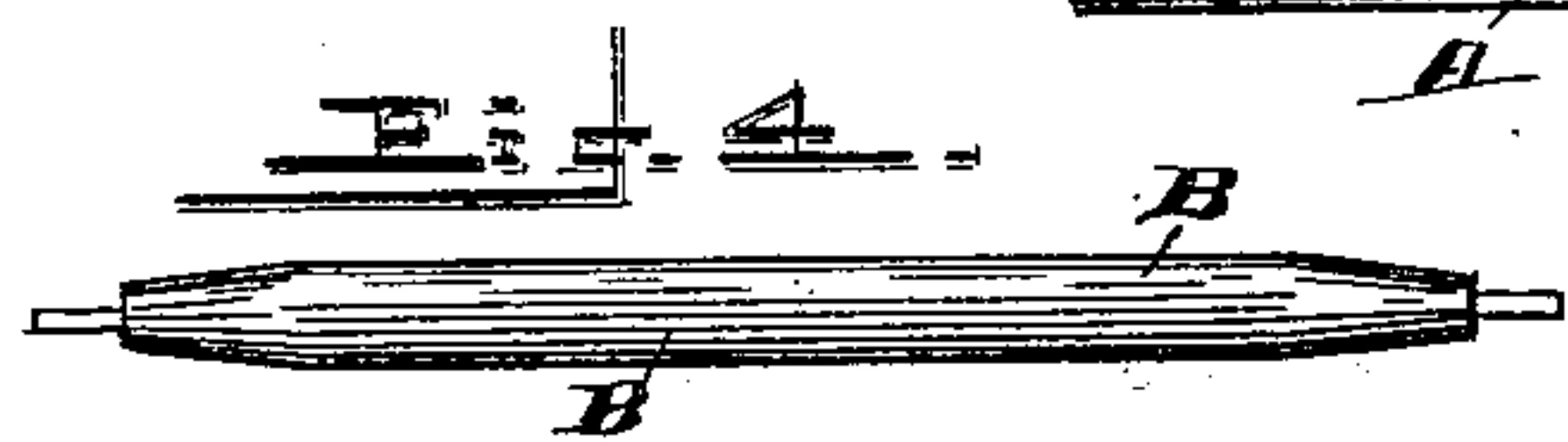
