

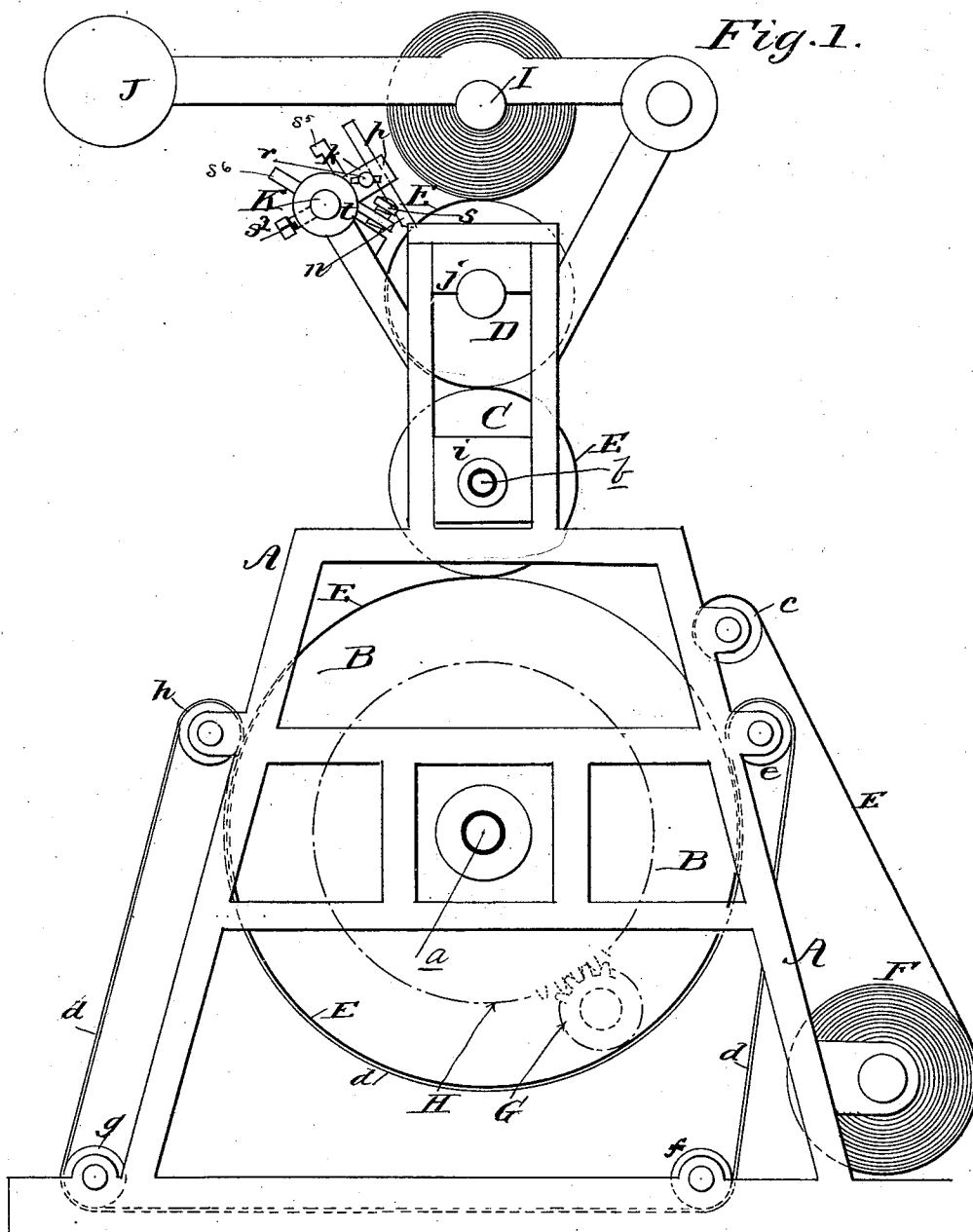
(No Model.)

2 Sheets—Sheet 1.

G. T. LEONHARD.
PAPER DRYING AND CUTTING APPARATUS.

No. 478,975.

Patented July 12, 1892.



