

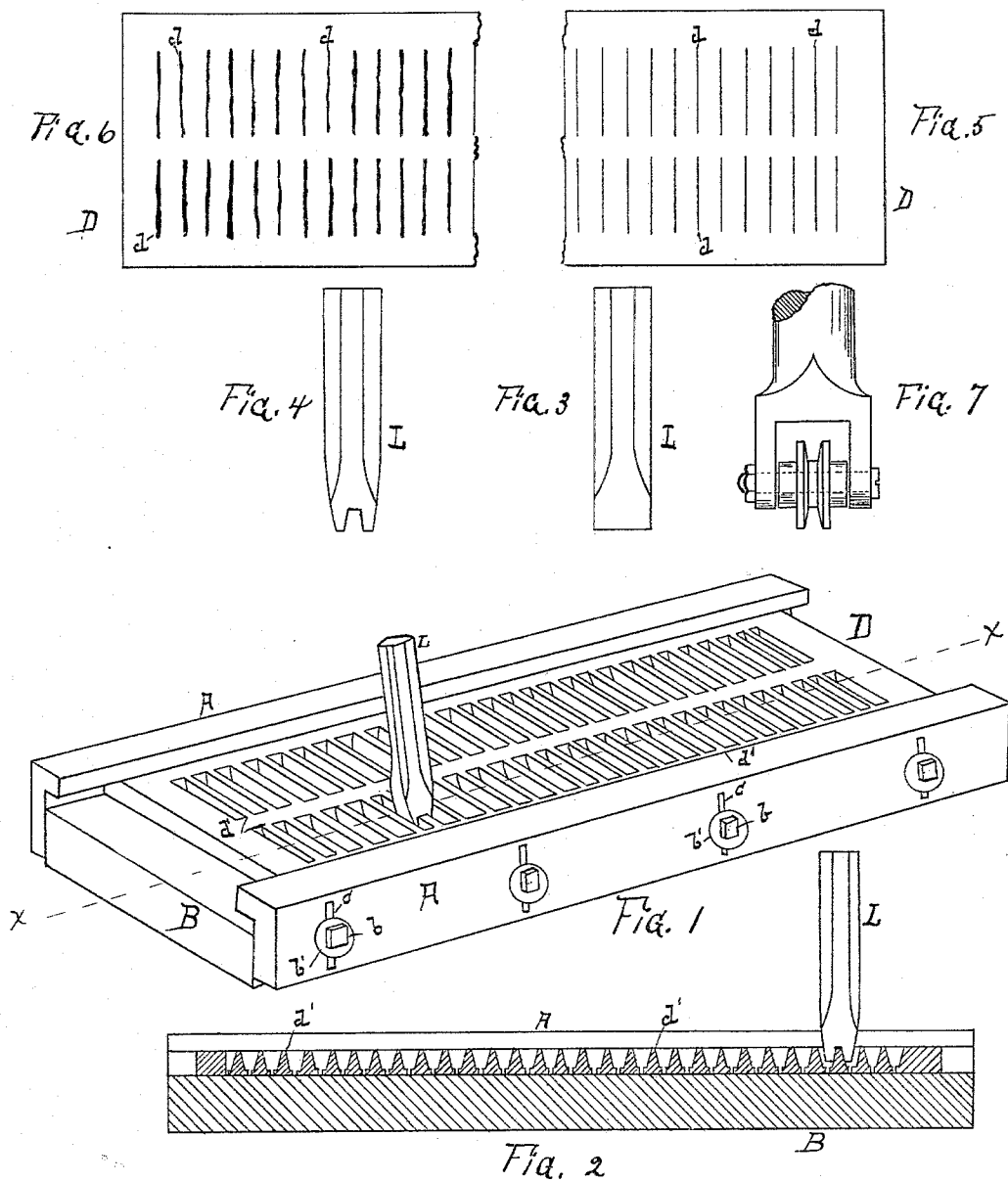
(No Model.)

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METHOD OF RENEWING STRAINER PLATES FOR PAPER MACHINES.

No. 381,737.

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WITNESSES.

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METHOD OF RENEWING STRAINER-PLATES FOR PAPER-MACHINES.

SPECIFICATION forming part of Letters Patent No. 381,737, dated April 24, 1888.

Application filed May 20, 1887. Serial No. 238,354. (No model.)

