(No Model.)

N. LAJOIE.

PAPER DRYING APPARATUS.

No. 512,478. Patented Jan. 9, 1894.

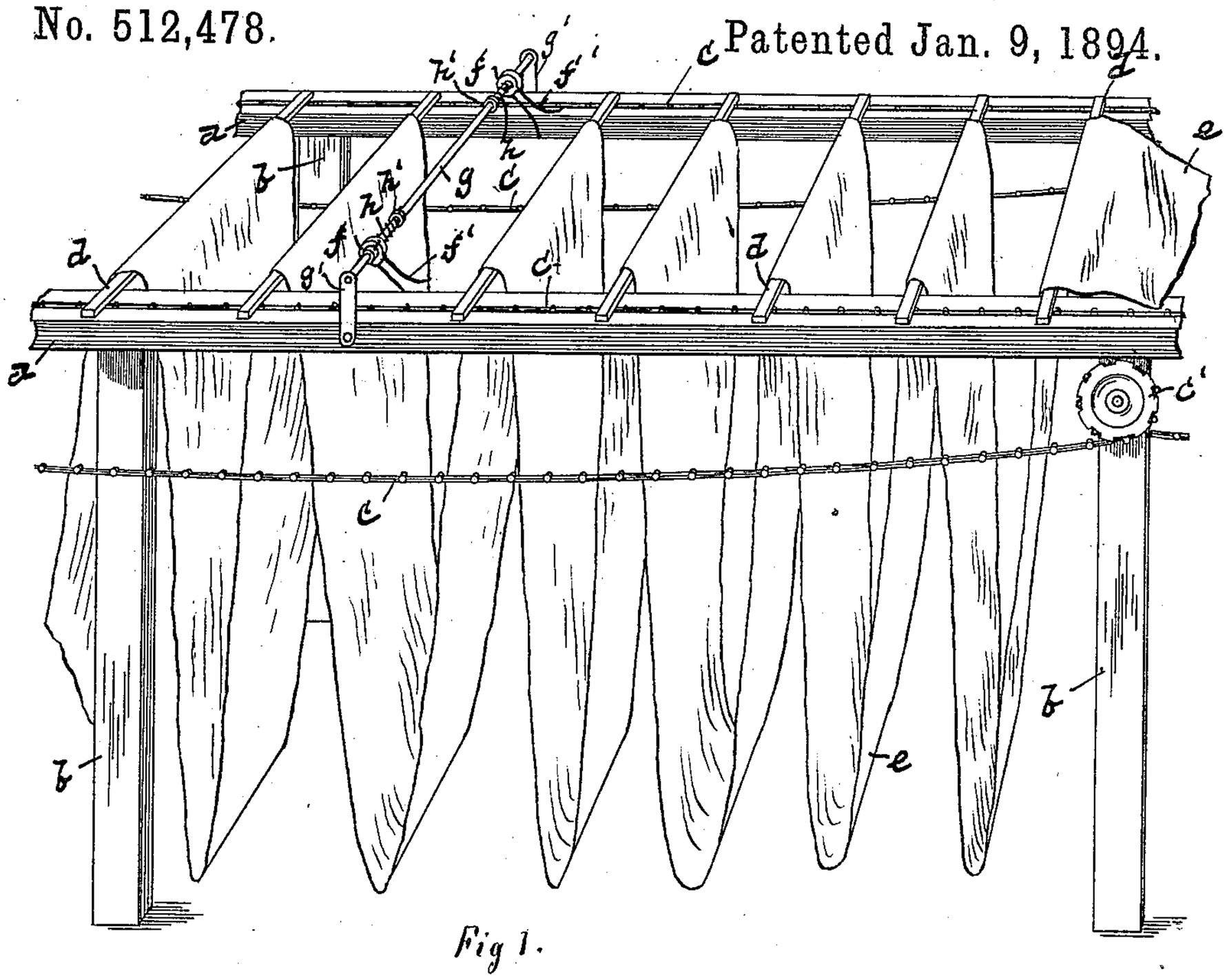

Fig 1.

