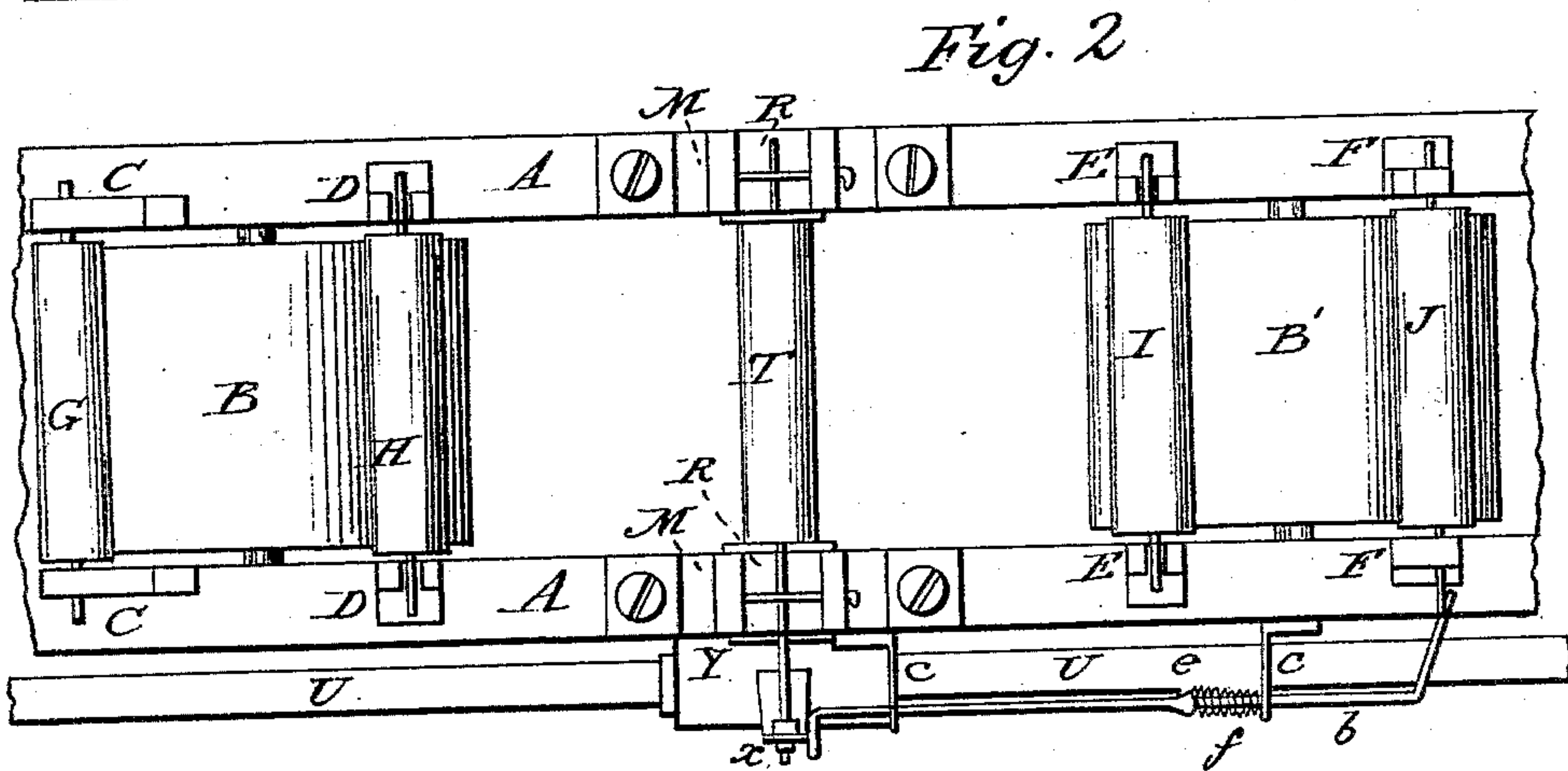
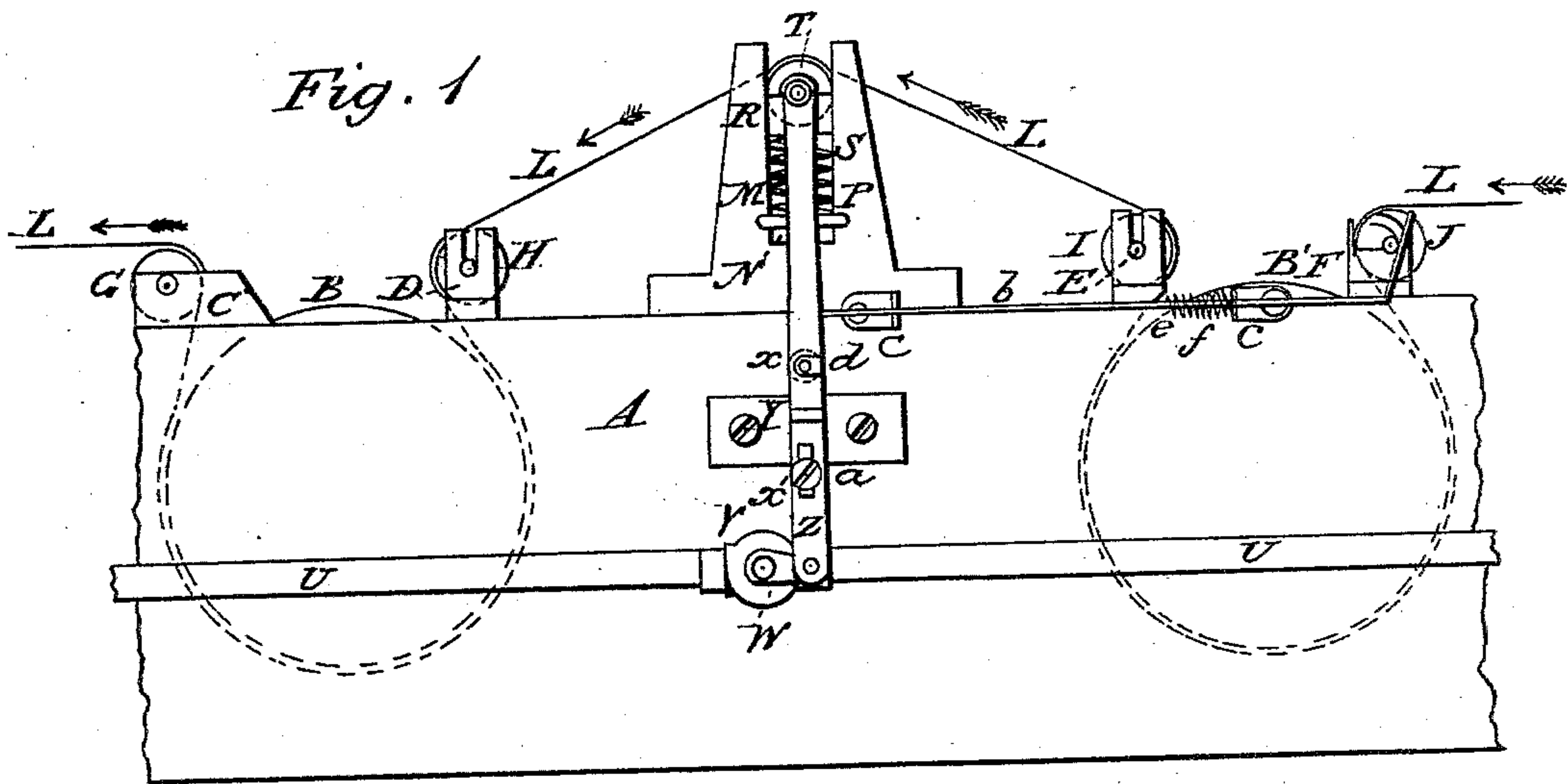