To all whom it may concern:

Be it known that I, FRANK WILLIAMS, of Holyoke, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Method of Renewing Strainer or Screen Plates of Paper-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

10 My invention relates to renewing or repairing the plates through which the pulp from which paper is made is screened or strained as it enters a paper-machine for the purpose of removing therefrom knots and other solid
15 particles, which, if not eliminated, would injure the quality of the paper. The work performed by these plates is one of great importance, and the greatest care is exercised in their manufacture. The face or upper surface when
20 in use is made perfectly smooth and level, and within this face is the series of fine slots through which the pulp is strained, the rear or lower side being formed into ribs extending between the slots to give the necessary stiffness
25 to the plate. The slots are cut with a circular saw, and the substance composing the plate must be soft enough to enable the saw to act thereon, while it must also be of a nature to withstand as much as possible the corrosive
30 action of the acids contained in the pulp. These two requirements have resulted in the use of brass and compositions of metal in which it is the principal ingredient as the material from which the plates are made. It
35 has been found to be impossible to construct a plate, however, which will for any great length of time withstand corrosion and the wear caused by the solid particles removed from the pulp, and the result is that the slots
40 in the plate become widened to such an extent as to render the plates inoperative to properly strain the pulp, and they then must be renewed or be replaced by new ones. I am aware of two methods by which it has heretofore
45 been proposed to renew such worn plates. In one of said methods the strainer-plate is held with its face uppermost upon a table or bed by means of clamps which engage the plate at intervals about its sides, and is operated upon by a tool the end of which is adapted
50 to bear upon the plate upon both sides of a slot therein, and having a blade projecting

beyond said end. The blade is inserted within the slot, and the metal forming the sides of the slot is forced against said blade by striking the
55 upper end of the tool with a hammer, the width of the blade regulating the width of the slot. In the second method referred to, the plate is also placed face uppermost upon a table or bed, no clamp being employed to hold it, however, and thin strips of metal are inserted
60 lengthwise within the slots, after which a roller having a grooved periphery to bear upon the plate upon each side of a slot is caused to traverse from one end of the slot to the other
55 under pressure, whereby the walls of the slot are forced against the interposed strip in the same manner as by the first method mentioned they are forced against the blade projecting from the tool. These methods are both open
70 to serious objections, and both fail to effectively accomplish the result aimed at. In the first place they both depend upon a pressure exerted vertically against the face of the plate at the sides of the slots therein and between the
75 vertical planes of the ribs at the rear side of the plate, at which point there is nothing to resist such pressure except the thin web of the plate between the ribs, which is elevated above the table or bed a distance equal to the depth
80 of the ribs. The result is that the pressure of the tool or roller depresses these thinner portions of the plate beneath the level of the thicker portions where the ribs occur, and the face is caused to become full of ridges and de-
85 pressions, which must be removed by planing off the face before the plate can be used. As the thickness of the plate between the ribs is only one-sixteenth of an inch, such removal of the metal by planing weakens the plate
90 materially at the very point where strength is required to withstand the wear to which it is subjected. Even where the pressure exerted is not sufficient to thus wholly depress portions of the plate the indentations caused by
95 the tool in the method first referred to, as the same is struck by a hammer and moved back and forth over the face of the plate, must all be removed by planing before the plate can properly perform its function. Again, the
100 pressure being exerted by the tool or roller upon the said thin portion of the plate, with nothing directly beneath it to support it, the side walls of the slot are not squarely brought

against the interposed strip or blade, but said walls stand more or less at an angle to each other, the top or portion at the upper surface of the plate being in contact with the interposed medium, while the bottom of said walls, or portion at the lower surface of the plate, will not be in contact with said medium. In other words, while the slot exactly at the upper surface of the plate will be of a proper width to check and remove the solid particles contained in the pulp at any point beneath said surface, the diverging walls of the slot will render it too wide to perform such function, and as a consequence, whenever the sides of the slot at the surface become slightly worn away, the said particles are free to pass bodily through the plate, whereas if the walls of the slot were parallel from top to bottom they would effectively perform their straining function until worn away through the whole thickness of the plate. Still another objection to these methods is that, the strainer-plate being clamped to the bed-plate at intervals only in the one case and not at all in the other, said strainer is free to expand under the pressure exerted upon it as much in one direction as another, and consequently it is liable to be distorted and forced out of its original shape and dimensions, when it is rendered practically useless.

It is the object of my invention to devise a method by the practice of which strainer-plates in which the slots have become worn and widened can be restored to the same condition in which they were when new without diminishing the thickness of the plate or weakening it in any respect, and without marring its face or changing its shape or proportions.

To this end my invention consists in the novel method comprising the treatment of strainer-plates upon their rear side instead of their face, hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several figures, Figure 1 is a perspective view of the strainer-plate secured to the bed-plate in position to be operated upon, and showing the operating-tool in engagement with one of the ribs thereof. Fig. 2 is a longitudinal section thereof, taken upon the line *xx* in Fig. 1. Figs. 3 and 4 are side and front views, respectively, of the operating-tool. Fig. 5 is a view of one half of a strainer-plate, showing the face of the plate when new or in perfect condition. Fig. 6 is a view of the other half of said plate, showing its appearance when the slots have become worn and widened. Fig. 7 is a front view of another form of operating-tool.

