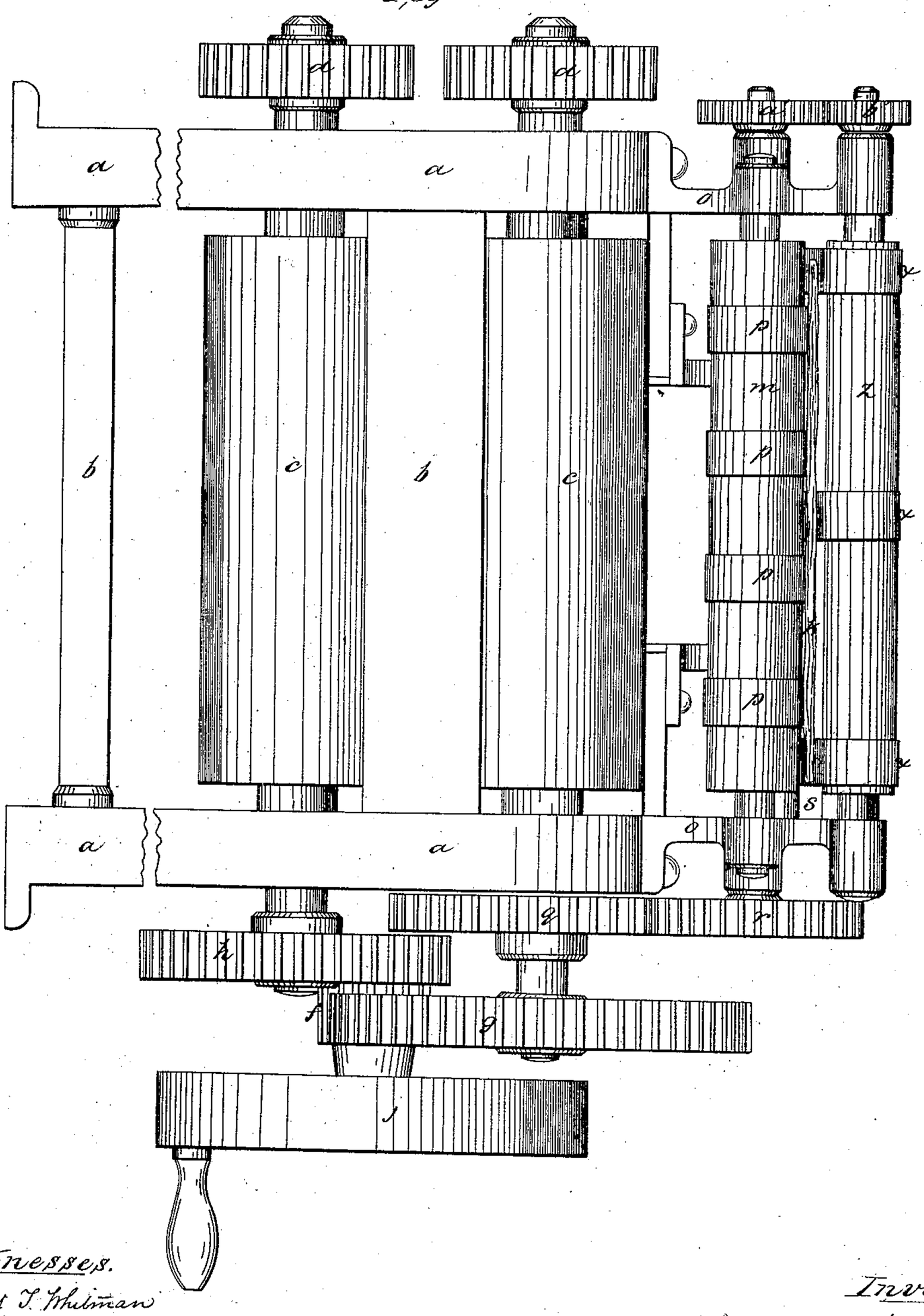
Sheet 1, 6 Sheets.

E. B. Bigelow.

Fiber Brake

No. 101,089. Patented Mar. 22, 1870.

Fig: 1.



Witnesses.
Herbert T. Whitman
Daniel P. Noyes

Inventor
Erastus B. Bigelow.

