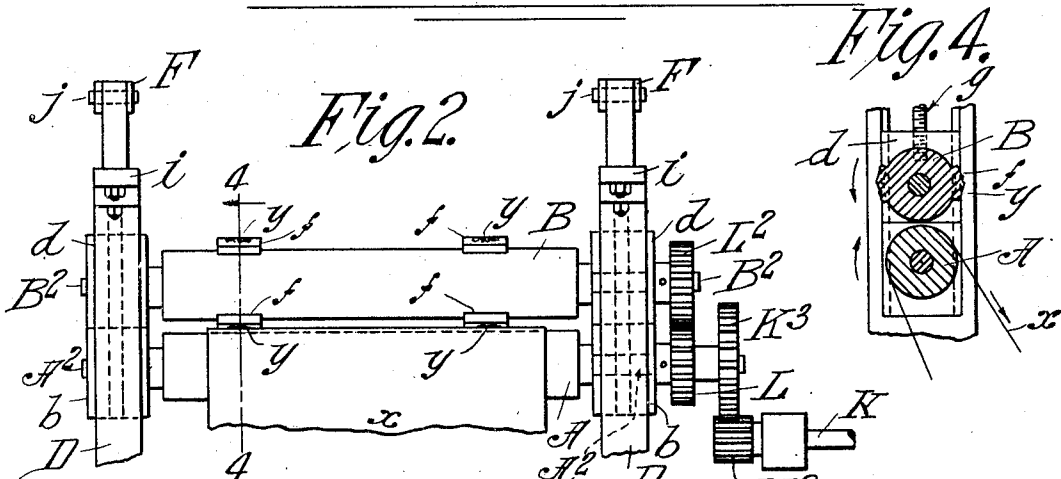
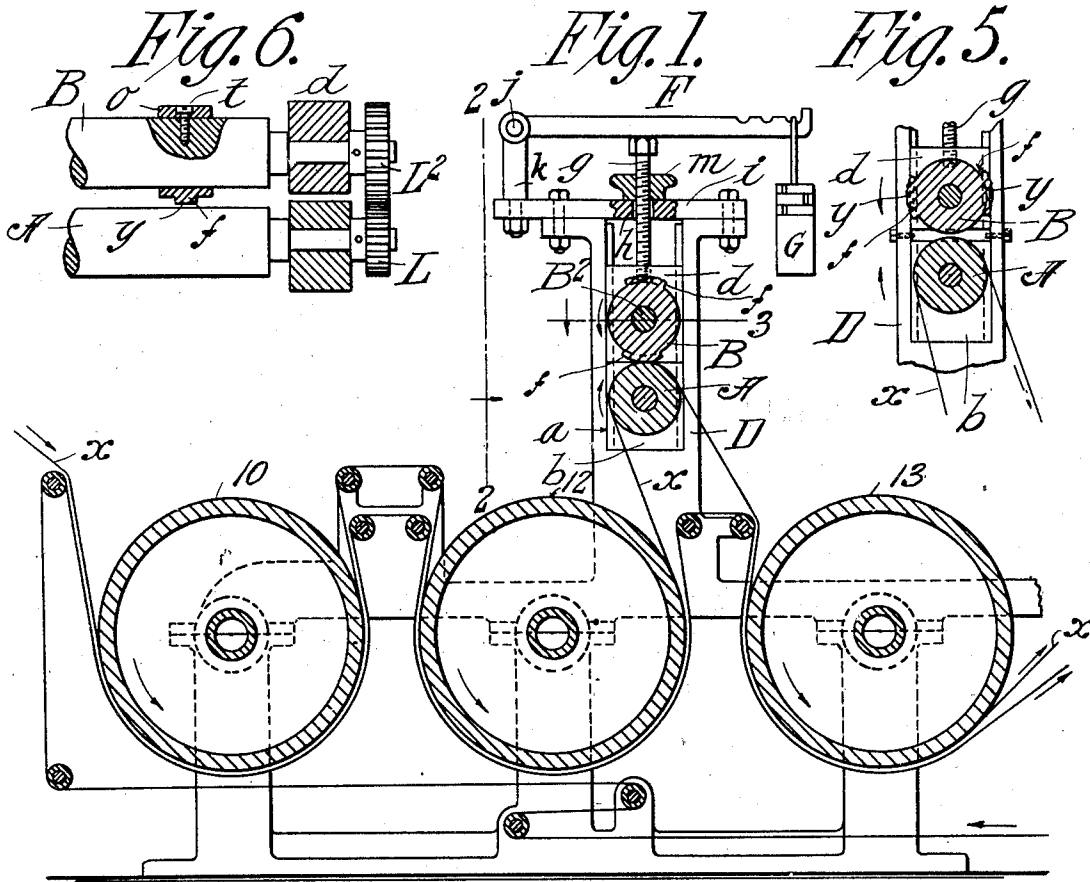