WITNESSES:

M. A. Sawyer
M. J. Spencer.

INVENTOR

G. T. Leonard

BY

Henry F. Parker

ATTORNEY

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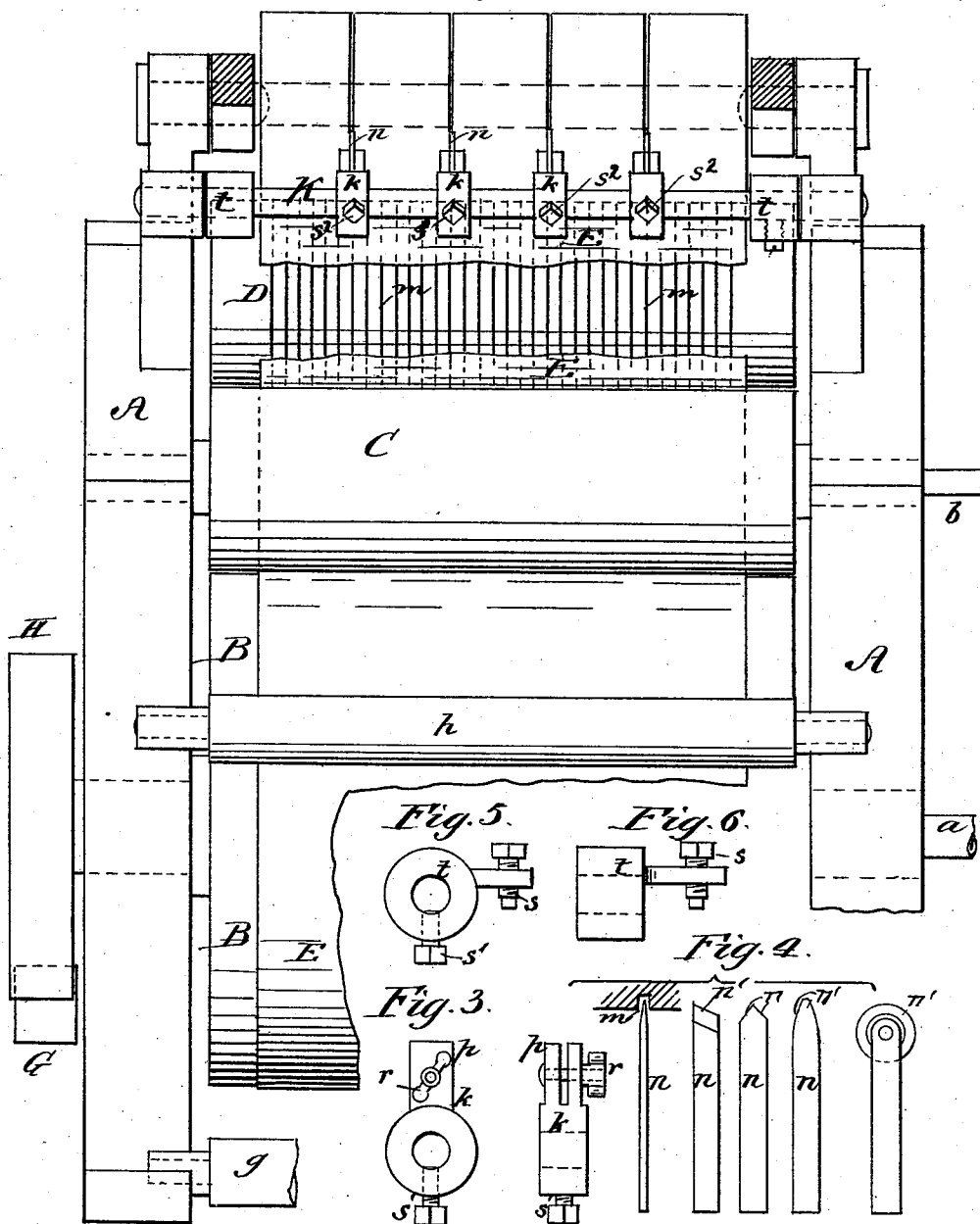
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Fig 2.



WITNESSES:

M. A. Dwyer
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INVENTOR

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Henry F. Parker
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UNITED STATES PATENT OFFICE.

GOTTLÖB THEODOR LEONHARD, OF PATERSON, NEW JERSEY.

