J. K. WHITTIER.

CONDENSER LAP MACHINE.

APPLICATION FILED AUG. 19, 1908.

1,034,849. Patented Aug. 6, 1912.

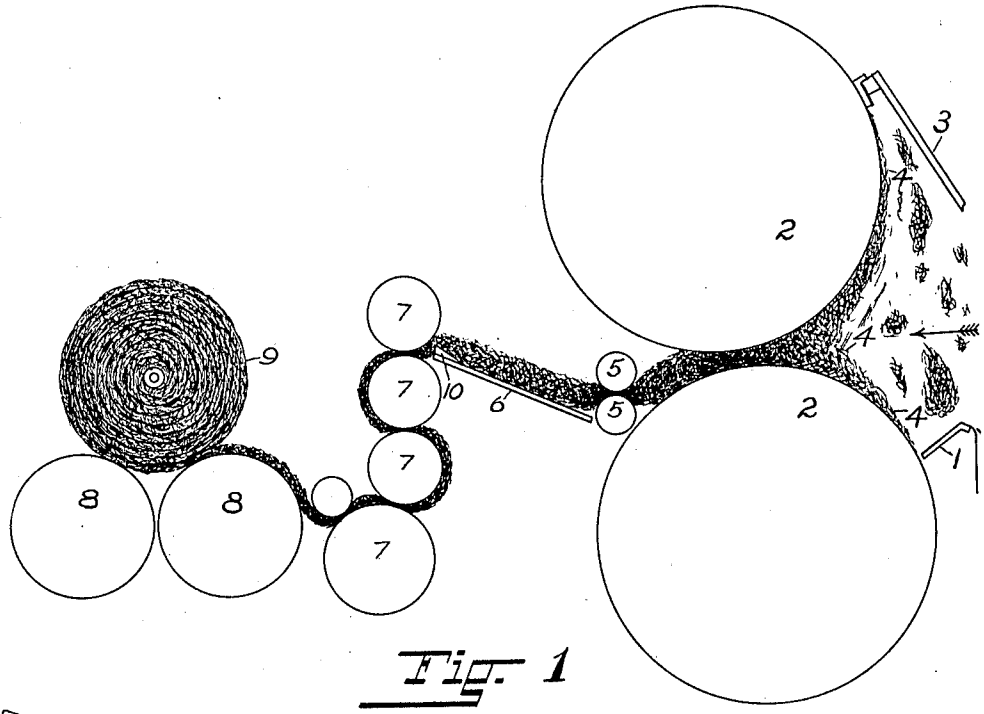

Fig. 1

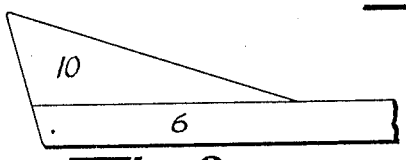

Fig. 2

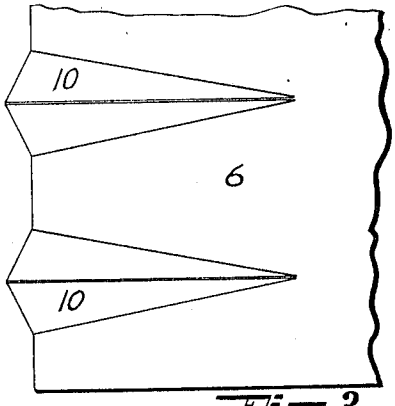

Fig. 3

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CONDENSER-LAP MACHINE.

1,034,849. Specification of Letters Patent. **Patented Aug. 6, 1912.**

Application filed August 19, 1908. Serial No. 449,351.

To all whom it may concern:

Be it known that I, JOHN KILBY WHITTIER, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Condenser-Lap Machines, of which the following description, with the accompanying drawings, is a specification.

Like letters on the drawings denote like parts.

This invention is an improvement in condenser-lap machines and particularly in means for preventing the splitting of laps as they unroll upon the aprons of succeeding machines, such as other condenser-lap machines and carding-engines.

It relates to improvements in means for advancing-and-compacting the fibrous material in combination with fiber-rearranging means whereby certain fibers are intermixed and interwoven with other fibers before the lap is rolled and the splitting of the lap thereafter prevented. Its objects are: first, to provide a more efficient form for the forward-terminal portion of the fiber-rearranging means; second, to arrange the said portion and, especially, its fiber-rearranging elements in more efficient relation to the fiber advancing-and-compacting surfaces with which they co-act; third, to improve the means for the attachment of the fiber-rearranging means; and, fourth, to provide attachments for condenser-lap machines such as can be manufactured and sold independently of the said machines and applied thereto in a mill that is far from any well-equipped machine shop and which comprise fiber-rearranging means. These objects are attained by the mechanism that is illustrated in the accompanying drawing, in which:

Figures 1, 2, and 3 represent the preferred form of my invention. Fig. 1 is a diagrammatic representation in longitudinal section of a portion of a condenser-lap machine having such co-acting fiber advancing-and-compacting surfaces as a pair of condenser-cages 2 2, a pair of draw-rolls 5 5, a calender-roll 7 co-acting with a plurality of teeth 10 10, a stack of calender-rolls 7 7 7 7, and the winding-drums 8 8 which co-act with the heavy lap-roll in the center of the lap 9; Fig. 2 represents in side-elevation a portion of a draw-plate with a plurality of teeth secured thereto, projecting therefrom, and integral therewith; Fig. 3 represents in plan a portion of the said draw-plate and two of such teeth which belong to a series of such teeth that extend entirely across the machine.