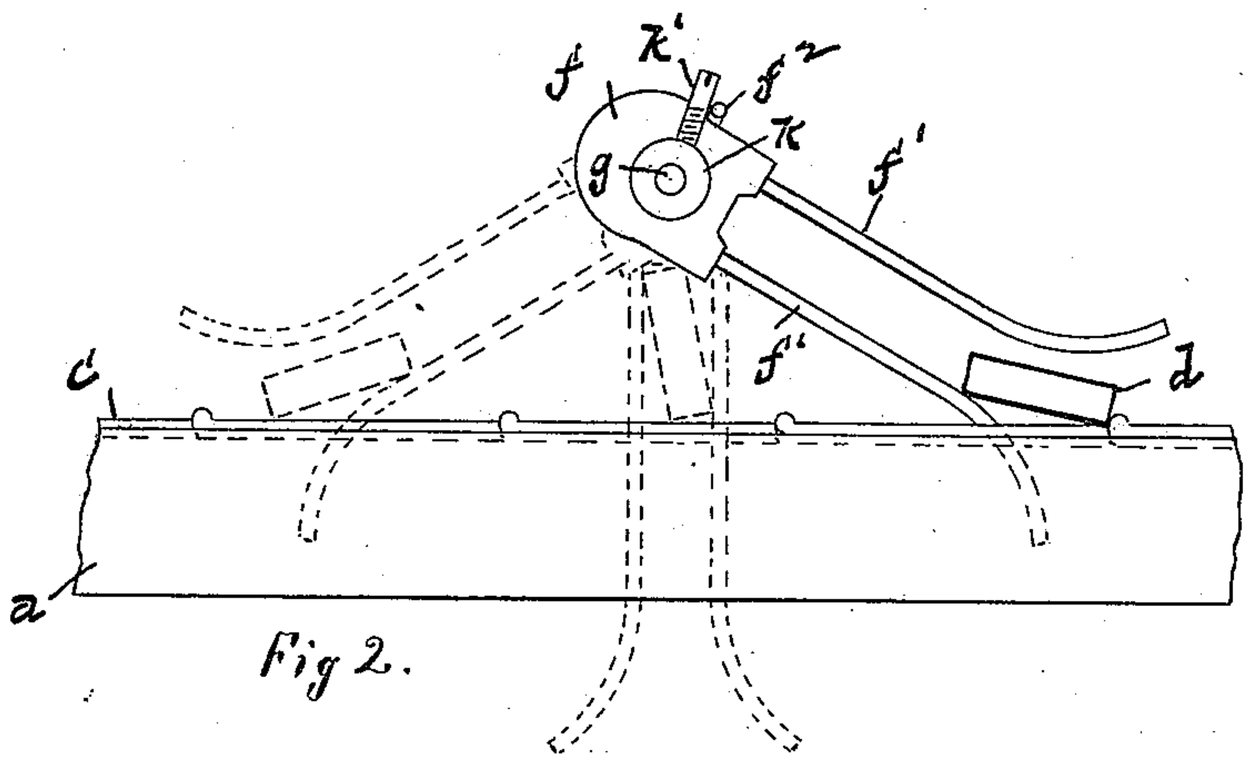

Fig 2.

WITNESSES:
Francis. W. Rice.
J. E. Chapman

INVENTOR
N. Lajoie.
BY Hawes & Chapman
ATTORNEYS.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

NAPOLÈON LAJOIE, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR OF ÒNE-HALF TO WILLIAM H. SMITH, OF SAME PLACE.

PAPER-DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 512,478, dated January 9, 1894.

Application filed April 5, 1892. Serial No. 427,788. (No model.)