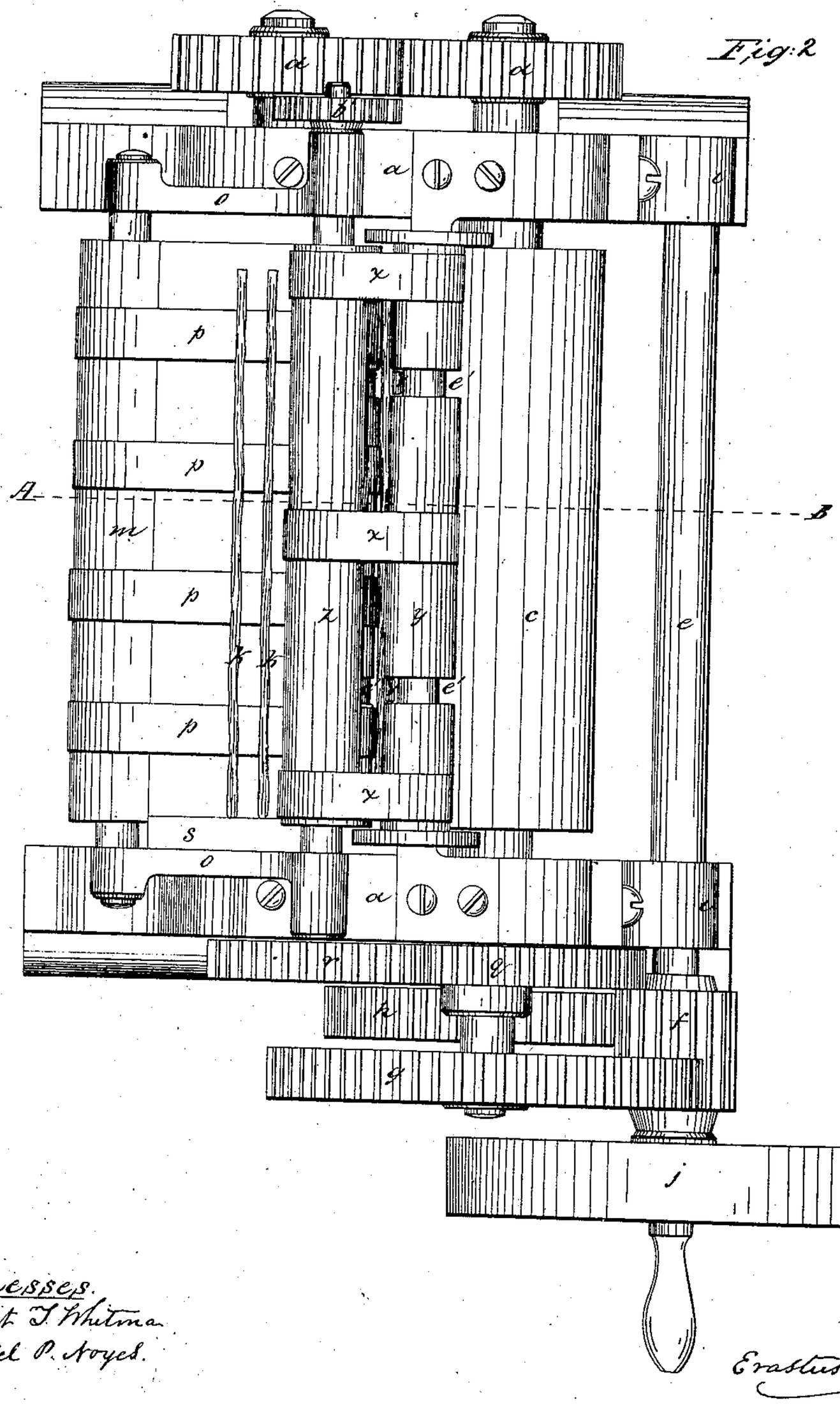
Sheet 2, 6 Sheets.

E. B. Bigelow.

Fiber Brake.

No. 101,089. Patented Mar. 22, 1870.

Fig: 2



Witnesses.
Herbert T. Whitman
Daniel P. Noyes.