A. WHITTON.
 WATERMARKING APPARATUS FOR PAPER MACHINES.
 APPLICATION FILED APR. 12, 1912.

1,058,826.

Patented Apr. 15, 1913.



WITNESSES:
 H. L. Sprague
 W. P. Noble.

Fig. 3 is a small detail view of a component, likely a roller or a part of the frame, showing internal mechanisms and labels (D, d, y, B).

INVENTOR,
 Alexander Whitton,
 BY *[Signature]*
 ATTORNEY.

Fig. 7 is a small detail view of a component, likely a roller or a part of the frame, showing internal mechanisms and labels (y).

UNITED STATES PATENT OFFICE.

ALEXANDER WHITTON, OF MITTINEAGUE, MASSACHUSETTS.

WATERMARKING APPARATUS FOR PAPER-MACHINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALEXANDER WHITTON, a British subject, and resident of Mittineague, West Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Watermarking Apparatuses for Paper-Machines, of which the following is a full, clear, and exact description.

The object of this invention is to provide means for the watermarking of paper in the process of the manufacture thereof which will do away with the requirement of dandy rolls and which is unlike certain watermarking means heretofore employed in the wet portion of a paper machine and comprising impression imparting cylinders.

In the present invention a pair of cylinders is provided which have their location forward of the first one of the drier drums employed as a part of or in conjunction with paper machines so that the web being drawn out from the wet end of the machine and becoming partially dry is subjected, while yet damp, to the paper marking impression of one of a pair of cylinders which has one or more arc faced projections extending from the circumferential surface thereof provided on such arc face with impression forming surfaces, such cylinder being journaled in boxes which are vertically movable to which pressure in a downward direction is imparted, and in conjunction with which boxes are means whereby the downward movements of the lower boxes are limited so that the coöperative cylinders themselves are never brought to circumferential contact, although in every revolution of the upper cylinder its impression carrying projection or projections are brought to pressure bearings against the periphery of the lower cylinder or against the web of paper running thereover.

The invention is more definitely described in conjunction with the accompanying drawings and is set forth in the claims.

In the drawings:—Figure 1 shows, in sectional elevation, the first, second and third drums of the drier apparatus and the arrangements comprised in my present invention combined therewith. Fig. 2 is an elevation as seen beyond the plane indicated by line 2—2, Fig. 1. Fig. 3 is a partial horizontal sectional view as taken on line 3—3, Fig. 1. Fig. 4 is a partial cross sectional view in detail as taken on the line 4—4, Fig. 2.

Fig. 5 is a view in detail showing a slight modification in the construction of the recessed uprights in which the journal boxes are fitted. Fig. 6 shows a roll having interchangeable equipment, and Fig. 7 is a detail view in further illustration thereof.

In the drawings, 10, 12 and 13 represent the first, second and third drier drums of the series, the number thereof being greater or less as required; *x* represents the web of paper understood as being drawn to the rightward from the wet end of the Fourdrinier machine and carried, by the usual felt apron, for its proper course through the drier drums, for which, as understood, usual means for rotating them at uniform speed is provided.

