

(No Model.)

2 Sheets—Sheet 1

R. SMITH.
PAPER MAKING MACHINE.

No. 398,091.

Patented Feb. 19, 1889.

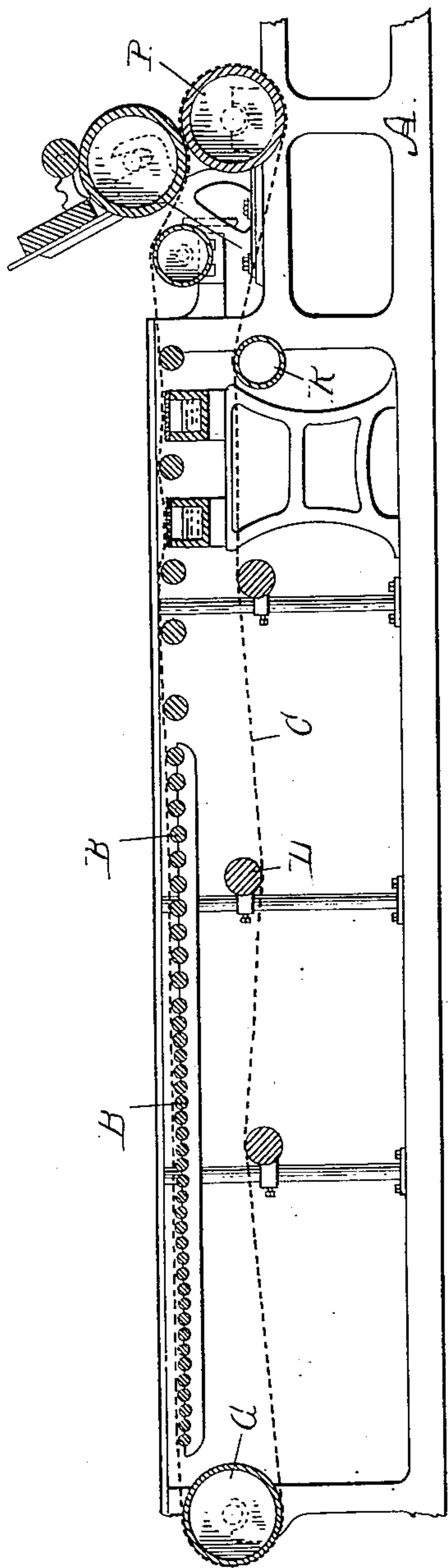


Fig. 1

witnesses
Thomas Hobday.
H. E. Lodge.