Inventor
Erastus B. Bigelow

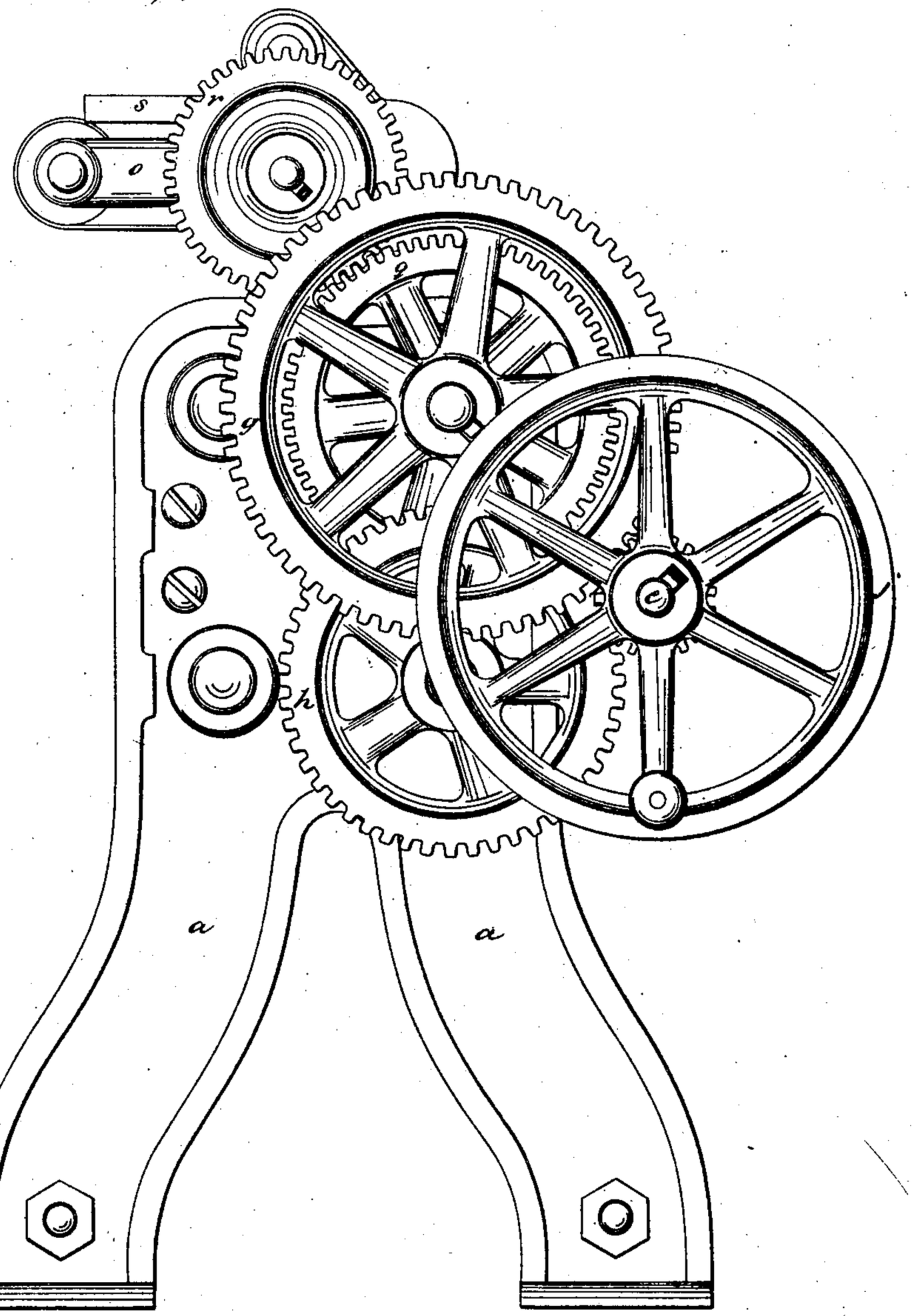
Sheet 3, 6 Sheets.

E. B. Bigelow.

Fiber Brake.

No. 101,089. Patented Mar. 22, 1870.

Fig: 3.



Witnesses.
Robert T. Whitman
Daniel P. Noyes.

