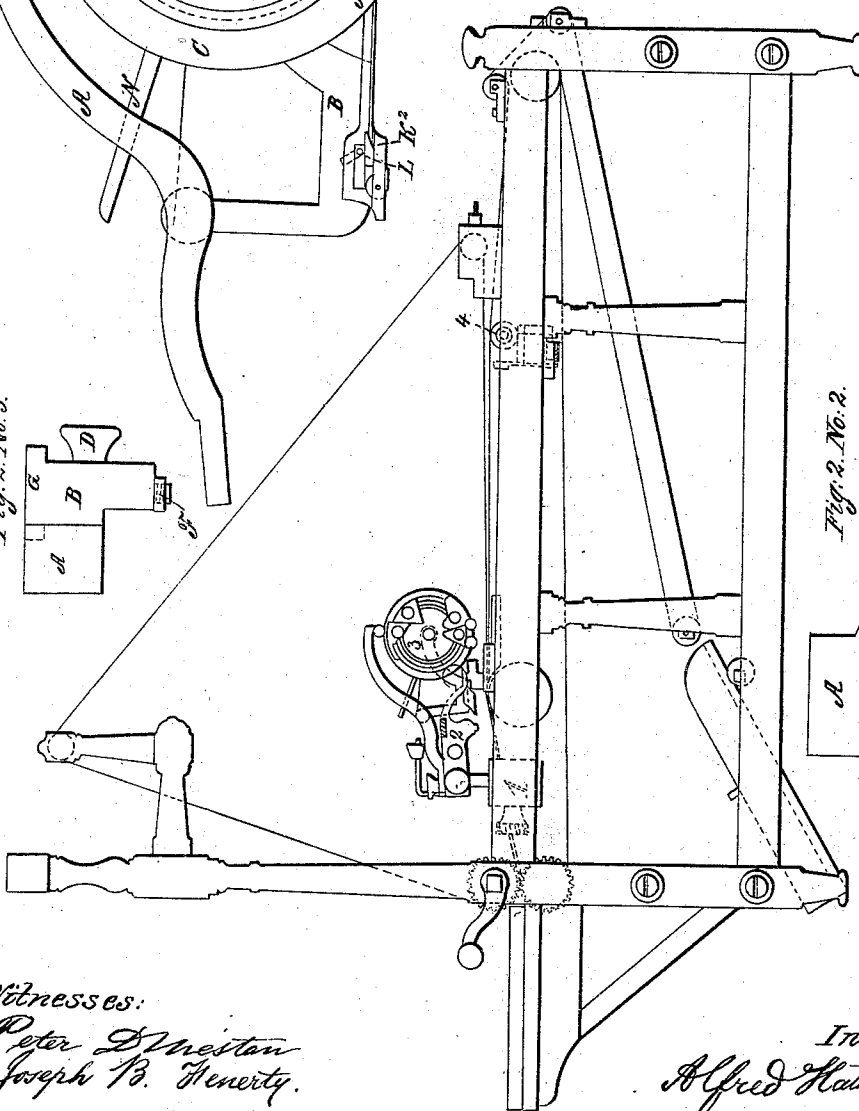
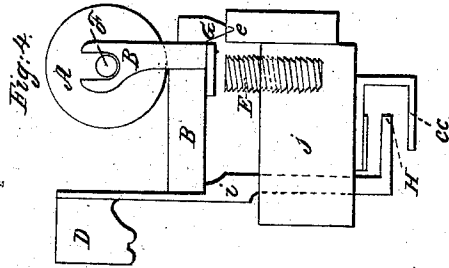
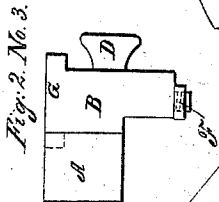
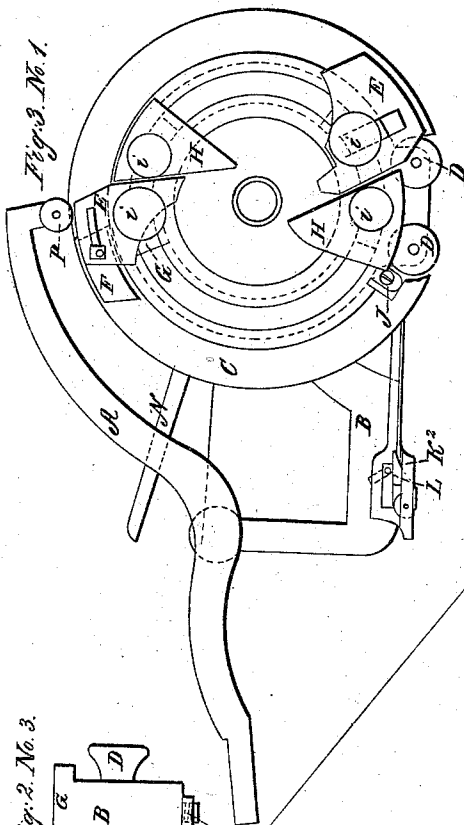


