(No Model.) 2 Sheets—Sheet 1.

H. L. CARTER & T. H. SAVERY.

PAPER MAKING MACHINE.

No. 397,275. Patented Feb. 5, 1889.

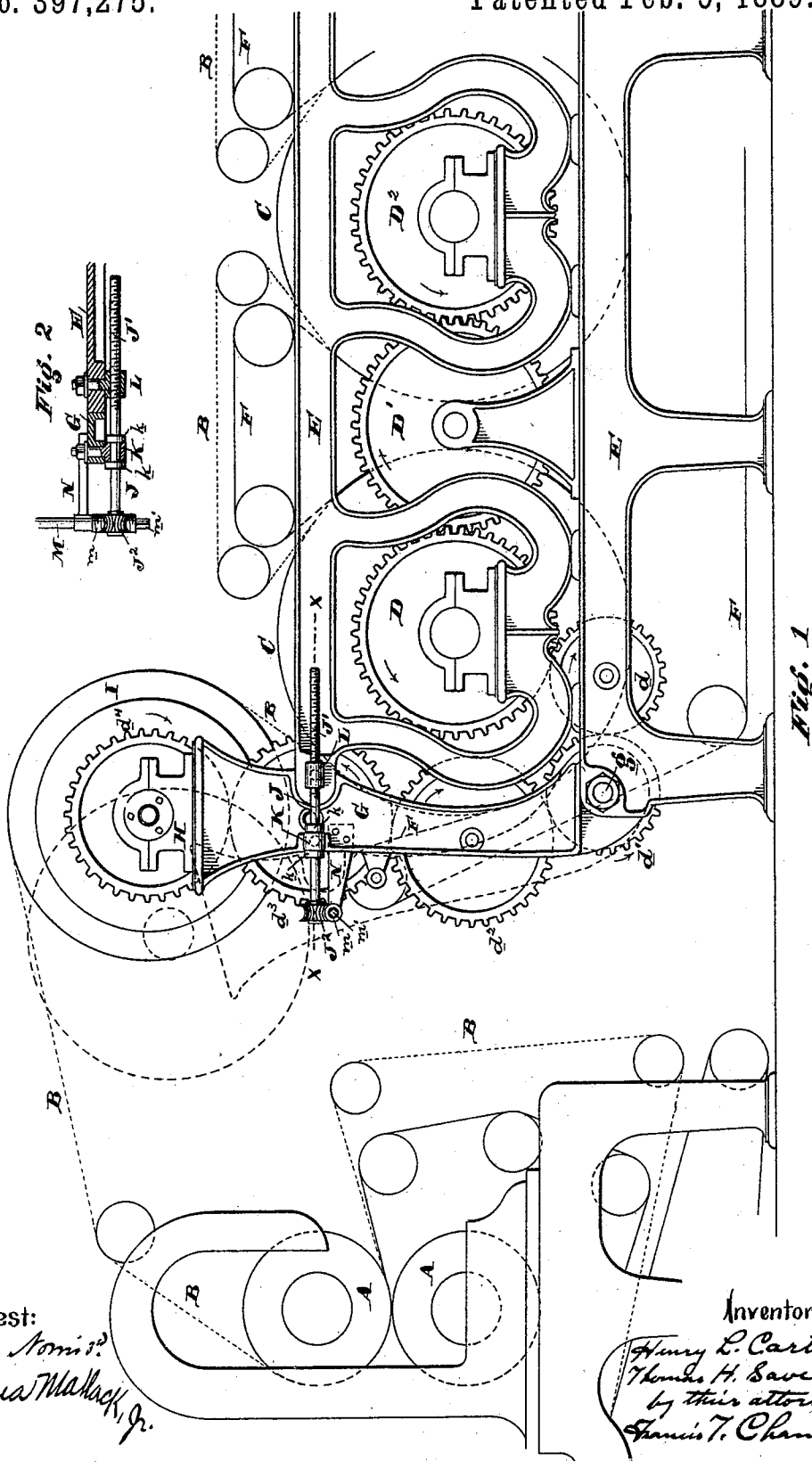

Fig. 1

Fig. 2

Attest:
Isaac Norris Jr.
Joshua Wallack, Jr.

