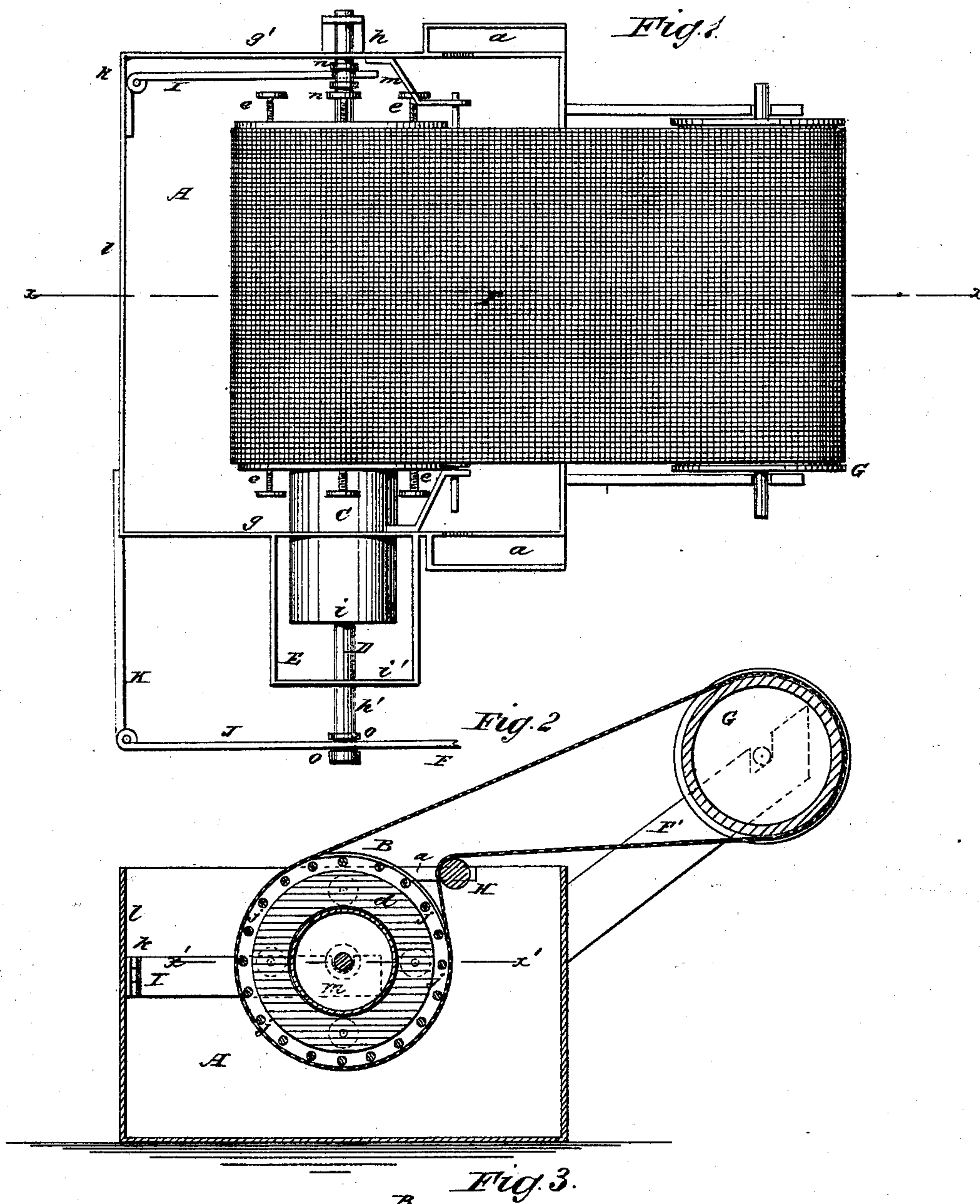


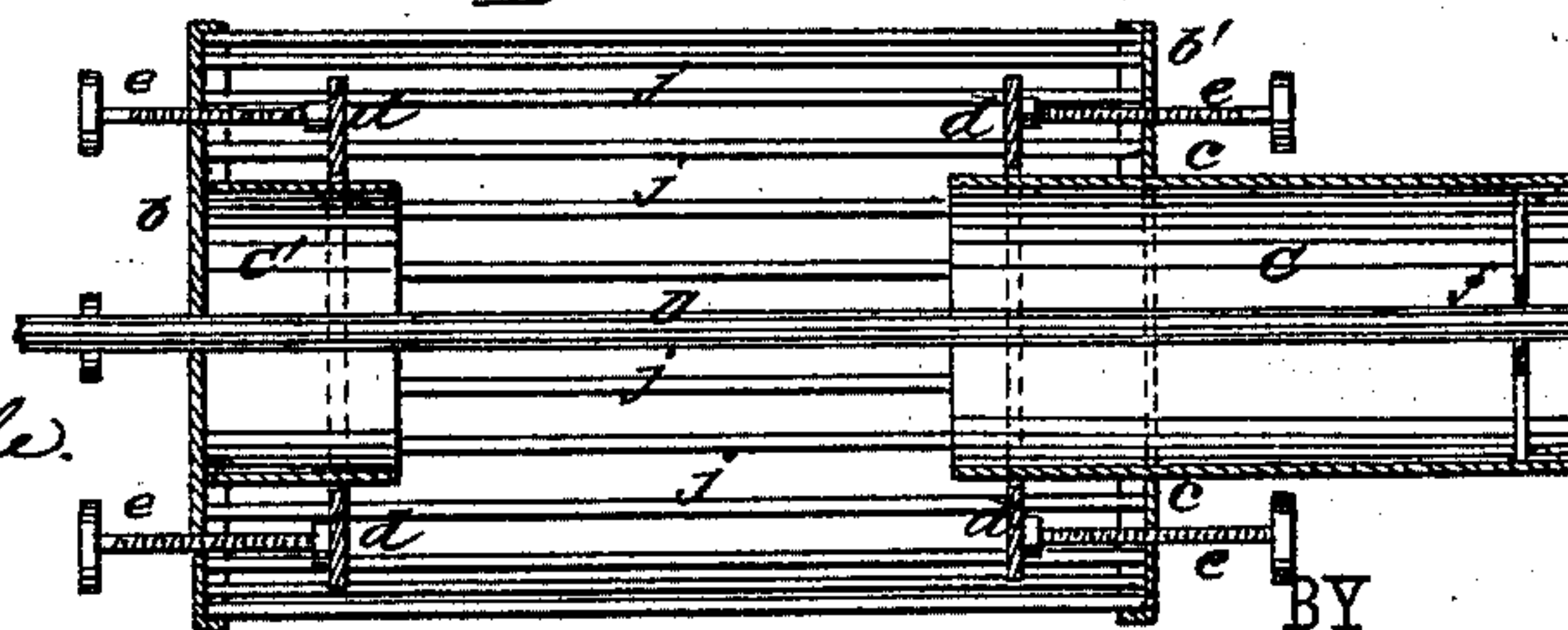
W. E. PHELPS.  
Paper-Machine.