A. HATHAWAY.  
Paper-Ruling Machine.

2 Sheets—Sheet 1.

No. 33,389.

Patented Oct. 1, 1861.



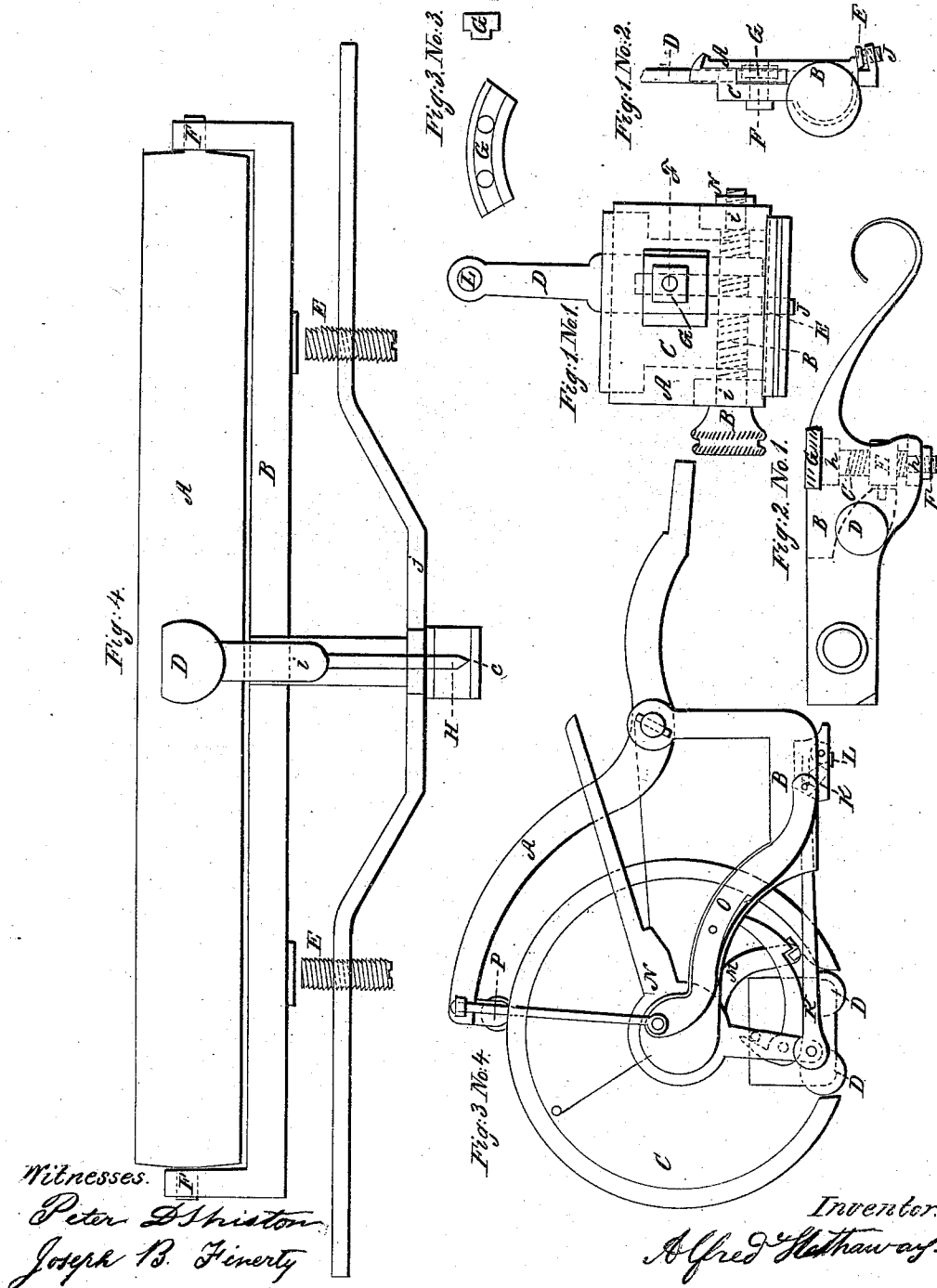
Witnesses:  
Peter D. Weston  
Joseph B. Fenerty.