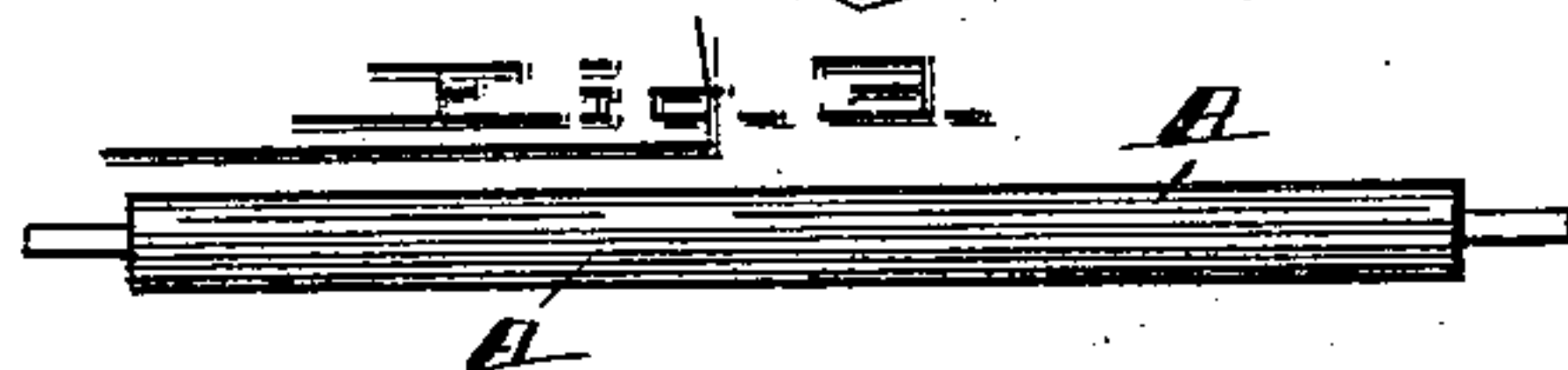
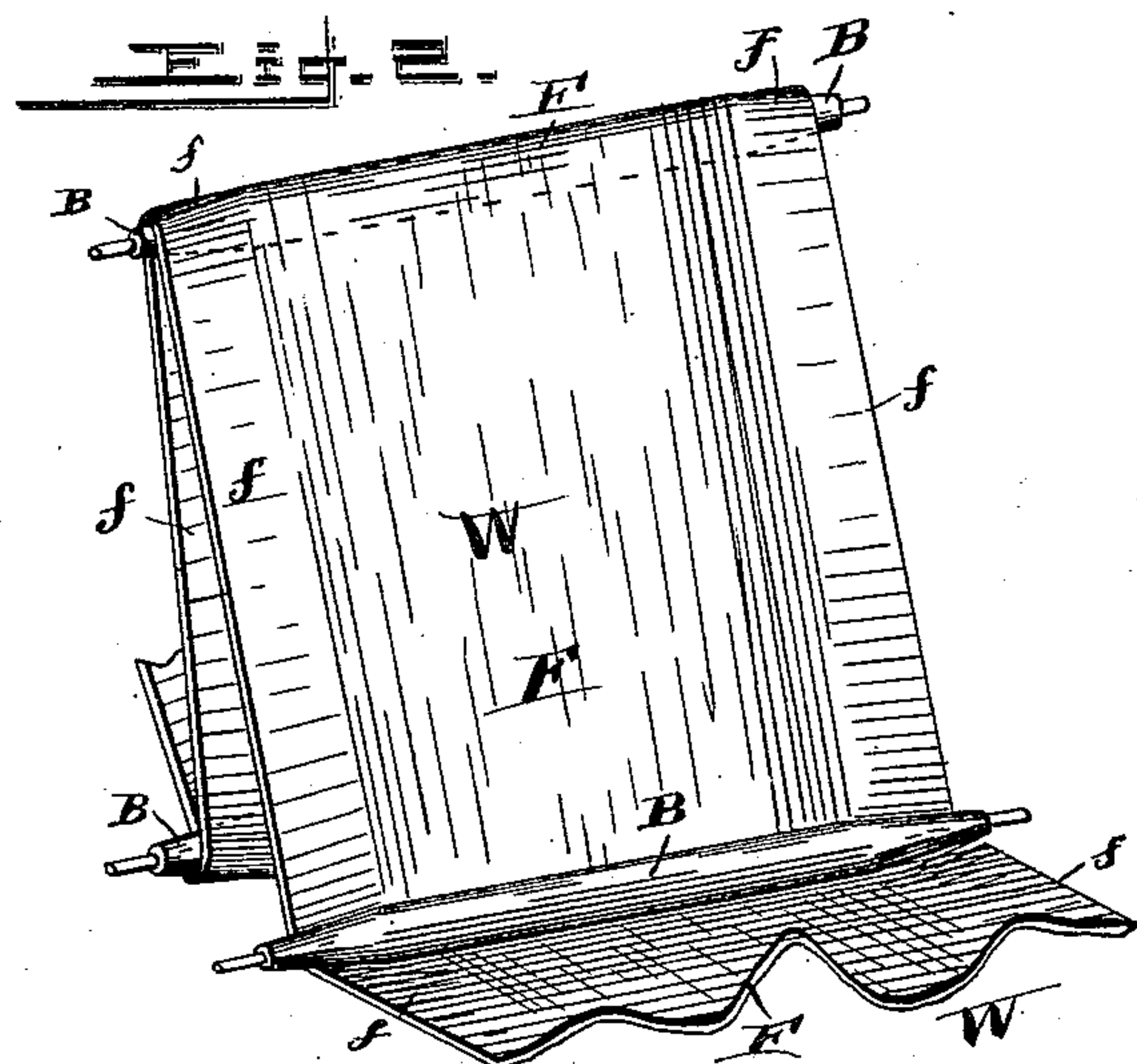