PAPER DRYING AND CUTTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 478,975, dated July 12, 1892.

Application filed October 31, 1891. Serial No. 410,480. (No model.)

To all whom it may concern:

Be it known that I, GOTTLÖB THEODOR LEONHARD, a citizen of the United States, residing at Paterson, county of Passaic, State of New Jersey, have invented certain new and useful Improvements in Paper Drying and Cutting Apparatus, of which the following is a specification, reference being had to the accompanying drawings, in which similar reference-letters indicate corresponding parts throughout the several views, and in which—

Figure 1 is a side elevation showing the drying-roll and calendering-rolls of a paper-machine embodying my invention; Fig. 2, an end elevation of Fig. 1; Figs. 3 and 4, enlarged detail views of one of the knife-holders and the knife, showing modifications of the latter; and Figs. 5 and 6, enlarged detail views of the gage for the knife-holding shaft.

My invention relates to the cutting of paper web into longitudinal strips, which are wound into rolls of suitable size adapted for their intended commercial use; and my invention especially relates to the cutting and enrolling of a paper commercially known as "vegetable-parchment paper," which is non-fibrous in its character, and which, owing to chemical treatment after its delivery from the calenders of the paper-making machine, requires a subsequent drying and calendering process before it is cut into strips.

The object of my invention is in the treatment of the aforesaid character of paper to prevent the exposure of both sides or surfaces thereof to the atmosphere before or after it is cut while on the drying-machine, which exposure would cause it to cockle.

In cutting-machines heretofore used the web of paper or the strips cut therefrom, or both, have been transferred from the final calendering-cylinder to the cutting-cylinder or the cutters, and from thence to the spools or independent rolls at greater or less distances of transmission in planes tangential to the cylinders, wherein both sides or surfaces of the paper are exposed, as aforesaid.

The object of my invention is also to provide an efficient cutter for severing the paper of the present non-fibrous character.

To the above ends my invention consists in a cutting-cylinder around which the paper is passed and cutters acting thereon, the said cylinder resting on the final calendering or

drying cylinder, whereby the paper is transferred in uninterrupted contact with the metal or other surface of the one or the other such cylinders; and my invention also consists, in conjunction with the calendering and cutting cylinders thus placed, of spooling-rolls for the paper, also in contact with the cutting-cylinder, thereby drying, calendering, cutting, and winding the paper on a continuous train of the cylinders and the rolls. Rapid evaporation and absolute dryness and cockling is thus prevented before the paper is wound, and, moreover, the paper is kept taut to a greater degree than it could be when tangentially transferred, and is retained in a perfectly-smooth condition until taken up in a plurality of compact rolls after it is cut.

A represents the frame of the machine; B, the drying and lower calendering cylinder, to which heat is applied by any suitable means, such as the steam-pipe *a*; and C is the upper calendering-cylinder, also heated in a similar manner by a pipe *b*.

D is the cutting-cylinder.

F represents a roll of paper to be dried and calendered.

The web E is passed over the roller *c* and carried upon the cylinder B by aid of the endless conveying apron or belt *d* of absorbent material, traveling upon rollers *e f g h*.

G H represent a spur gear and pinion, whereby the cylinder B is driven, and motion is imparted to the upper calendering-cylinder C by frictional contact with the cylinder B or other usual or suitable means. The cylinder C and cutting-cylinder D are journaled in vertically-movable bearings *i j*, such as permit their frictional contact upon one another and upon the cylinder B, and the shaft I, upon which the cut paper is received, is kept in position by means of the weights J at either side of the machine, so that the enrolled paper thereon shall bear upon and rotate in unison with the upper calendering-cylinder D, taking up the paper as fast as cut. By means of the weighted arms J the firm and continuous contact is thus always maintained between the cylinders B C D and the spooling-rolls on the shaft I, irrespective of their diameter.