Inventor:  
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# UNITED STATES PATENT OFFICE.

ALFRED HATHAWAY, OF CHARLESTOWN, MASSACHUSETTS.

## IMPROVEMENT IN PAPER-RULING MACHINES.

Specification forming part of Letters Patent No. 33,359, dated October 1, 1861.

*To all whom it may concern:*

Be it known that I, ALFRED HATHAWAY, of Charlestown, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Paper-Ruling Machines; and I do hereby declare that the following is a full and clear description of the construction and operation of the same, reference being had to the annexed drawings, and to the letters of reference marked thereon.

Figure 1, No. 1, and Fig. 1, No. 2, as shown in the drawings, represent my arrangement for connecting one end of the pen-beam to the frame in such a manner that it can be moved back and forth as the work may require. Fig. 2, No. 1, Fig. 2, No. 2, and Fig. 2, No. 3, as shown in the drawings, represent my arrangement for regulating the amount of pressure on the points of the pens while ruling and lifting them from the paper when necessity requires. Fig. 3, No. 1, Fig. 3, No. 2, and Fig. 3, No. 4, as shown in the drawings, represent my arrangement for lifting the points of the pens or letting them down at any required place or places on the paper while ruling. Fig. 4, end view, and Fig. 4, side view, as shown in the drawings, represent my arrangement for keeping the endless cloth or apron on rolls within prescribed limits or moving it laterally back and forth at any angle required.

To enable others skilled in the art to make and use my improvements, I will proceed to describe their construction and operation.

Letter D, as shown in the drawings, Fig. 1, No. 1, and Fig. 1, No. 2, represents the usual arrangement for supporting the pen-beam in its bearings at L.

A, as shown in the drawings, Fig. 1, No. 1, and Fig. 1, No. 2, is a plate of metal screwed on the inside of the top rail of the frame. To said plate are connected boxes that support the journals *i i*, as seen in the drawings, Fig. 1, No. 1, of screw B.

C is a plate of metal, dovetailed over A and held adjustably tight by means of screws *j* and spring E. Connected with C is a nut, through which passes and works screw B. D is firmly attached to C by the screw-bolt F and nut G.

B is a screw supported by bearings *i i* in boxes on plate A. Said screw B is held in its

place by a milled head on one end and nut H on the other (or their equivalents.) The milled head forms one shoulder for the screw and serves to turn it by the nut which works on screw B, being connected to C, and the supporter of the pen-beam D being firmly attached to C by means of screw-bolt F and nut G. The end of the pen-beam is moved back and forth, as the work may require, by turning the screw B.

Letter A, as shown in the drawings, Fig. 2, No. 2, is a piece of metal attached to one end of the pen-beam and makes part of the same.

B is a regulator working on A at one end, the other or bent end resting on the frame or something prepared for that purpose while ruling, so that the amount of pressure on the points of the pens can be regulated by the screw C.

