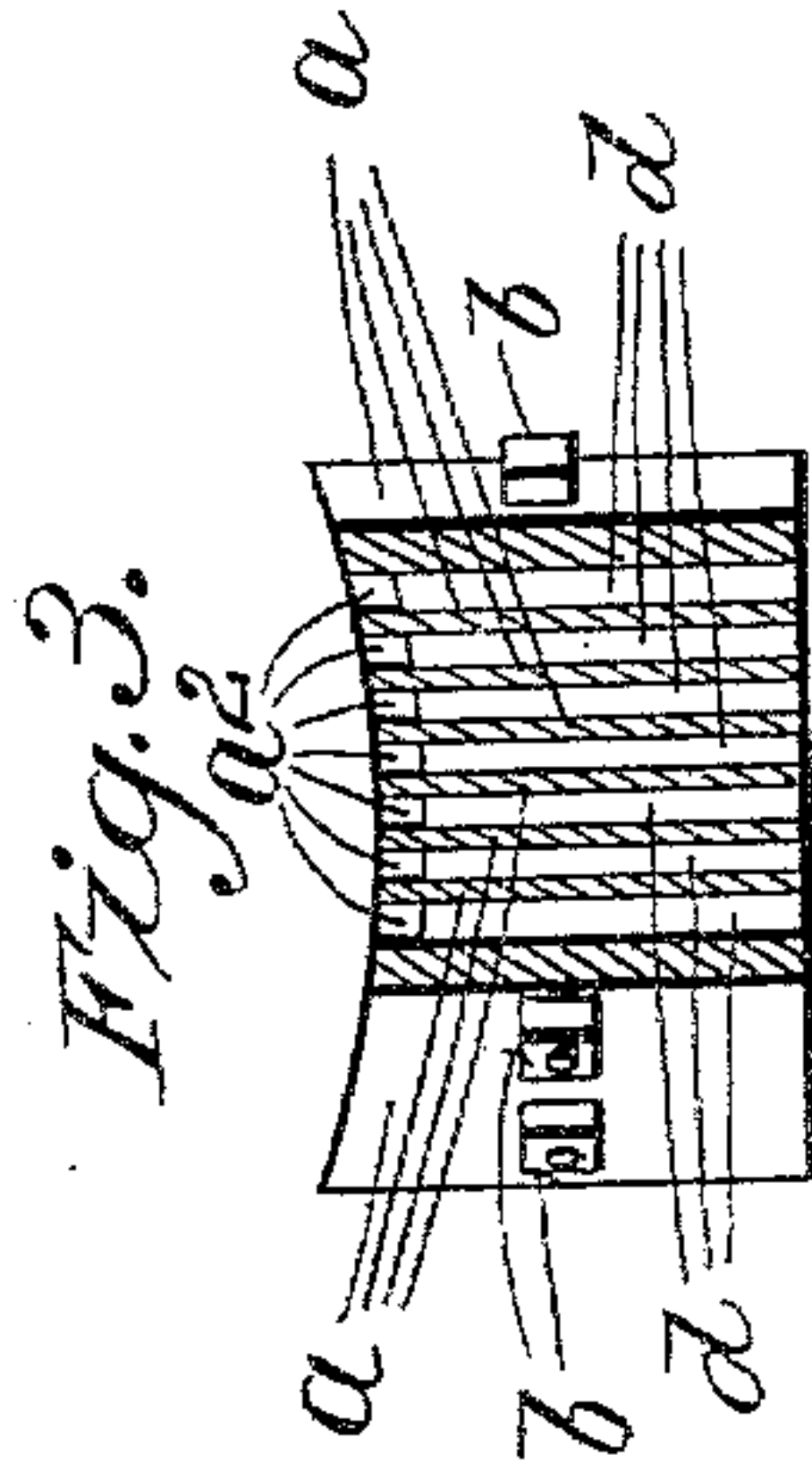
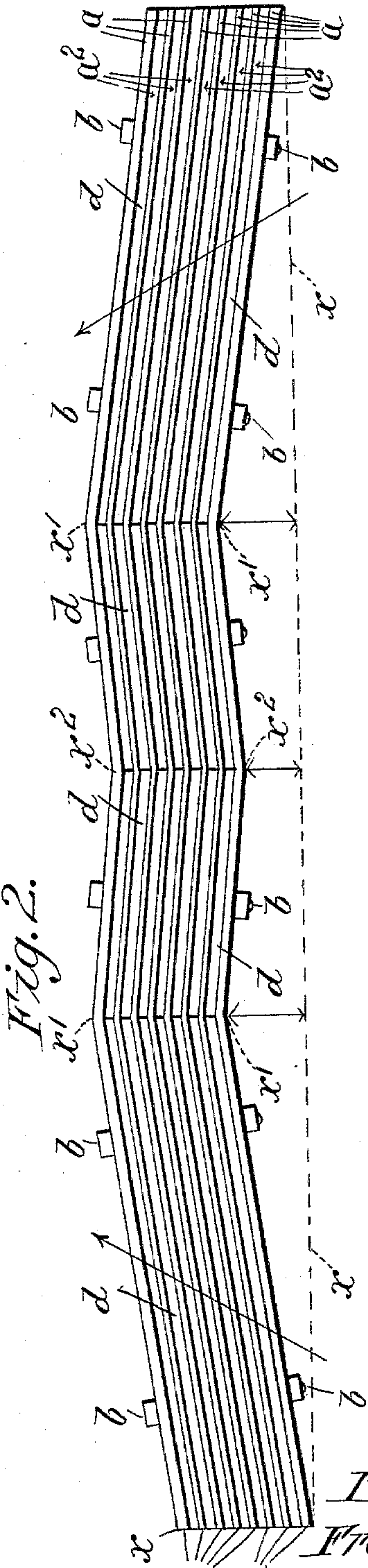