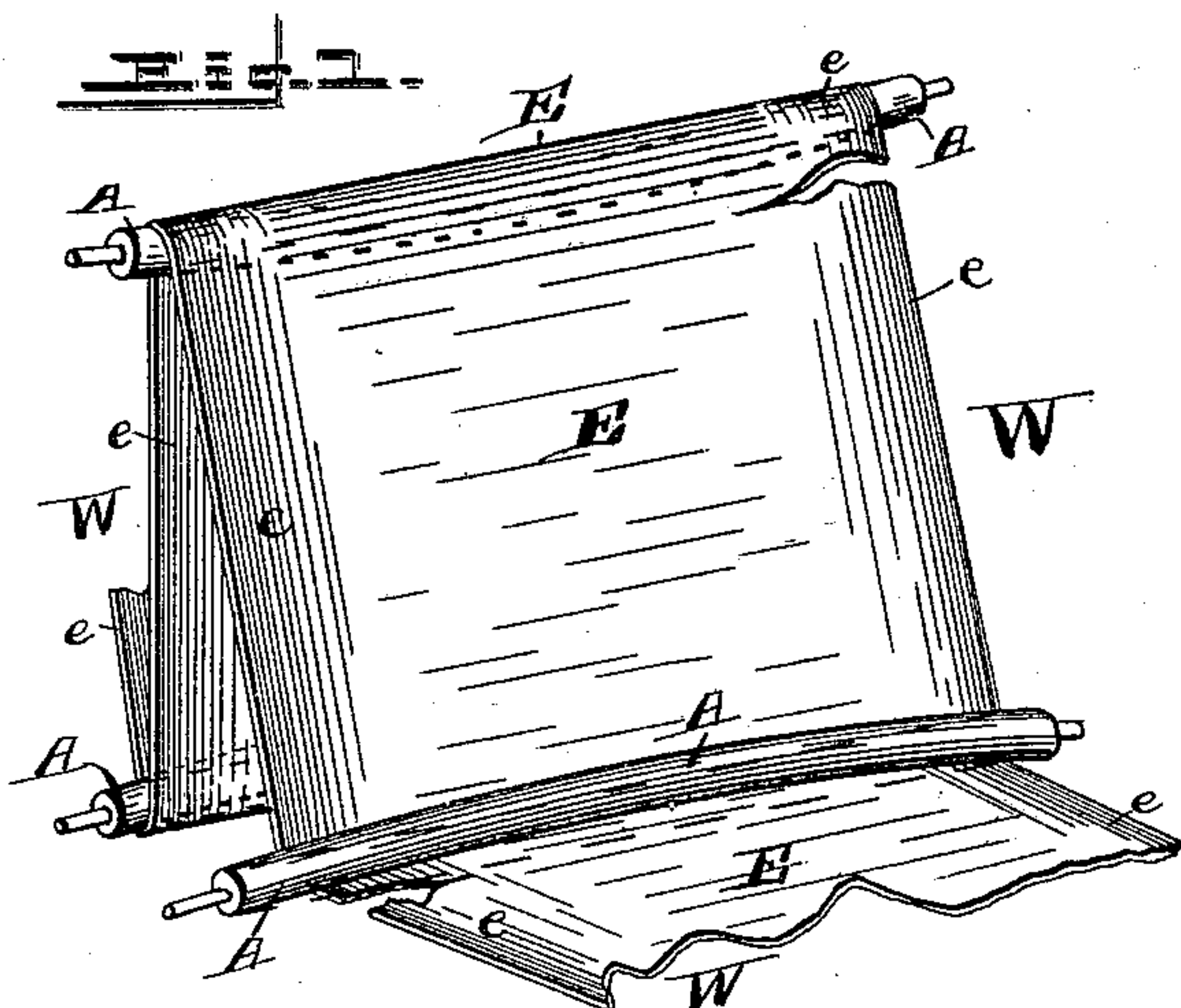