C is a screw which works in bearings *h h*, said bearings being connected with B.

E is a nut through which works the screw C, said nut E having a tongue or tenon on the side next the bearing of the pen-beam, the said tongue or tenon fitting in a groove or mortise in the end of A sufficiently loose to allow the nut to travel or work on the screw C and not bind while working.

F is a nut screwed on screw C at its lower end outside of bearing *h* and makes a shoulder for screw C at that end.

D is a screw with a milled head. Said screw, passing through a slot in B and screwing into A, binds together A and B after they have been brought to their proper relative positions by means of the screw C.

G is a milled head on screw C, which forms a shoulder on one end of screw C, as seen in the drawings, Fig. 2, No. 1, Fig. 2, No. 2, and Fig. 2, No. 3, and projects outside of B, so as to have room to work the screw C with the thumb and fingers, the screw C working through the nut E, which is connected with A by means of a tongue or tenon on E and corresponding groove or mortise in A, the pens being firmly connected with the pen-beam or A. The turning of the screw C changes the relative position of A to B, and consequently changes the amount of pressure of the points of the pens on the paper while ruling.

Letter A, as shown in the drawings, Fig. 3,

No. 1, and Fig. 3, No. 2, is a lever connected with the pen-beam at one end and at the other supporting the friction-roll P.

B is hinged on A at one end. The other end supports the shaft on which revolves the cylinder C.

C is a cylinder of sufficient length to make it revolve with the endless cloth when allowed to do so. In the face of cylinder C is fixed two friction-rolls D D. On one end of cylinder C is a raised groove with flanges on both inner edges.

G is a double nut, (for screws *ii*,) made to fit and pass easily back and forth in the groove on the end of cylinder C.

H is a metallic plate, fastened to nut G, by means of one of the screws *i*, in such a manner as to confine the plate H to one end of the cylinder C at any desired point in the circle and form a guide for moving out or in the cam E.

E is a cam connected to G by one of the screws *i*, said cam having a slot parallel to the guide, so as to be moved out or in as the work may require. The face of said cam is so shaped that the friction-roll P will roll up and down on it as the cylinder revolves. The friction-roll P being supported by A and A connected with the pen-beam, it raises the points of the pens from the paper and lets them down at each cam.

F is an adjustable section of one of the cams E. Said adjustable section can be so arranged as to lift the points of the pens from the paper or cloth at any desired point. The said cam, with the adjustable section, is so placed in the circle as to have the friction-roll P to rest on its top near the end or drop, while the cylinder C is balanced on the friction-rolls D D, in which position the points of the pens are held from the paper or cloth.

D D are friction-rolls in the face of cylinder C, so placed as to hold the face of the cylinder from the paper or endless cloth while it remains stationary. Said friction-rolls, revolving on the endless cloth, form two bearings for cylinder C, one on either side of the center, so as to hold the cylinder C stationary, while the friction-rolls are left to revolve freely on the endless cloth.

*j* is a brake, which is to be pressed against one of the friction-rolls D, so as to stop its motion and give motion to the cylinder C.

K is a rod hung at one end on lever N and at the other connected with the shoe-shaped piece K<sup>2</sup>, in which is hung bent lever L. Said shoe-shaped piece K<sup>2</sup> is held at any required distance from cylinder C by means of rod K.

L is a bent lever hung in the shoe-shaped piece K<sup>2</sup>, with a point or tooth projecting below in such a manner that the sheet of paper as it passes through the machine on the endless cloth will come in contact and move K<sup>2</sup> with the cloth, and also press the brake *j* against one of the friction-rolls D and start the cylinder C, K<sup>2</sup> moving with the paper or cloth until the lever L is allowed to turn on

its bearing in K<sup>2</sup> and relieve its point or tooth from the paper, and thus leaving the cylinder C to be kept in motion by its adhesion to the endless cloth.

M is a support for brake *j*, working on the hub of cylinder C, with a spring or weight attached sufficient to hold the brake *j* from the friction-roll D, while the friction-rolls D D are required to revolve on the endless cloth.