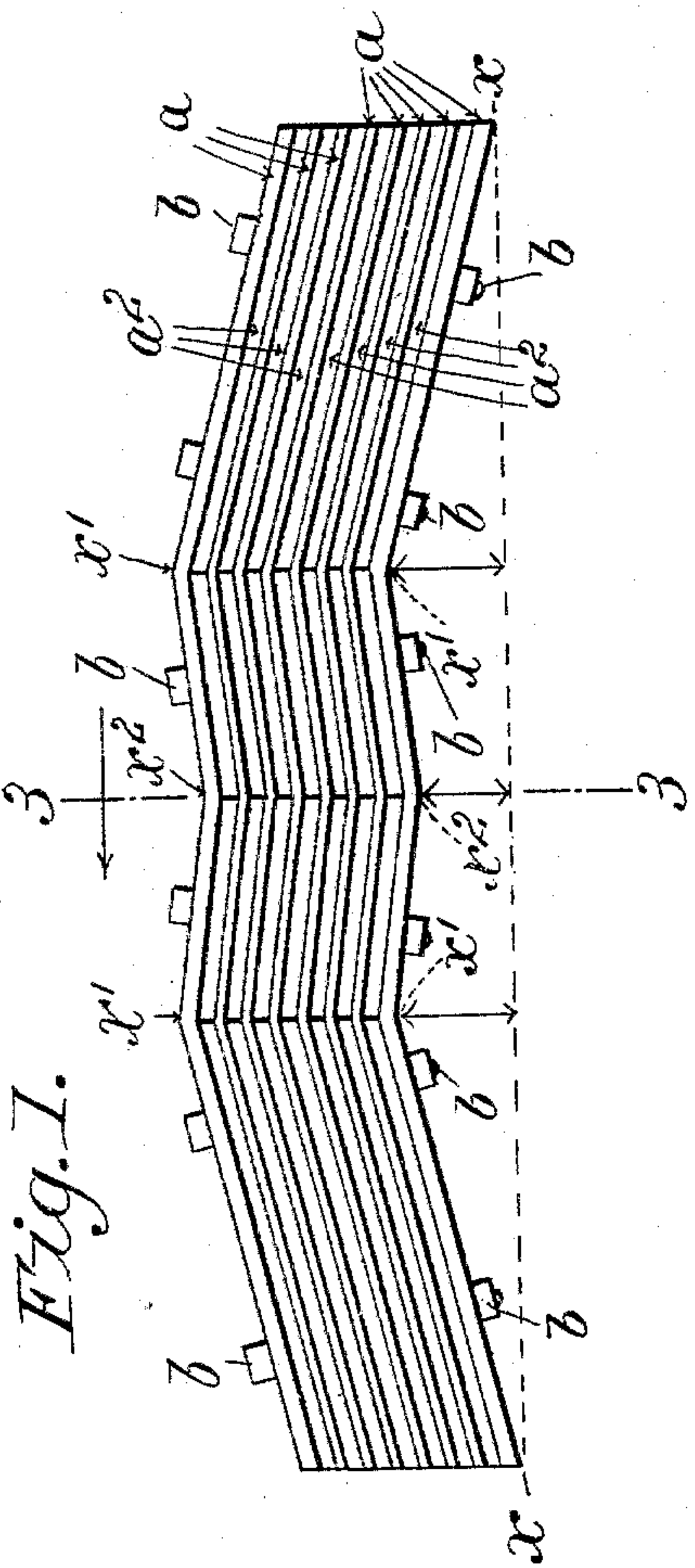