(No Model.)

J. L. COX.
WEB ROLLER FOR PRINTING PRESSES.

No. 457,255.

Patented Aug. 4, 1891.



Witnesses

P. L. Brooks

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Inventor

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By his Attorney W. Alexander

UNITED STATES PATENT OFFICE.

JOSEPH L. COX, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO THE DUPLEX
PRINTING PRESS COMPANY, OF SAME PLACE.

WEB-ROLLER FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 457,255, dated August 4, 1891.

Application filed November 1, 1889. Serial No. 328,948. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. COX, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Web-Rollers for Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a detail perspective view illustrating some web-looping idler-rollers of a printing-press and the web of paper looped thereon, indicating in dotted lines the position of the rollers when at rest or unsprung and in full lines showing the rollers sprung by the pressure of the web or centrifugal force of their rotation. Fig. 2 is a similar view of the loop of paper and its rollers, the latter being constructed in accordance with my invention. Fig. 3 is a detail view of the ordinary form of idler-roller for looping the web, made of equal diameter throughout. Fig. 4 is a view of a roller embodying the principle of my invention, but greatly exaggerated in appearance to more distinctly show the difference between my rollers and the old ordinary kind and to more readily assist in the understanding of my invention in connection with the following description.

This invention is an improvement in idler-rollers for use in the paper-feed mechanism of printing-presses wherein the paper is taken in a continuous sheet or web and operated upon; and the object of my invention is to remedy a common defect in the paper-feed mechanism—namely, the excessive strain on the web in its passage over the various idler or looping rollers found in such devices.

Every pressman operating web-printing machines finds that when running at high speed the web is frequently torn at the edges in passing through the press, owing to unequal strain thereon, which it is in most cases absolutely impossible to remedy, except by slowing up the machine. One cause of this defect is the fact that the various rollers over which the web passes are not perfectly true, these rollers being in many cases several feet

in length, and, as they are to be rotated by the friction of the web in its passage thereunder, they must be made light and small in diameter, and obviously they are thus rendered very liable to be bent or distorted by pressure thereupon and to be sprung at center, so that even if the web passes around a roller with equal strain throughout its width the center of the roller will sag, and hence when the web reaches the succeeding roller the edges will be drawn more taut in passing around this roller than the central portion thereof, so that by the time the web has passed several of these rollers its edges are strained so much that rupture frequently ensues. This is illustrated in Fig. 1, wherein the web of paper W is shown looped over three rollers A, and these rollers have been sprung, as described, (though this defect is greatly exaggerated in the drawings.) The central portion E of the web is loose and its edges *ee* are taut and liable to rupture or fracture, as indicated. The rapid revolution of a small roller, which is virtually nothing more than a section of a steel rod or tube, will of itself frequently cause the springing of the center of the roller, especially when there is any pressure against one edge thereof. Various attempts have been made to remedy this defect in web-printing machines by adjusting the rollers and by employing web-tensioning devices in different positions. It is a fact that a sheet of paper will sustain a longitudinal strain of many pounds if applied at the center of its width, whereas if the strain of as many ounces was applied on the edge thereof rupture would result, especially where the paper has to loop and bend in different directions, as it does in most web-printing perfecting presses. Of course where it is possible to make the rollers of sufficient diameter and weight to withstand the pressure thereon, due to the tension of the web necessary to draw it through the machine, such defects of severe strain on the edges of the web would be obviated; but were the rollers so large and heavy it would be too great a strain on the web to operate them, and, besides, the paper-feeding devices of the press would be inconveniently large and practically inoper-

ative, as the web-loops would have to be enlarged correspondingly with the rollers.

I overcome the defects of small rollers by modifying their construction, enabling them to be made as light or lighter than those now used and at the same time compensating for any spring occasioned by the tension of the web thereagainst or by their rapid revolution, and transfer the principal strain on the web from its edges to center simply by reducing the ends of the rollers, making them slightly smaller in diameter at ends than at center, this reduction being gradual and in actual use almost imperceptible, for the difference of the thickness of a sheet of paper in the circumference of the roller ends and center will sometimes be sufficient to remedy the evil where there are a number of rollers employed, several of the rollers being similarly formed—*i. e.*, with reduced ends.

The improved rollers are shown greatly exaggerated in Figs. 2 and 4. In Fig. 2 the effect of the use of such rollers is illustrated, only that were the rollers tapered as perceptibly as in the drawings the web would not be properly regulated; but the rollers are shown thus formed merely for the purpose of illustration, since as the actual tapering of the rollers at the ends would generally not make a difference in the circumference of the roller at center and ends of more than one to three thicknesses of the paper or web to be operated upon such taper would not be perceptible to the eye, but can be made by proper machinery. Where several such rollers are used together, the aggregated differences in circumference between the ends and centers of the rollers will have a very appreciable

and decided effect upon the transverse tension or strain on the web, which will be thereby transferred from edges to center, as indicated in Fig. 2, B B B being three such rollers over which the web is looped, the edges *f f* running over the reduced ends of the rollers being relieved of undue strain, while the central portion F has to bear an increased strain, which it is well enabled to do. By slightly increasing the amount of reduction of the ends of one roller it may be made to sufficiently relieve strain on the edges of the paper web, or one or more alternate rollers may be thus reduced for the purpose and with the effect described. The paper web thus passes through the press without fracture of the edges, and consequently the press or folder can be run at the highest speed attainable, as there is no danger of damage to the paper by excessive longitudinal strain on the edges thereof occasioned by the various rollers over which it is looped and passed.

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

A feed-roller for paper-web-printing presses, consisting of a cylindrical roller of equal diameter throughout its length, except just at its ends, which are slightly tapered, so as to relieve strain on the edges of the web of paper, substantially as shown and described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH L. COX.

Witnesses:

A. E. DOWELL,
P. F. BROOKS.