The web of paper after passing through one or more of the drier drums becomes partially dried so that in passing to and through further of the drums it reaches them in only a damp condition; and I have found it advantageous to locate the watermarking cylinders A and B adjacent and forwardly of the second one, 12, of the drums. The opposite uprights D D are provided adjacent the ends of the second drier drum 12, each having a vertical recess *a* therein.

b b represent a pair of oppositely located boxes for the journals A² of the lower cylinder A, the same being stationary by reason of resting on the lower boundary of the vertical recess *a*.

d d represent a pair of oppositely located boxes for the journals B² of the upper cylinder B, which boxes are vertically movable, and have means below them for limitations of their downward movements. Such means, as represented in Figs. 1, 2 and 4, is constituted by the simple expedient of the lower journal boxes on which the upper ones bottom. The upper cylinder has one or more (a pair being here shown) projections *f* extending from the circumference thereof and provided with arc shaped impression forming faces *y* produced in any suitable way, as by engraving, or by the processes of electrotyping, stereotyping, or otherwise.

The upper boxes *d d* have upwardly extending stems *g* which extend for guidance through holes *h* therefor in the cap pieces or bars *i* secured on the tops of the uprights D and which are provided with head forming enlargements; and coacting with these headed upwardly extending stems *g* are levers F F each of which is connected by

pivot *j* at one end to post *k* upstanding above the cap piece *i*, and has a weight *G* suspended from its other end so that according to the size of the weights a greater or less pressure in a downward direction is exerted through the stems *g* to the upper boxes and to the upper cylinder B.

The cylinders A and B are to be rotated at uniform speed corresponding to the surface speed of the drier drums 10, 12, and 13, and to the travel of the paper which runs in conjunction therewith; and as a means therefor, power is transmitted through the shaft K which has a pinion K² thereon which meshes into a gear wheel K³ on the end of one of the journals A² for the lower cylinder; and the journal of the lower cylinder is by gear L affixed thereon meshed into the gear L² of the upper cylinder and in constant and running engagement therewith.

In operation, the web coming in a very wet condition from the Fourdrinier machine and carried by the apron to and around one or more of the drier drums, passes between the cylinders A and B and thence forwardly to the farther drier cylinder or cylinders. By reason of the arrangement of the journal boxes, and the means for sustaining the upper ones in a limited degree of descent, the web will pass freely through and between the pair of cylinders A and B, but every time one of the arc faced impression projections *f* comes around adjacent the lower cylinder *a*, it has a pressure bearing on the paper under the weight of such cylinder and its boxes; and an augmenting pressure is exerted through the stems *g* by the weighted levers F to produce an impression having all the general aspects of a water mark in the but partially dried web of paper.

When each revoluble arc faced projection *f* comes around to its lowermost position and adjacent the lower cylinder, it causes the upper cylinder B and its journal boxes *d d* to have a degree of rising movement so that the impression producing parts are subject to the weighting pressures aforementioned; and then when the arc faced projection has been partially and so far revolved as to move upwardly away from the plane of the traveling paper, the upper cylinder A is permitted to descend in a limited extent, but not so far as to permit the periphery of the cylinder proper to come to contact against the web. Such limitation of the downward movement of the cylinder is assured by the arrangement of the parts, such as shown and described wherein the boxes *d d* for the upper cylinder bottom or come to rest upon the tops of the journal boxes *b b* for the lower cylinder. But as represented in Fig. 5, instead of having an arrangement by which the upper journal boxes bottom against the lower boxes, a horizontal partition is provided across the vertical recesses

in the uprights *d* below which partition the lower boxes are located, and upon which the tops of the upper boxes bottom.

The means hereinabove described for water-marking paper is less expensive than the means constituted by dandy rolls, and is preferable to the employment of dandy rolls for the further reason that it becomes possible to produce watermarking of more elaborate and complex design, and one in which the delineation is formed by marks or impressions which may be more closely related or finer than any possible to produce by the action of a dandy roll.

When desired to run the driers without having the paper passing therethrough watermarked, the upper boxes may be elevated by the hand-wheel-nuts *m* engaged on the screw threaded portions of the stem *g* so that through the elevation of the upper boxes the cylinder is supported to such an extent above the lower cylinder that the revoluble projections *f* pass around free and clear of the traveling paper. And inasmuch as it is desirable to have the watermarking impressions at different distances apart on the traveling web, I provide, for use in some cases, interchangeable rings such as shown at *o* in Fig. 6, which may be slipped on the upper cylinder, which may be of a standard diameter, and secured by set screw *t*.