Inventors:
Henry L. Carter
Thomas H. Savery
by their attorney
Francis T. Chambers

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

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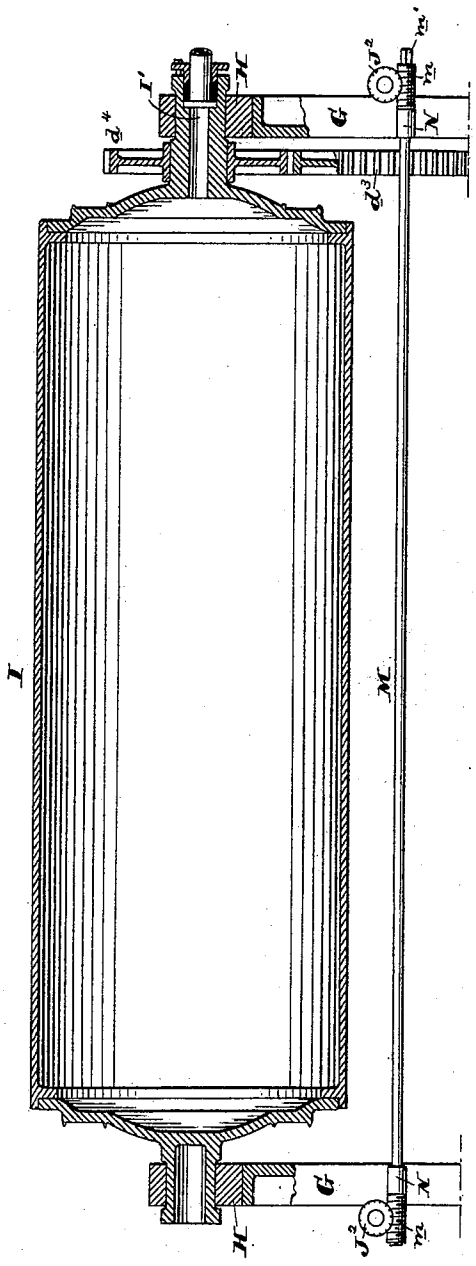

Fig. 3

Attest:

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UNITED STATES PATENT OFFICE.

HENRY L. CARTER, OF PHILADELPHIA, PENNSYLVANIA, AND THOMAS H. SAVERY, OF WILMINGTON, DELAWARE.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 397,275, dated February 5, 1889.

Application filed June 4, 1888. Serial No. 275,952. (No model.)

To all whom it may concern:

Be it known that we, HENRY L. CARTER, of the city and county of Philadelphia, State of Pennsylvania, and THOMAS H. SAVERY, of Wilmington, county of New Castle, State of Delaware, have invented a new and useful Improvement in Paper-Making Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to that part of the paper-making machinery known as the "drying-cylinders," and has for its object to facilitate the transfer of the web of paper from the press-rolls to the drying-cylinders by, in the first place, making it possible to adjust the web in proper position easily and accurately; in the second place diminishing the strain on the web between the press and drying-cylinders proper, because the points of support are not so far apart, and, thirdly, delivering the web to said cylinders in a slightly dryer and stronger condition than has heretofore been the case. The usual strain thrown upon the web of paper where points of support are far apart robs it of a part of its elasticity and strength before it has reached the first drier and disqualifies it in a great measure to resist the strains that it must necessarily endure in its passage over the drying-cylinders.

Our invention is hereinafter clearly defined in the claims. Generally speaking, its leading feature is a guide-cylinder journaled in boxes directly or indirectly secured to the frame of the drying-cylinders, said guide-cylinder being used in place of the ordinary small loosely-journaled guide-roll, over which the web passes on its way from the press-rolls to the drying-cylinders, and being of comparatively large diameter, (say from twenty inches to thirty-six inches,) in combination with driving mechanism connected with the gears which drive the drying-cylinders, so as to impart to said guide-cylinder the same peripheral velocity as that of the drying-cylinders. Preferably we secure this guide-cylinder on supporting-arms pivoted to the frame of the drying-cylinders and provided with adjusting mechanism, whereby the position of the cylinder with respect to the guide-rolls can be changed at will, and we consider it also advisable to make the guide-cylinder hollow and provide it with a steam-connection for heating it, so as to partially dry the web passing over it.

Reference being now had to the drawings, which illustrate our invention in its preferred and most complete form, Figure 1 is a side view or elevation showing the connection of our improved guide-cylinder with the drying-cylinders and the press-rolls. Fig. 2 is a section on the line $x\,x$ of Fig. 1; and Fig. 3, a front view showing the guide-cylinder in section, and also its immediate supports and adjusting device.

A A indicate the press-rolls, which, with their supports, &c., may be of any desired construction, and need not be particularly described.