(No Model.)

F. E. MAXFIELD & E. W. LOVEJOY.
BED PLATE FOR BEATING ENGINES.

No. 597,885.

Patented Jan. 25, 1898.



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UNITED STATES PATENT OFFICE,

FRED E. MAXFIELD, OF HOLYOKE, AND ELWYN W. LOVEJOY, OF LOWELL,
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BED-PLATE FOR BEATING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 597,885, dated January 25, 1898.

Application filed July 19, 1897. Serial No. 645,128. (No model.)

To all whom it may concern:

Be it known that we, FRED E. MAXFIELD, residing at Holyoke, in the county of Hampden, and ELWYN W. LOVEJOY, residing at Lowell, in the county of Middlesex, State of Massachusetts, citizens of the United States, have invented new and useful Improvements in Bed-Plates for Beating-Engines, of which the following is a specification.

10 This invention relates to bed-plates for beating-engines used in the manufacture of paper, and has for its object the production of a plate of this class in which the blades within prescribed limits of width are given
15 a maximum degree of inclination relative to the axis of the beater-roll of the engine and the blades of the plate so disposed as to cause a uniform movement of the stock being operated upon from the ends of said bed-plate
20 toward the central line thereof, and whereby the stock is subjected to a longer continued shearing or beating action between the roll and the blades of said plate than has heretofore been possible.

25 The invention consists in the construction of a bed-plate, as fully described and claimed hereinafter.

In the drawings forming part of this specification, Figure 1 is a plan view of a bed-plate
30 constructed according to our invention. Fig. 2 is a plan view of a bed-plate of the same width as that shown in Fig. 1, but of greater length. Fig. 3 is a cross-section of a plate, taken on line 3 3, Fig. 1.

35 Certain conditions prevail in the building of beating-engines for paper-stock which make it necessary that said plates should not exceed a certain prescribed width, though in beaters of varying capacity the length of said
40 plates may vary considerably.

The aim of manufacturers of bed-plates is always to first so arrange the blades composing said plates relative to the axis of the
45 beater-roll as to produce a shearing action between the blades of the roll and the blades of the bed-plate, and, secondly, to so dispose the blades of the plate relative to the axis of the roll of the beater-engine that the course of paper-stock being worked will be from the
50 ends of said bed-plates toward the center line

thereof or in a general direction indicated by the arrow on Fig. 2.

The width of the bed-plates being substantially the same in engines of varying capacity and their length showing wide variations, it
55 follows that a bed-plate for a small beater—such as the one shown in Fig. 1, for example—may have opposite ends of the blades thereof placed at a greater angle relative to the axis
60 of the roll than the blades of a bed-plate as long as that shown in Fig. 2. Assuming that the maximum width of the bed-plate is represented by the distance from the base-line x to the points x' of the opposite side of the
65 plate, the greatest efficiency of such a plate is attained by giving the blades a thereof such a degree of inclination relative to the axis of the beater roll or cylinder and so disposed as
70 to give the fiber the longest course across said plate, and consequently subjecting said fiber longer to the shearing or drawing-out action
between said plate and the said beater-roll. The solution of this problem has been sought
heretofore by making blades having angular
75 bends therein, said blades having been arranged sometimes in parallelism and sometimes at an angle to each other, but so far the only result of such construction has been the
attainment of increased shearing action between the plate and the blades on the roll. 80

The peculiar arrangement of the angular blades herein shown and to be described accomplishes the above-mentioned sought-for
ends—viz., the maximum shearing action, the continuous movement of the stock from
85 the sides toward a central line of the bed-plate, and means for giving to the stock the longest course diagonally across the bed-plate, whereby a longer and more even fiber is produced and the time for beating a given amount
90 of stock is very much reduced.