O. ELLSWORTH.

Paper Drier.

No 61,930.

Patented Feb. 12, 1867.



Witnesses:

C. H. Fowler
Attestation

Inventor:

Oliver Ellsworth
By his Attorney,
J. Dennis F.

United States Patent Office.

OLIVER ELLSWORTH, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND RICHARD SMITH, OF SAME PLACE.

Letters Patent No. 61,930, dated February 12, 1867.

IMPROVEMENT IN MACHINERY FOR DRYING PAPER IN PAPER-MAKING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, OLIVER ELLSWORTH, of Boston, Suffolk county, State of Massachusetts, have invented a new and useful Regulator for Regulating the Pressure of Steam in Steam Cylinders for Drying Paper, &c.; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains, to make and use my said invention or improvements without further invention or experiment.

The nature of my invention consists in graduating the supply of steam to the cylinders which dry the paper by the expansion and contraction or tension of the paper dried or made and dried. Also in arranging a movable roller in connection with the steam-drying cylinders, and connecting said roller by a link and lever to a valve in the steam pipe which supplies the drying-cylinders, which roller is acted on by the tension of the paper and depressed, if dried too fast or too much, so as to partially close the valve and lessen the supply of steam; or if the paper is not dried enough it runs loose, and the springs which support the roller raise it and open the valve so as to supply more steam to the drying-cylinders. And in making the link which connects the movable roller with the regulating valve detachable, and connecting it to a roller held in place by the paper, so that when the paper breaks and releases the roller, the connecting mechanism will detach the link, so that it will cease to operate the valve in the steam pipe, and leave it standing in the position it was in when the paper broke and released the roller. Also, in making the link above mentioned adjustable in its length by means of a slotted slide and screw or other device. In the accompanying drawings—

Figure 1 exhibits as much of a paper-drying machine as is necessary to show my regulator and its connection with the machine.