The dotted line B B, &c., indicates the course of the web of paper through this part of the machine. C C are drying-cylinders; D D′ D^2, gearing for actuating the cylinders. E is the frame supporting them. F F indicates the felt used in connection with these cylinders. All these parts are of the usual construction, and need not be further referred to.

G G are standards secured to the frame E and to which are attached the journal-boxes H H of the guide-cylinder I. As shown in the drawings, the standards G are secured at their lower ends to frame E by means of pivot-pins g, and further attached to the frame by means of adjusting-screws J. A convenient way of making this attachment is shown in detail in Fig. 2, in which K indicates a pivoted journal for the adjusting-screw J, on which collars $k\ k$ are formed to secure it against lateral movement in the journal K.

L indicates a threaded nut, secured by means of a pivot-pin to frame E, and through which passes the threaded end J′ of screw J.

J^2 is a worm-wheel on end of screw J, and M a connecting-shaft having worms m at each end to engage the worm-wheels J^2, and a squared end, m', by which it can be turned

and the adjusting-screws J simultaneously actuated to move standards G and the small cylinder I, which they support out or in.

d, d', d^2, d^3, and d^4 indicate a train of gears connecting the gear-train D D', &c., with the guide-cylinder I, arranged, as shown, with wheel d' journaled on the same center as pivots g, and with gears d^2, d^3, and d^4 journaled on the standard. It is obvious that they will not be affected by the movement of the guide-roll. The guide-roll I, as we have already stated, should be from twenty to thirty-six inches in diameter, and we recommend a diameter of twenty-eight inches as adapted to give excellent results. We prefer to make the cylinder hollow, as shown in Fig. 3, and to provide it with a hollow journal, I', through which it can be heated, as are the drying-cylinders.

The operation of our improved machine is clear from the above description, and does not differ from that of the ordinary machine except in that the guide-cylinder I, being positively rotated, acts to draw the web along instead of being rotated by the web, as was the guide-roll whose place it takes. The adjustability of the guide-cylinder enables the web to be engaged at the most advantageous point and delivered to the drying-cylinders at any desired angle, and of course the heating of the guide-cylinder will to some extent dry and strengthen the web passing over it.

One great advantage which we gain by using the large and positively-rotated guide-cylinder is that the machine-attendant can with our device adjust the end of a new web between the press-rolls and the drying-cylinders with much greater rapidity and precision, the broad surface and comparatively slow motion of the cylinder enabling him to straighten and correctly align the web much better than he could on the old light and small roll. He can also pass the paper from the press-rolls to the driers under proper tension, and thus avoid its breaking. It is a well-known fact that the best efforts of the machine-tender are often concentrated at the driers, endeavoring to pass the paper over them after it has broken, when his attention is imperatively demanded at some other part of the machine.

Upon machines as usually constructed the paper is not delivered to driers under proper tension, and in order to correct this the web is necessarily doubled or folded in one or more places, in order to take up the slack on the driers. Whenever there is a fold or a double there is a wet spot, and consequently a weak spot, which is sure to part and break at some point in its passage over the driers. Every break is a serious matter, as it occasions much loss of valuable time and material, and renders the clothing and machinery liable to serious injury. All these defects in the usual type of machine are corrected by the use of our device.

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

1. In a paper-making machine, the combination, with the drying-rolls and the frame supporting said rolls, of a guide-cylinder supported on the front of said frame, and driving-gear connecting said guide-cylinder with the mechanism actuating the drying-rolls, so as to rotate it with the same peripheral velocity, all substantially as and for the purpose specified.

2. In a paper-making machine, the combination, with the drying-rolls and the frame supporting said rolls, of an adjustable guide-cylinder, said cylinder being supported on movable bearings connected with the front of the frame of the drying-cylinders, and driving-gear connecting said guide-cylinder with the mechanism actuating the drying-rolls, so as to rotate it with the same peripheral velocity, all substantially as and for the purpose specified.

3. In a paper-making machine, the combination, with the drying-rolls and the frame supporting said rolls, of an internally-heated guide-cylinder supported on the front of said frame, and driving-gear connecting said guide-cylinder with the mechanism actuating the drying-rolls, so as to rotate it with the same peripheral velocity, all substantially as and for the purpose specified.

H. L. CARTER.
THOS. H. SAVERY.

Witnesses to signature of H. L. Carter:
SAMUEL MASON,
J. C. SMITH,
WM. T. WILMANS,
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Witnesses to signature of T. H. Savery:
WM. T. WILMANS,
JOSHUA MATLACK, Jr.