The letter D designates the strainer-plate, having the slots *d* in its face. The side walls of the slots *d* are parallel for a distance of one-sixteenth of an inch from the surface of the plate, at which point they diverge, at first abruptly to form a slight shoulder, and then gradually to the bottom of the plate, thus form-

ing the ribs *d'* between the slots. The metal at each side of each slot is thus left one-sixteenth of an inch in thickness, while the thickness of the plate through the ribs *d'* is from one-fourth to five-sixteenths of an inch. In manufacturing these plates the metal between the ribs is removed from the rear side by milling, after which the face is made perfectly smooth and true, and the slots *d* are then cut with a circular saw. When new, the face of the plate presents the appearance shown in Fig. 5; but the corrosive action of the acids in the pulp and the wear caused by straining the pulp through the slots soon widen the latter and cause their edges to become rough and uneven, as shown in Fig. 6. When in this condition, the plate will not properly strain the pulp, and must be renewed by closing up the side walls of the slots to restore the latter to their former width.

In practicing my novel method of making such renewal I place the plate face downward upon a metallic bed-plate, B, as shown in Figs. 1 and 2, the upper surface of said bed-plate being planed perfectly true. The strainer-plate is secured to the bed plate by clamps which bear continuously upon the sides of the former throughout their length. To secure this result I have devised the clamp shown in the drawings, which consists of bars A A, adjustably secured to the sides of the bed-plate by bolts *b* passing through vertical slots *c* in said bars into the bed-plate, washers *b'* being interposed between the heads of the bolts and the bars.

The clamp-plates A A each have an inwardly-projecting lip which extends over the bed-plate and the strainer-plate placed thereon, as shown. By loosening bolts *b* the clamp-plates can be raised and lowered independently of the bed-plate, and when their projecting lips are forced down upon the strainer-plate and said bolts are tightened the said plate is securely and continuously held along its sides, so that expansion thereof in either direction is prevented. The bed-plate will preferably be of the exact width of the strainer-plate, so that the sides of the latter will abut against the vertical inner walls of the clamp-plates A A to prevent expansion of the strainer-plate in the direction of the length of the slots therein; but by the use of gibs, consisting of thin metal strips inserted at the sides of the strainer-plate, a bed-plate wide enough to accommodate strainer-plates of different widths can be used. The strainer-plate being thus secured to the bed-plate, a tool, L, having in its lower end a slot conforming to the shape of the ribs *d'* in cross-section and of sufficient depth to receive the greater part of a rib, is applied to one of the ribs, as shown in Figs. 1 and 2. The operator then administers a series of blows upon the end of the tool with a hammer or mallet, moving the tool along the rib after each blow. That portion of the rib received within the tool being prevented from lateral expansion, and the rib being prevented

from longitudinal expansion by the clamps at the sides of the strainer-plate, it follows that the pressure exerted by the blows on the tool will cause the metal to expand at the face of the plate between the slots *d*. Again, the pressure being exerted perpendicularly to the plane surface of the bed-plate B, the expansion must be at a right angle to the vertical walls of the slots *d*, and therefore said walls are caused to approach each other squarely and parallel with each other, thus diminishing the width of the slot. The face of the strainer-plate, being held in contact with the surface of the bed-plate, is rendered perfectly smooth and true, and consequently does not require planing or other treatment to put it in condition for use.

By exercising the proper amount of care the operator can close the slots *d* to their proper width with the tool alone; but I prefer to close them up entirely, and then, removing the plate, resaw them with a circular saw, as is done when the plates are manufactured, and I thus practically transform the worn-out plate into a new one.

Instead of the tool L, a roller, M, having a peripheral groove corresponding in outline to the slot in the tool, can be employed either as part of a hand implement or mounted in the head of a press or similar machine having means for applying pressure to said roller and for reciprocating the bed-plate B beneath it, whereby the roller can be caused to move back and forth upon the ribs of the strainer-plate. Such a roller is shown in Fig. 7. Its operation upon the strainer-plate, whether used as a tool or as part of a machine, is identical with that of the tool just described.

When the slots have been completely closed and resawed, as described, their side walls are vertical and parallel, and the plate is rendered capable of withstanding wear fully as long as when new, and as the thickness of the plate is not diminished, the plates can be renewed several times before being finally abandoned.

It will be observed that by the practice of my method, as distinguished from the methods of operating upon the face side of the plate hereinbefore referred to, I secure the all important advantages of retaining the full thickness of the plate, closing the slots with their sides parallel to each other throughout their length, and preserving the smooth even surface of the plate. It will also be observed that the method herein set forth can be practiced irrespective of the particular apparatus shown and described, and I therefore do not wish to limit myself to such apparatus.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The method of renewing strainer or screen plates of paper-machines herein set forth, which consists in securing the plate face downward upon a suitable bed by means of clamps bearing continuously upon two sides of the plate, and applying sufficient pressure to the ribs upon the rear side of the plate to expand the metal at the face of the plate and decrease the width of the slots therein, substantially as described.

2. The method of renewing strainer or screen plates of paper-machines, which consists of the following steps, viz: first, securing the plate face downward upon a bed-plate by means of clamps bearing continuously upon two sides of the former-plate; second, applying sufficient pressure to the ribs at the rear side of the plate to expand the metal at the face of the plate and completely close the slots therein, and, third, making new slots in the plate, substantially as set forth.

FRANK WILLIAMS.

Witnesses:

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