To all whom it may concern:

Be it known that I, NAPOLÈON LAJOIE, of Holyoke, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Paper-Drying Apparatus, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to apparatus for drying paper in continuous sheet or web form, such as is generally employed in connection with machines for coating the paper with a coloring or other material. Such apparatus consists of two parallel rails or supports of considerable length, upon which are caused to travel two endless chains or other carriers, moving at a uniform rate of speed. The web of paper as it issues from the coating machine is led between said rails, and is suspended from flat sticks, which extend transversely across the space between the rails and rest loosely upon the carriers, the paper depending from said sticks in loose festoons or folds reaching nearly to the floor. As the sticks and the paper depending therefrom are carried by the carriers from one end of the rails to the other, the paper is quickly dried and is ready to be wound into rolls or be otherwise disposed of. In practice it is found that more or less of the coating material is liable to be deposited upon the edges of the web of paper, and when, as often happens, the two sides of a loop of the paper swing into contact with each other the edges thereof adhere together in such manner as to result in the tearing of the paper if they are not separated before the paper is completely dried. Again, it is found that a mark is left at the points where the web rests upon the sticks, which disfigures the paper, and in the case of very heavy paper or card-board the surface thereof is broken at said points. In order to overcome these tendencies it has been customary to station a man or boy at some point in the length of the drying apparatus, whose duty it is to grasp the end of each of the sticks, as they are carried slowly past him, and impart thereto a half-revolution, or, in other words, turn them upside down, thereby causing a new portion of the paper to bear upon the sticks and preventing the latter from either marking or breaking the former. While such method of reversing the sticks secures the desired result, the additional labor involved materially increases the cost of coating the paper, and it is the object of my invention to provide means for automatically reversing the sticks of such a drying apparatus and thereby dispensing with the services of an operator for such purpose and effecting a great saving in the cost of operating a paper coating machine.

To this end my invention consists in the device constructed and operating as hereinafter fully described and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several views, Figure 1 is a view in perspective of a portion of a drying apparatus having applied thereto a stick reversing device embodying my invention. Fig. 2 is an end view of the reversing device, and illustrating, by broken lines, its action in reversing a stick.

The letters *a a* designate the two parallel rails, *b b* the vertical standards supporting the same, and *c c* the two endless chains or carriers passing about suitably disposed sprocket-wheels *c'* and longitudinally over said rails *a*, of the ordinary form of drying apparatus generally used in connection with machines for coating paper. The sticks *d*, from which the web of paper *e* depends in festoons or folds as shown in Fig. 1, rest upon said chains and are carried along with the latter from end to end of the rails *a* in a manner which will be familiar to persons skilled in the art. As before stated, the sticks *d* have heretofore been reversed manually, to prevent them from marking or breaking the paper, and to disengage the edges of any of the festoons or folds of the paper which may have adhered to each other, before the paper is completely dried. The device for automatically securing this result devised by me consists essentially of two forks pivotally supported above the plane of and adjacent to each of the rails *a*, and movable about an axis which is perpendicular to said rails, or, in other words, parallel with the sticks *d*, said

forks being normally retained in a position in which they intersect the path of movement of the sticks, in such manner that the latter, as they are carried along by the chains, are caused to enter said forks and, as the latter swing about their axes, are gradually turned to reverse their sides, and then pass out of the forks again. The particular form of the forks and of their supports can be greatly varied within the scope of my invention. As herein shown, they are composed of hubs *f* having projecting therefrom two fingers *f'*, the outer ends of which are preferably curved outwardly as shown. Said hubs *f* are loosely mounted upon a stationary shaft *g*, which is supported in suitable bearings *g'* on the rails *a*, whereby said hubs are adapted to revolve about said shaft as a center. Coil springs *h*, surrounding said shaft, are connected at one end to said hubs respectively, and at their opposite ends to collars *h'* on the shaft, said collars being adjustably secured to the shaft by set-screws or otherwise to enable the tension of said spring to be regulated at will. Said springs tend to revolve the hubs *f* about the shaft in a direction opposite to that in which the sticks *d* are moved by the carriers, and suitable stops are provided for limiting such movement at a point where the fingers *f'* will stand at an acute angle to the path of movement of the sticks, as shown in Fig. 1 and by full lines in Fig. 2, such stops as shown consisting of screws *k'* projecting from collars *k* on the shaft, and laterally projecting studs f^2 on the hubs. See Fig. 2. The hubs *f* are located adjacent to the rails *a* respectively, whereby the fingers *f'* are adapted to engage the sticks at each side of the web of paper, and the operation of said fingers to automatically reverse the sticks is clearly shown in Fig. 2. The stick, as it is carried along by the chains, enters the forks formed by said fingers, and as it is carried toward the inner ends of said forks is gradually tilted to an edgewise position, and then to a reversed position, at the same time swinging the forks about shaft *g* as a center in opposition to the stress of springs *h*, and then passes out of the forks again, the latter being immediately returned to their normal position by their springs, ready to receive the next stick. In this manner each stick is reversed as it passes the forks without interruption of its movement or breaking its connection with the carriers. By adjustment of the collars *h'* the tension of springs *h* can be regulated to suit different grades of paper, heavy papers requiring a greater resistance of the forks than light ones in order to insure the reversal of the sticks.