In constructing the herein-described bed-plate the outside plates are made slightly heavier than the plates clamped between
95 them. The blades are all given their proper angular bend and are then secured together by the bolts b , strips d of wood or other suitable material being interposed between them in the ordinary manner. The peculiar features of this construction consist, first, in 100

making that part of the blades between the ends thereof and the bend therein at x' longer than that part between x' and the center, and, second, in giving to that part of the blades between x' and the center of the plate a less degree of inclination than to the portion between x' and the ends of the plate and in reversing the angle thereof. By reversing the angle of the blade between x' and the center of the plate a longer cutting edge on the blades a is provided and the dip of the angle between the said two points is made as great as is possible without materially arresting the movement of the stock toward the center.

It has been found in practice that the best proportions of angles for the purposes above described are substantially those shown in the drawings and are obtained by dividing each half of the plate into three parts, and at substantially one-third of the distance from the center toward each end thereof is located the point x' , and the distance between the base-line xx and the bend of the first plate above said base-line at x' is substantially one-third greater than the distance from said line to the termination of the reversed angle at the center x^2 of the plate. Whether the plate be long or short the distance from the base-line to the points x^2 and x' is practically the same, the angles being determined by the distance from the point x' to the end of the plate and to the center thereof, respectively.

The course of the paper-stock in a diagonal direction across the bed-plate, as specified, is due to two causes.

First, the shearing action of the blades of the roll against the inclined edges of the blades of the bed-plate gives the stock a lateral sliding movement of greater or less extent toward the center. If the angles of the bends in the blades of the plate are equal and the lengths of the bent portions are substantially equal, the stock will not have the same tendency to travel toward the center of the plate as in the present construction, for the pulp in the spaces between the blades of the bed-plate at each side of any angular bend in said plate will be of about the same weight and will therefore travel from each side of said bend to the apex of the angle and there seek to pass out in a straight line, but with a body of pulp of greater weight in the spaces between the blades on one side of said angular bend will overcome the resistance of the body of pulp of less weight on the other side of said bend and cause it to be forced back toward the center of the plate and out between the blades of the beater-roll and those of the plate, thus causing said pulp to travel far-

ther diagonally across said plate than if the plate were constructed as specified.

Second, the spaces a^2 between the blades a of the bed-plate, which blades project a certain distance above the blocks d between said blades, constitute channels in which the fiber travels, the movement of said fiber therein being set up by the action of the blades of the roll constantly forcing the stock into said channels and by reason of the inclined position of the latter toward the center of the plate. When the stock in said channels arrives at the point x' , where it meets the reverse angle of the blade and where the channel is diverted away from a straight line, the tendency of the stock is to back up somewhat therein, and therefore that portion of the plate between x' and x^2 is made of smaller area than that part between x' and the ends, for the backing up of the stock in the channels a^2 tends to force the stock out over the edges of the blades a more forcibly than on that part of the plate between the ends and x' , and to equalize the work of the rolls against the blades a it has been found in practice that the relative proportions of the two angular portions for producing the maximum efficiency is substantially as shown and described herein. If these proportions are varied to any great extent, it is found that the distribution of stock along the bed-plate varies, and consequently the work of the engine is uneven.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A bed-plate for beating-engines consisting of a series of parallel blades secured together, having reversed angular bends therein similarly disposed at each side of the center of said plate, the angles of the end portions of the blades with the base-line of the plate being less acute than the angles of the central portions thereof, substantially as described.

2. A bed-plate for beating-engines consisting of a series of parallel blades secured together having reversed angular bends therein similarly disposed at each side of the center of said plate, both the angles, with the base-line of the plate and the lengths of the central portions being less than the angles and the lengths of the succeeding portions between the center and the ends of said plate, substantially as described.

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