Figure 2 is a plan or top view of the parts shown in fig. 1.

In these drawings, A A are the sides of the frame, which may be connected by bars or girders, so as to hold them a proper distance apart, and make a strong frame. The sides A A are perforated for the journals of the steam-drying cylinders B B', which may be made in the usual and well-known mode, and supplied with steam through the journals, and provided with the means in common use for discharging the water generated in the cylinders by condensing the steam. There are four pairs of stands, C, D, E, and F, fastened to the sides A, for the journals of the four rollers, G, H, I, and J, to turn in, over which rollers the paper L passes to and from the drying-cylinders in the direction indicated by the arrows. The stands M M are made in the form shown in the drawings, that is, with a deep score across them, and in the centre of the score a screw is fastened for the nut N, and above the nut the plate P, and on the plate the spiral spring S, and above the spring the journal boxes R R, in which the journals of the roller T turns, being supported by the springs S, so as to yield readily to the pressure of the paper on the roller; the pressure of the springs against the journal boxes may be adjusted as desired, by turning the nuts N. A portion of the steam pipe which conveys the steam from the boiler to the drying-cylinders is shown at U U, in which pipe there is a valve at V, which is worked by the lever W, by means of slide Z, connected by the adjustable, detachable link X X' to the journal of the roller T, so that as the roller rises when the paper is not dried enough, it will open the valve at V, and let more steam into the drying-cylinders to dry the paper more. But if there is too much steam passing into the cylinders, so as to dry and contract the paper too much, the contraction of the paper passing over the roller T depresses it, with the link X X', and partially closes the valve at V, so that less steam flows into the drying-cylinders and the paper is dried less. From the foregoing it will be fully apparent that it is the tension or contraction of the paper in drying that regulates the supply of steam to the drying-cylinders. The lower part of the link X X' is fitted to traverse freely in the bracket Y, fastened to the side A, to hold the link in position while it traverses; and the slide Z is connected to the lever W, and provided with a slot for the screw *a*, which fastens it to that part of the link X' embraced by the bracket, so that the length of the link can be adjusted by moving the slide Z up or down, and tightening the screw *a*. The journal stands F of the roller J are made so that the journals can traverse horizontally in the stands; and one of the journals projects beyond the stand to hold the rod *b* away from the upper part X of the link, which rod *b* is made in the form shown, and fitted to traverse in the stands *c c*, fastened to the side A. The upper part X of the link is made separate from the lower part X', and

provided with a hook to hook on to the pin *d*, in the lower part, so that the link can be readily detached and disconnect or release the roller from the valve for any purpose, and particularly when the paper breaks at or before it reaches the cylinder B'. There is a knob, *e*, on the rod *b*, between which knob and the stand *c* the spiral spring *f* acts to push the rod *b* against the link X, and push it off of the pin *d*, and leave the valve at V stationary by disconnecting the link. While the paper remains whole and runs properly it holds the roller J against the right side of the stand, and its journal holds the rod *b* from the link X, and compresses the spring *f*; but if the paper breaks and releases the roller, the spring moves the rod and roller, and detaches the link, disconnecting the valve, and leaving it in the same position it was in when the paper broke, so as to supply a regular quantity of steam to the drying-cylinders. If the link X was not detached when the paper breaks and releases the roller T, the springs S would raise the roller and nearly or quite cut off the supply of steam to the drying-cylinders.

My improved regulator indicates the condition of the paper being made perfectly at all times, and prevents the paper from breaking so frequently between the cylinders and calenders, regardless of the velocity at which the machine runs. It saves steam, as only the heat required to dry the paper can possibly be used. Besides, it is simple in its construction and readily understood and managed by the workmen, and enables a machine to make far more paper than it could do without it.

What I claim as my invention and improvement in machines for making paper is graduating the supply of steam to the cylinders which dry the paper by the expansion and contraction or tension of the paper made and dried.

I also claim, in combination with the drying-cylinders, the movable roller over which the paper passes, and the link and lever which connect it to the valve in the steam pipe, which supplies the drying cylinders.

I claim making the link which connects the movable roller with the regulating valve detachable, and connecting it to a roller held in place by the paper, by the mechanism described, or its equivalent, so that when the paper breaks and releases the roller, the connecting mechanism will detach the link, so that it will cease to operate the valve in the steam pipe.

I also claim making the link X X' adjustable in its length by means of a slotted slide and screw, or other equivalent device.

OLIVER ELLSWORTH.

Witnesses:

O. B. LOCKE,
A. W. HORTON.