If desired two or more of the reversing devices can be located at different points on the same drying apparatus but ordinarily one reversal of the sticks will be sufficient.

It is obvious that by providing each of the hubs *f* with a plurality of forks projecting therefrom, instead of the single one as herein shown, said hubs can be caused to revolve entirely about their axes the action of one stick upon one of the forks bringing another fork into the proper position to receive the succeeding stick, and that various other modifications of the construction herein shown and described can be made within the spirit of my invention.

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

1. The combination with a drying apparatus, comprising two carriers moving in a horizontal plane and a series of sticks adapted to rest upon said carriers and to support a web of paper as described, of means for automatically reversing said sticks to bring their lower sides uppermost, said means comprising two forks pivotally supported at their closed ends adjacent to said carriers respectively and revoluble about their pivots in a vertical plane, and means substantially as described for normally retaining said forks in such position that said sticks will successively enter the open ends thereof, arranged and operating substantially as set forth.

2. The combination with a drying apparatus, comprising two carriers moving in a horizontal plane and a series of sticks adapted to rest loosely upon said carriers and to support a web of paper, of two hubs revolubly supported upon fixed axes adjacent to said carriers respectively, each of said hubs being provided with forked arms projecting therefrom one of which arms normally intersects the path of movement of said sticks, substantially as and for the purpose set forth.

3. The combination with a drying apparatus, comprising two parallel ways, two carriers movable upon said ways, and a series of sticks, as described, of two hubs revolubly supported adjacent to and slightly above said ways respectively with their axes at a right-angle to the latter, each of said hubs being provided with two projecting fingers forming a fork, springs connected to said hubs and tending to revolve them in a direction opposite to that of the movement of said carriers, and suitably disposed stops for limiting the movement of the hubs, arranged and operating substantially as and for the purpose set forth.

4. In a drying apparatus of the kind described, the combination with the carriers and the series of sticks carried thereby, of a transversely disposed, stationary shaft located above said carriers, two hubs revolubly mounted upon said shaft and carrying projecting fingers as described, two springs connected with said hubs and tending to revolve them in a direction opposite to that of the movement of the carriers, stops for limiting such movement of the hubs, and means substantially as described for adjusting the tension of said springs, substantially as and for the purpose set forth.

5. The combination with the drying ap-

paratus comprising rails *a a*, carriers *c*, and sticks *d*, of stationary shaft *g* supported in suitable bearings above said rails, hubs *f* loosely mounted upon said shaft and having the projecting fingers *f'* the outer ends of which are curved in opposite directions as described, springs *h* connected at one end to collars *h'* on said shaft and at their opposite ends to said hubs respectively, and suitable stops for limiting the movement of said hubs in one direction, arranged and operating substantially as set forth.

NAPOLÈON LAJOIE.

Witnesses:
W. H. CHAPMAN,
J. E. CHAPMAN.