No. 223,381.

Patented Jan. 6, 1880.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

WILLIAM E. PHELPS, OF LEWISVILLE, PENNSYLVANIA.

## PAPER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 223,381, dated January 6, 1880.

Application filed November 10, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM E. PHELPS, of Lewisville, in the county of Chester and State of Pennsylvania, have invented a new and useful Improvement in Paper-Machines, of which the following is a specification.

The object of my invention is to strengthen the paper by laying the fibers in all directions, instead of in the direction of the length of the paper only, as is now done.

In the accompanying drawings, Figure 1 is a plan of my improved machine. Fig. 2 is a vertical longitudinal section thereof, taken on line *x x* of Fig. 1; and Fig. 3 is a horizontal section of the cylinder, taken on line *x' x'* of Fig. 2.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A is the vat for receiving the liquid pulp, which is conveyed into the said vat through troughs *a a*. B is the cylinder, provided with one solid head, *b*. The opposite head, *b'*, is provided with a central circular opening, *c*, in which is fixed a discharge-tube, C, extending from the interior of the cylinder beyond the head *b'* any required distance.

From the inside of head *b* a short tube, C', projects toward the cylinder C, and in line therewith. Around the tubes C C', within the cylinder, are placed collars *d d*, which are adapted to be moved to and from the heads *b b'* by screws *e*. These collars form the deckels for regulating the width of the sheet of paper.

The cylinder B is provided with a central shaft, D, said shaft being held in head *b* and in a spider-head, *f*, placed in discharge-tube C, so that the cylinder and shaft revolve together.

A circular opening is cut in the end *g* of the vat for the reception of the discharge-tube C, and around this opening is built a box, E.

The cylinder is placed in the vat *x*, and one end, *h*, of shaft D is boxed in the end wall, *g'*, of said vat. The discharge-tube is passed through the circular opening in the end *g*, so that the outside end, *i*, of said tube is within box E, and the end *h'* of shaft D is boxed in the wall *i'* of box E.

The face of cylinder B is made of parallel bars *j*, in place of the wire-gauze heretofore employed; and as a substitute for said wire-

gauze face I employ an endless belt of wire-gauze, F, which is passed around cylinder B, lower coucher-roll, G, and stretcher-roll H.

The wire-gauze belt F takes up the pulp from the vat and carries it to the lower coucher-roll, G, whence it passes up on the felt around the upper coucher-roll, which is not shown in the drawings.

In order to lay the pulp on the wire-gauze belt with the fibers pointing in every direction, I arrange the cylinder B so that it can be vibrated laterally as it revolves on its axis. For this purpose the ends *h h'* of shaft D are passed some distance through their bearing in walls *g' i'*, so that the shaft can be moved endwise without the ends slipping out of their boxes.

Inside of the vat A, at the end *g'*, is an arm, I, having one end, *k*, pivoted to the side wall, *l*, of said vat, and the opposite end, *m*, is held on shaft D between fixed collars *n n*.

J is the vibrating lever, fulcrumed at the end of arm K, projecting from the wall of the vat A. The end *h'* of shaft D is passed through lever J, and held in connection with said lever by collars *o o*.

Vibrating lever J is connected with a crank-wheel or any other suitable mechanism for giving it a reciprocating motion. By means of such mechanism the lever J is caused to move cylinder B and wire belt F sidewise back and forth at the same time that said cylinder rotates on its axis and said belt is passing around the cylinder.

By this vibratory movement the pulp, as it is taken up by the belt F, is shaken so that its fibers are caused to lie in every direction, and thus the paper is made equally strong every way.

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

1. As an improvement in paper-machines, in combination with the cylinder B and coucher-roll G, the endless wire-gauze belt F, substantially as described.

2. The cylinder B and wire-gauze belt F, adapted to be vibrated laterally, in combination with the vibrating lever J, as and for the purpose substantially as described.

WILLIAM ELISHA PHELPS.

Witnesses:

KIRK ALEXANDER,  
REES SAMMEY.