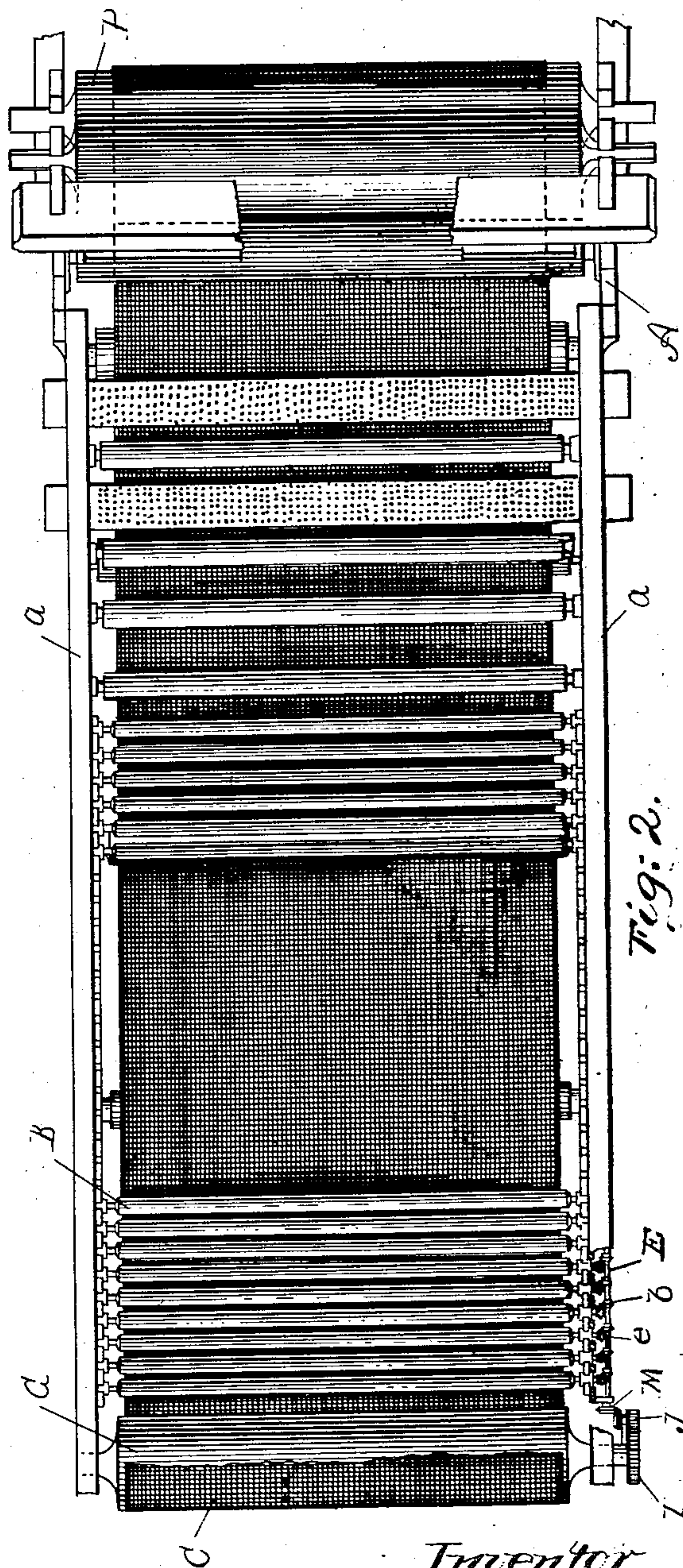


Fig. 2.

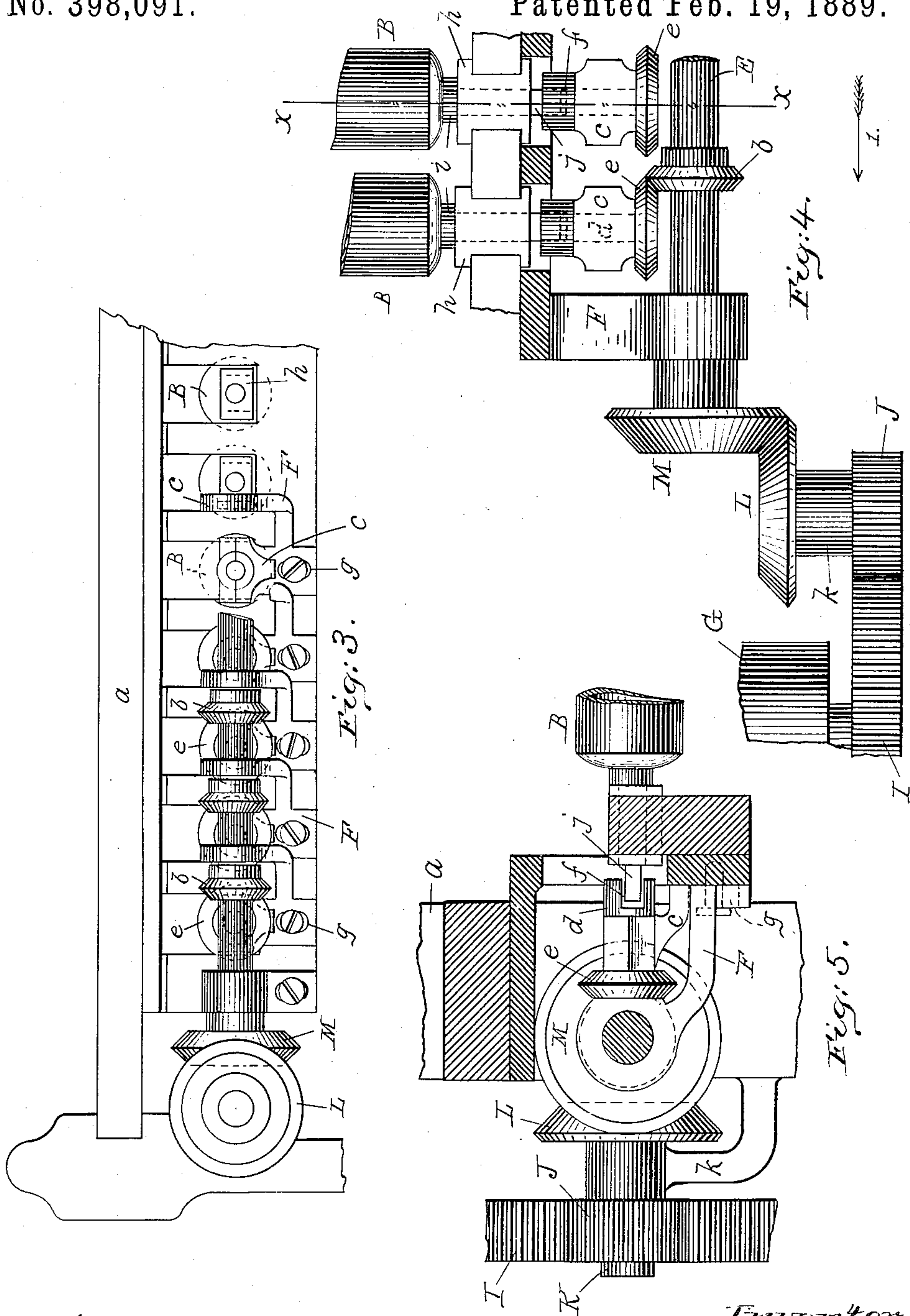
Inventor.
Richard Smith.
H. Curtis, atty.