N is a bent lever working on the hub of cylinder C, as shown in the drawings, Fig. 3, No. 2. On the lower arm of lever N is hinge K. Said lever N is brought to its proper position after it has been acted upon by the paper at lever L by means of a weight or spring. On lever N is a latch or hook so arranged as to connect lever N with support M while K<sup>2</sup> is moving with the paper.

O is a lever, the fulcrum of which is attached to B, one end of said lever being connected with lever A by means of a rod and the other end supporting a pin, on which hangs (in a slot) K<sup>2</sup>, while the cylinder C is revolving. Said pin also holds lever L in its proper position while K<sup>2</sup> is being moved by the paper.

Letter A, as shown in the drawings, Fig. 4, side view, and Fig. 4, end view, is a roll, on or around which passes the endless cloth in such a manner as to give motion to the roll A.

B is a frame, which supports the roll A at its bearings F F, and to which is attached the weight D and the points or fulcrums G and H.

C and C C are sockets connected with *j*, in which rest the points or fulcrums G and H.

D is a weight for the purpose of adjusting the cloth laterally on the machine while in motion, (if not required to move laterally, the less weight on frame B the better.)

E E are adjusting-screws.

F F are the bearings of roll A.

G is a point or fulcrum connected with frame B and resting in socket C.

H is a point or fulcrum resting in socket C C, and connected with the frame B by the rod *i*.

*i* is a rod by means of which the point or fulcrum H and weight D (when not made adjustable) is attached to the frame B.

*j* is an arrangement connected with main frame and through which work the adjusting-screws E E, also supporting the sockets C and C C at angles from the roll A in such a manner as to receive the points or fulcrums G and H. On said points or fulcrums rests the frame B in such a manner as to be made to tip on the points or fulcrums G and H by the action or weight of the endless cloth or apron on one end of the roll A. The amount of the tip of the roll A is regulated by the adjusting-screws E E.

G and H are points or fulcrums on which balance or rest the frame B. One of said points or fulcrums being at a greater distance than the other from that part of the face of the roll A where the greatest amount of weight or pressure of the cloth is when in motion brings the roll A on an angle to the cloth as it tips in

proportion to the tip, and as the corresponding difference in the distances of the points or fulcrums G and H is from that part of the roll A where the greatest amount of pressure or weight of the endless cloth is so will be the angle of the roll A to the cloth in proportion to the tip, and consequently as the roll A is placed on an angle to the endless cloth or apron it causes the cloth or apron to move laterally from that end of the roll A which supports the majority of the weight to the opposite one, and thus changing the lateral motion of the cloth from side to side of the machine.

The object of my improvements in paper-ruling machines is, first, to make the points of the pens bear uniformly on or leave the paper at any required angle; second, to make the points of the pens leave the paper uniformly one time with another whether the points be long or short; third, to lift the points of the pens from the machine or paper and let them down on same at any required place or places; fourth, to keep the endless cloth or apron on rolls within prescribed limits or move it uniformly from side to side of the machine at any degree of angle required by its action on the roll A.

The advantages of my improvements I think must readily be seen by those practically acquainted with the ruling of paper.

What I claim, and desire to secure by Letters Patent as my improvements in paper-ruling machines, is—

1. The moving of one end of the pen-beam by means of a screw connected with and working parallel to the side of the frame, substantially as described, and for the purpose set forth.

2. Adjusting the regulator on the pen-beam by means of the combination of the screw C, nut E, and plate A, substantially as described, and for the purpose set forth.

3. Lifting the points of the pens from the paper or cloth and letting them down at any desired place on the same by means of cams, as seen on the end of cylinder C, together with the friction-rolls D D, brake j, shoe-shaped piece K, and bent lever L, either singly or collectively, substantially as described, and for the purpose set forth.

4. The adjusting or angularly placing the roll A by means of the action or weight of the endless cloth or apron on roll A, substantially as described, and for the purpose set forth.

ALFRED HATHAWAY.

In presence of—

EDW. A. DEXTER,  
D. L. GIBBENS.