In Fig. 1, 1 represents the forward end of a "trough-bottom" that is more specifically called a "screen" or a "grid." It is the bottom of the "trough" or "trunk," through which the lap-forming-materials pass to the "condenser-cages" 2 2. The "trunk-cover" is represented by 3. The arrow in the trunk indicates the general direction of the motion of such materials. The typical shape of the surface of the previously deposited mass of such materials is represented in cross-section, by the line 4 4 4, although the actual shape of such cross-section varies considerably from time to time. Within the trunk and approaching the surface represented by 4 4 4 are shown flying tufts or fragments of such materials. Ordinarily, the parts of such tufts adhere together better than such whole tufts or fragments adhere to one another. As such materials pass the draw-rolls 5 5 over the draw-plate 6 they are called a "sheet." The sheet is compacted by the calender-rolls 7 7 7 7, and finally is wound by the winding-drums 8 8 into a lap 9.

The surface represented by 4 4 4 is one of comparatively easy splitting. In the sheet, it becomes substantially V-shaped with its angle in advance and near the center of the sheet and with its other extremities in the surfaces of the sheet. In the lap, the outer surface splits more easily than the inner one. Laps that contain much waste composed of tufts of straight parallel fibers, split very easily between or through such tufts and easily fall apart. By my invention, I disarrange such parallelism and confusedly intermix and interweave fibers of different tufts by dragging forward some fibers or parts of fibers and by detaining others or parts of others. I prefer that such rearrangement of the fibers shall occur throughout the thickness of the lap, that it shall be most effective in a series of narrow and parallel strips of the sheet, and, especially so, in the outside surface of the rolled lap. I make this rearrangement more permanent by severely compacting the materials imme-

diately after the rearrangement and before the stresses that have been produced during the rearrangement within the elastic mass of the materials have had opportunity to return the rearranged fibers to their original positions to any important extent.

In my improvements I utilize any usual co-acting fiber-advancing-and-compacting surfaces preferably the surfaces of the upper pair of calender-rolls. I particularly utilize the parts of such surfaces where they bite the materials and another part of the surface of one of them, preferably the lower surface of the upper calender-roll. Preferably, I oppose to the said lower surface a series of stationary teeth or projections situated but a short distance apart in a line parallel to the axes of the calender-rolls and extending entirely across the machine. Preferably, I cast each tooth integral with the draw-plate at the forward end thereof but separately from and independently of every other tooth, so that the tooth is connected with another of the series only through the substance of the draw-plate. I prefer to elevate the forward end of the draw-plate to somewhere about the level of the bite of the calender-rolls, as a means of elevating the sheet and as a means for strengthening and stiffening the teeth by shortening the distance that they project above the draw-plate. I prefer to use strong and inflexible cast teeth of pyramidal shape and triangular cross-section with plane sides and very narrow straight backs formed by the intersection of the plane sides, the directions of the said backs intersecting the lower surface of the upper calender-roll at a large acute angle therewith, the said teeth having end-faces that intersect the said sides and back in sharp, fiber-detaining edges, and having sharp, fiber-detaining apexes that are located in the directions and at the forward ends of such backs in close proximity to the lower surface of the upper calender-roll, and near to the fibers that are held in the bite of the rolls. I prefer to cast the teeth integral with the draw-plate, as, in that case, no fastenings, projections, slits, or other fiber-detaining devices near or between the bases of the teeth injuriously interfere with the free advance of the fibers relative to the draw-plate and the teeth. The preferred teeth can be set wholly out of contact with either calender-roll but with their apexes in very close proximity to the lower surface of the upper roll. The great compressibility and elasticity of the sheet and the great strength and stiffness of the preferred teeth will enable the sheet to pass the apexes of the teeth under very severe pressure. The stronger and stiffer the teeth, the narrower the backs, the sharper the apexes, and the sharper the fiber-detaining edges, the closer their apexes can be set to the lower surface of the upper roll, and the more efficiently will the teeth detain and rearrange the fibers and prevent the splitting of the laps.