In conjunction with the employment of the interchangeable ring having the projection *f* provided with the arc formed impression producing surface, proper interchangeable gearing to substitute that shown at L, L² is provided to secure the propulsion of the cylinders at the proper speeds.

I claim:—

1. The combination with the drier drums of a paper machine, of upper and lower cylinders having positions adjacent and axially parallel with the drier drums and provided with journals at their ends, the upper one of said cylinders having a projection extended from the circumferential surface thereof provided with an arc shaped impression forming face, opposite uprights adjacent the ends of an intermediate one of the drier drums, having a pair of oppositely located stationary boxes for the journals of the lower cylinder, and having a pair of oppositely located boxes for the journals of the upper cylinder which are vertically movable, means below the movable boxes for limiting their downward movements, and means for imparting a downward pressure against said upper boxes.

2. The combination with the drier drums of a paper machine of upper and lower cylinders having positions adjacent and axially parallel with the drier drums and provided with journals at their ends, the upper one of said cylinders having a projection extended from the circumferential surface thereof

and provided with an arc shaped impression forming face, opposite uprights adjacent the ends of an intermediate one of the drier drums having a pair of oppositely located stationary boxes for the journals of the lower cylinder and having a pair of oppositely located boxes for the journals of the other cylinder which are vertically movable, and which normally rest on the tops of the lower boxes, and which have upwardly extending stems, and means for imparting a downward pressure against said stems.

3. The combination with the drier drums of a paper machine, of a pair of cylinders having positions adjacent and axially parallel with the drier drums and provided with journals at their ends, the upper one of said cylinders having one or more projections extended from the circumferential surface thereof and provided with arc shaped impression forming faces, opposite uprights adjacent the ends of an intermediate one of the drier drums having a pair of oppositely located stationary boxes for the journals of the other cylinder which are vertically movable and normally rest on the tops of the lower boxes and which have upwardly extending stems, levers pivoted at the upper portions of said uprights, extending in bearing across the tops of said stems, and having weights at their free ends.

4. The combination with the drier drums of a paper machine, of a pair of cylinders having positions adjacent and axially parallel with the drier drums, and provided with journals at their ends, the upper one of said cylinders having one or more projections extending from the circumferential surface thereof provided with arc shaped impression forming faces, opposite uprights adjacent the ends of an intermediate one of the drier drums having a pair of oppositely located stationary boxes for the journals of the lower cylinders having a pair of oppositely located boxes for the journals of the other cylinder which are vertically movable, means for imparting downward pressures to the boxes, and means for elevating and supporting, in their raised positions, the said pair of upper journal boxes.

5. The combination with the drier drums

of a paper machine, of a pair of cylinders having positions adjacent and axially parallel with the drier drums and provided with journals at their ends, pairs of boxes for the journals of both cylinders, those for the upper cylinder being vertically movable, means for imparting downward pressures to the upper boxes, a ring adapted to be removably engaged on the upper cylinder having a projection provided with an arc shaped impression forming face and means for detachably confining said ring on the upper cylinder.

6. The combination with the drier drums of a paper machine, of upper and lower cylinders having positions adjacent and axially parallel with the drier drums and provided with journals at their ends, the upper one of said cylinders having a projection extended from the circumferential surface thereof provided with an arc shaped impression forming face, opposite frame uprights adjacent an intermediate one of the drier drums, having a pair of oppositely located stationary boxes for the journals of the lower cylinder, and having a pair of oppositely located boxes for the journals of the upper cylinder which are vertically movable, means for limiting the vertically movable boxes in their downward movements, and means for imparting a downward pressure against said movable boxes.

7. The combination with the drier drums of a paper machine, of a pair of cylinders located adjacent to an intermediate one of the drier drums, one of said cylinders having a projection extending from the circumferential surface thereof provided with an arc-shaped impression forming face, stationary journal boxes for one of the cylinders, journal boxes for the other cylinder movable relatively to the stationary boxes, means for limiting such movement, and means for imparting pressure to said movable boxes.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

ALEXANDER WHITTON.

Witnesses:

WM. S. BELLWS,
G. R. DRISCOLL.