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UNITED STATES PATENT OFFICE.

RICHARD SMITH, OF BOSTON, MASSACHUSETTS.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 398,091, dated February 19, 1889.

Application filed January 13, 1888. Serial No. 260,598. (No model.)

To all whom it may concern:

Be it known that I, RICHARD SMITH, a citizen of the Dominion of Canada, residing at present in Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Paper-Making Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to Fourdrinier paper-making machines, particularly that part which contains the "endless wire-cloth" upon which the paper web is formed.

Hitherto the wire-cloth has been mounted upon a number of rolls—viz., a main drive-roll, a stretch-roll, breast-roll, a guide-roll to direct the path of travel of the wire-cloth, and a series of horizontal tube-rolls arranged closely together, but not in contact. These latter rolls form conjointly a table, serving as a support to the wire-cloth, upon which the comminuted material, termed "stuff," is delivered in the process of forming a continuous endless paper web. In this arrangement the tube-rolls are independently mounted. One object in their employment is to effect the purpose of anti-friction rolls to decrease the wear of the wire-cloth as it passes over them. Since said rolls have been actuated merely by the contact of the cloth upon them, and the tension upon the latter not being sufficient to bring it to bear evenly upon all the rolls, some of them fail to operate and remain inactive at intervals; hence much unnecessary wear and friction ensue upon the cloth. A further purpose which the rotation of these tube-rolls serves to accomplish is to convey away and extract a portion of the liquid contained in the stuff before the latter reaches the suction-boxes. In the event of a number of these rolls remaining stationary this function is not properly performed; hence I propose to actuate positively, by means of a suitable driving-train, each roll in the series of tube-rolls, which latter shall

jointly serve to partially drain the stuff as well as to cause the least possible friction and wear.

The drawings represent, in Figure 1, a general view, in sectional elevation, of the making part of a paper-making machine. Fig. 2 is a plan of the same with the upper portion of the wire-cloth and some of the rolls removed. Fig. 3 is a detailed side elevation of a portion of the driving-train. Fig. 4 is a plan of the same. Fig. 5 is a sectional view on line *xx* in Fig. 4, and looking in direction of arrow 1.

In said drawings, A represents one of the two side frames of the making part of a paper-making machine. Transversely thereof are mounted a series of tube-rolls, B, upon which is supported the endless wire-cloth C, which passes about several rolls, chief among which is the breast-roll G, the guide-roll R, drive-roll P, and stretch-roll D. By aid of the latter proper tension is exerted upon said cloth to compel continuous rotation of the latter by some prime motor which actuates the drive-roll P. The various other instrumentalities—such as suction-boxes, the mechanism for effecting the shake motion, and other features incidental to this part of a paper-making machine—are of the usual construction and need no mention, since their functions and operation are distinct and separate.