K represents the knife-holding shaft, and *k* the knife-holders clamped thereon by the set-screws *s*², and *n* are the knives, which may be

made of any suitable form, as shown in the illustrations embraced in Fig. 4, n' representing the cutting-edges. The knives n , &c., and their holders are ranged along at any desired intervals on the shaft K, being adjustable thereon, and upon the cutting-cylinder D there are provided a series of grooves m , &c., one of said grooves appearing in enlarged cross-section in Fig. 4. The knives project through the paper into the grooves m , and there are a sufficient number of the latter to admit of all the desired ranges of adjustment. Each knife-holder has a clamp p and a set-screw r , both of which provide for the convenient angular adjustment of the knife, and when all are adjusted regarding their angular position their amount of projection through the paper into the grooves may be determined by the adjustment of the set-screws s , of the shaft-gages t , bearing on the frame A of the machine. The knives, being projected tangentially, form a circle concentric with the shaft K and radially or tangentially or otherwise projecting toward and slightly intersecting the surface of the cylinder D.

Rotary knife-edged wheels or other well-known or suitable forms of cutters may be substituted for those shown; but I prefer to use the special character of knife herein described and claimed, owing to its adaptation to the non-fibrous paper treated.

In the operation of my invention the paper after delivery from the calendering-rolls of the paper-making machine is passed through a bath of sulphuric acid, which acid is then washed out and neutralized, and subsequently the paper is wound into the undried roll F. As the web is drawn from the roll F upon the drying-cylinder B it is confined closely thereto by means of the endless conveying-belt d , of absorbent felt, which extends in a continuous piece the full width of the cylinder B. The surface speed of the paper being about sixty feet per minute, sufficient time is afforded while the paper is in contact with the cylinder B, having its large circumference, to expel the greater part of the moisture. The web is then calendered and transferred to the cylinder C and kept in close contact with the surface thereof while moving upward in the course indicated by the arrows, and the cutting-cylinder D also contributes to the calendering operation. The knife-grooves in the cylinder D are so narrow as to cause no material defect in this function. The paper while upon the cylinder D is severed into strips by the knives n , and upon reaching the point of contact between said cylinder and the roll of paper on the shaft I is transferred to the latter without at any time having its tension relaxed or having more than one side or surface thereof exposed to the atmosphere. The weighted arm J by its range of movement maintains the vertical pressure of the rolls and successive cylinders upon one another.

The cylinders B C D and rolls of paper on the shaft I may be placed in any order of succession other than the vertical and the pressure from one to another transmitted by other well-known equivalents in lieu of the weighted arm J—as, for example, springs.

Were it attempted to enroll the full-width web at I without cutting and to cut it subsequently into subdivisions, the work could not be done as efficiently, if at all, as it is done by my present apparatus. An unequal shrinkage of the full width of paper would occur after its enrollment, the longitudinal contraction at the center being greater than that at the edges of the web. Thus when subsequently fed to the knives the edges of the paper would have greater surface speed than the center, causing it to buckle or tear and interrupt the work.

Each knife n may be independently adjusted as to its angle to the radius of the cylinder D by its set-screw s' , and when the gang of knives n are so adjusted the amount of their projection into the grooves of the cylinder D, so as to slit the paper, may be adjusted by means of the set-screws s . When it is desired to throw the knives into an inactive position to readjust the machine or examine or substitute such knives, the same may be tilted back simultaneously by the partial backward rotation of the shaft K in the bearings supporting its extremities, and such retraction of the knives is limited by the contact of the stop s^5 with the stop s^6 .

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

1. In a paper drying and cutting apparatus, a drying and calendering cylinder, a cutting-cylinder, the spooling-rolls, and knives acting on the cutting-cylinder to sever the web longitudinally, said cylinders and rolls having contact with one another in the successive order named at the transferring-points of the paper between them, for the purpose described.

2. In a paper drying and cutting apparatus, a drying and calendering cylinder, a cutting-cylinder resting by gravity on the drying-cylinder, spooling-rolls for receiving the paper, resting by gravity on the cutting-cylinder, knives acting on the cutting-cylinder to sever the web longitudinally, and vertically-movable weighted bearings for the journals of the said spooling-rolls, adapted to compress the same and the said cylinders together.

3. In a paper drying and cutting machine, the drying or calendering cylinder and a cutting-cylinder bearing thereon to receive the paper, as described, and knives acting on the paper while it is upon the said cutting-cylinder.

G. THEODOR LEONHARD.

Witnesses:

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HENRY F. PARKER.