I prefer to attach the tooth to the draw-plate; partly, because the calender-roll, which is opposed to the tooth in its action upon the cotton that passes between them, is a solid and substantial roll and is well adapted to oppose the forceful pressure of the tooth; partly, because the front end of the draw-plate approaches near to the bite of the calender-rolls and for this reason effective teeth can be made quite short; partly, because the front terminal or point of the tooth can be brought very near to the bite of the calender-rolls and fibers that are displaced by the tooth can almost immediately afterward be so bent that they will better retain their new positions; and, partly, because the trough of which the draw-plate is the bottom is open and conveniently placed and therefore the teeth can be easily reached. Such teeth integral with a draw-plate, screen, or other support can be manufactured and sold independently of the machines to which they may be applied. They can be shipped to any manufactory and old condenser-lap machines will be greatly increased in efficiency by their incorporation therein.

I prefer to apply my hereinbefore described invention for preventing the splitting of laps to every breaker, intermediate, and finisher lapper. If the lap splits when unrolling in an intermediate or a finisher lapper or in a carding-engine, the split-off portion adheres to the outer surface of the next inner coil of the lap. The operative must, as soon as possible and as far as he can, rectify this defect in the unwinding. Otherwise, the splitting and the adhesion may continue, while the splitting lap makes several rotations about its own axis. The split may tear through the sheet. It may tear across the width of the sheet. By my invention the operative is relieved from the necessity of closely watching the unrolling laps, from the work of rectifying as far as he can the defects due to splitting, and from throwing parts of the split laps into the waste to be worked over, and the waste is prevented. In other words, the cost of production is diminished by the use of my invention. The transference of a split-off portion of the lap from the part of the sheet where it belongs to a different part of the sheet tends to non-uniformity in the weight per unit of length of the product from the machine. In the usual intermediate and in the usual finisher lapper an evener is provided and the evener tends to correct such non-uniformity, but it will not perfectly correct it. In the usual carding-engine there is no evener mechanism and the resulting

non-uniformity of the product is more serious. When my invention is used the laps do not split and non-uniformity consequent upon lap-splitting does not occur.

I claim:

1. In devices for obviating tendency of a fibrous lap to split, the combination with a pair of calender-rolls, and a draw-plate located near to the said rolls, of a plurality of fiber-detaining teeth located in the path of the fibers, each such tooth being integral with the said draw-plate, and having a forward-terminal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face near to the bite of the calender-rolls, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward end of the said back and in close proximity to the lower surface of the upper calender-roll.

2. In devices for obviating tendency of a fibrous lap to split, the combination with a pair of calender-rolls, and a draw-plate located near to the said rolls, of a plurality of fiber-detaining teeth located in the path of the fibers, each such tooth being of pyramidal form and integral with the said draw-plate, and having a forward-terminal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face near to the bite of the calender-rolls, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward end of the said back and in close proximity to the lower surface of the upper calender-roll.

3. In devices for obviating tendency of a fibrous lap to split, the combination with a pair of calender-rolls, and a draw-plate located near to the said rolls, of a plurality of fiber-detaining teeth located in the path of the fibers, each such tooth being integral with the said draw-plate, and having a forward-terminal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face near to the bite of the calender-rolls, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward end of the said back and in close proximity to the lower surface of the upper calender-roll, the said draw-plate with the said teeth projecting therefrom being free from fiber-detaining devices near or between the bases of the said teeth.

4. In devices for obviating tendency of a fibrous lap to split, the combination with a pair of calender-rolls, and a draw-plate located near to the said rolls with the forward-end of its upper surface nearly on a level with the bite of the calender-rolls, of a plurality of fiber-detaining teeth located in the path of the fibers, each such tooth being integral with the said draw-plate, and having a forward-terminal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face near to the bite of the calender-rolls, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward-end of the said back and in close proximity to the lower surface of the upper calender-roll.

5. As an attachment for a condenser-lap machine: a support for location near to a pair of calender-rolls, having a plurality of fiber-detaining teeth integral therewith and projecting therefrom for location in the path of the advancing fibers, each such tooth having a forward-terminal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward end of the said back for location in close proximity to the lower surface of the upper calender-roll.

6. As an attachment for a condenser-lap machine: a support for location near to a pair of calender-rolls, having a plurality of fiber-detaining teeth integral therewith and projecting therefrom for location in the path of the advancing fibers, each such tooth having a forward-terminal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward end of the said back for location in close proximity to the lower surface of the upper calender-roll, the said support with the said teeth projecting therefrom being free from fiber-detaining devices near or between the bases of the said teeth.

7. As an attachment for a condenser-lap machine: a support for location with the forward end of its upper surface nearly on a level with the bite of the calender-rolls, having a plurality of fiber-detaining teeth integral therewith and projecting therefrom for location in the path of the advancing fibers, each such tooth having a forward-ter-

minal portion having plane sides that intersect in a straight narrow edge to form the back of the tooth and a plane end-face, each of said sides ending abruptly in a sharp fiber-detaining edge at its intersection with said end-face, and said sides and end-face intersecting to form a sharp fiber-detaining apex in the direction and at the forward end of the said back for location in close proximity to the lower surface of the upper calender-roll.

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

JOHN KILBY WHITTIER.

Witnesses:
IRVING D. KIMBALL,
CHANNING WHITAKER.