As before premised, the series of tube-rolls B B have hitherto been operated solely by the friction of the wire-cloth upon them; but no positive motion has been imparted to each one of the series, and hence some are active and others inactive. As a consequence the full benefit of said tube-rolls as preventives of wear upon the cloth is not obtained, or as partial extractors of the liquid in the stuff when delivered upon the wire-cloth. The prime mover of the train consists of the shaft E, arranged in parallelism with the side of the frame and supported beneath the rail *a* of the making part upon brackets F F. Upon this shaft are mounted a series of miter-gears, *b b*, which are securely affixed thereto.

Laterally of the shaft E, and bolted to the frame A, I have disposed a series of castings, *c c*, which serve as bearings for short shafts

d d at right angles with the shaft E, and provided at the end nearest the main drive-shaft with miter-gears *e e*, the latter meshing with the other series, *b b*, before mentioned. The
 5 opposite ends of said shafts *d d* are shouldered and socketed at *f*, said sockets being rectangular in cross-section. To provide proper vertical adjustment of the bearings *c c*, the latter are slotted, as shown at *g*, and secured by
 10 suitable bolts to the frame.

The tube-rolls are to be removable in the event of substituting a new wire-cloth for an old worn-out one. Therefore it becomes necessary to provide suitable connections between them and the main driving-train. I
 15 have consequently mounted the tube-rolls in independent bearings, (shown at *h*, Fig. 5,) the shafts *i* of said rolls projecting beyond the bearings and are formed with lugs *j*, rectangular in cross-section, or of a shape adapted to conform to and fit within the sockets *f*, before mentioned. The tube-rolls can thus be very
 20 readily lifted out and disengaged from the actuating mechanism. On the other hand, when set in position, any rotation of the shaft E is directly transferred to each and every roll *b b* of the series, and uniform motion with continuous activity of all the rolls B is obtained.

To provide constant rotation of the shaft E by and through the prime motor actuating the paper-machine, intermediary mechanism is arranged as follows: The breast-roll G, a portion of which appears in Fig. 3, is driven by
 35 the wire-cloth, and has mounted at one end of its supporting-shaft a spur-gear, I. This gear meshes with a pinion, J, upon one extremity of a short shaft, K, rotating in the bearing in the standard *k*. The opposite end of said shaft
 40 carries a miter-gear, L, which meshes with a similar one, M, on the end of the shaft E. Thus movement of the prime motor by means of the above-described instrumentalities maintains continuous rotation of the shaft E, and
 45 likewise the tube-rolls B B, which co-operate therewith.

It is evident that the shaft E, in lieu of be-

ing actuated by means of the breast-roll, can be connected to the prime motor by various mechanical expedients, and I do not desire to
 50 be limited to the precise devices or arrangement herein shown for actuating said shaft. For instance, the shaft of the breast-roll G can be furnished with a miter in lieu of a spur-gear, and mesh with the miter-gear M on the
 55 end of said shaft E adjacent to the breast-roll.

What I claim is—

1. In combination with a wire-cloth and a series of tube-rolls which support it, the driving-shaft and gearing which connects said
 60 driving-shaft with said series of rolls, substantially as set forth.

2. In Fourdrinier paper-making machines, the combination, with an endless wire-cloth and the series of independently-mounted removable tube-rolls, of the intermediary driving-shaft and the series of socketed shafts which interconnect the tube-rolls with said
 65 intermediary shaft, whereby each tube-roll is independently and positively rotated, substantially as stated.

3. In combination with the drive-roll P, the driving-shaft E, provided with gears, the series of tube-rolls *a a*, and the wire-cloth C, resting thereon, the shafts *d d*, socketed at
 75 at one end and furnished with the gears *e e* on the opposite end, said sockets engaging the shafts of the tube-rolls and the gears meshing with said gears upon the driving-shaft E, substantially as set forth.

4. The combination, with the main shaft E, its gears *b b*, and the independently-mounted tube-rolls B B, having shafts *i i*, with lugs *j j*, of the interconnecting gear-furnished shafts
 85 *d d*, socketed at *f*, whereby the tube-rolls are connected and disconnected, and the wire-cloth carried by said tube-rolls, as and for the purposes specified.

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

RICHARD SMITH.

Witnesses:

H. E. LODGE,

F. CURTIS.