Inventor
Erastus B. Bigelow

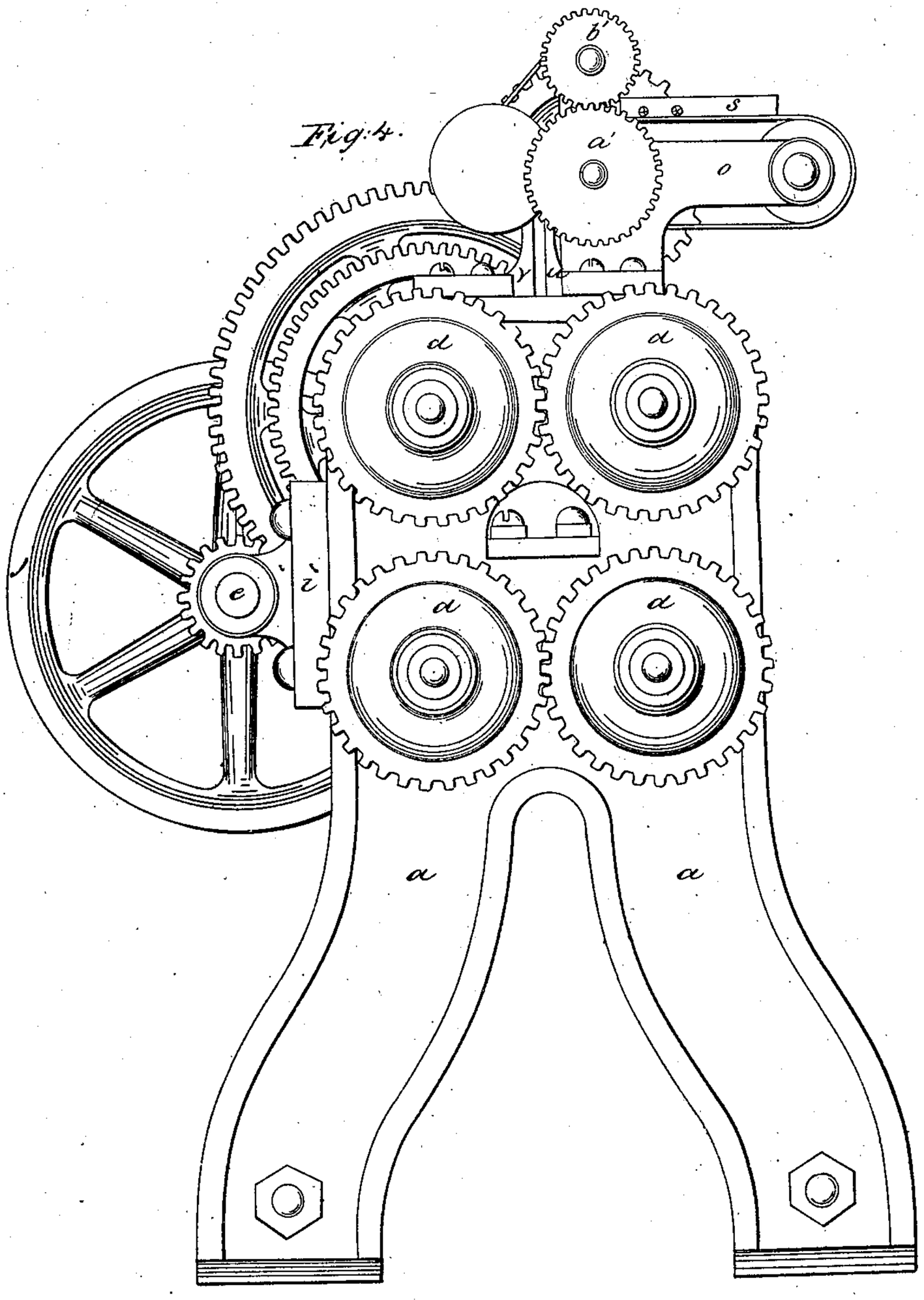
Sheet 4, 6 Sheets.

E. B. Bigelow.

Fiber Brake.

No. 101,089. Patented Mar. 22, 1870.

Fig. 4.



Witnesses
Robert F. Whitman
Daniel P. Noyes

Inventor
Erastus B. Bigelow

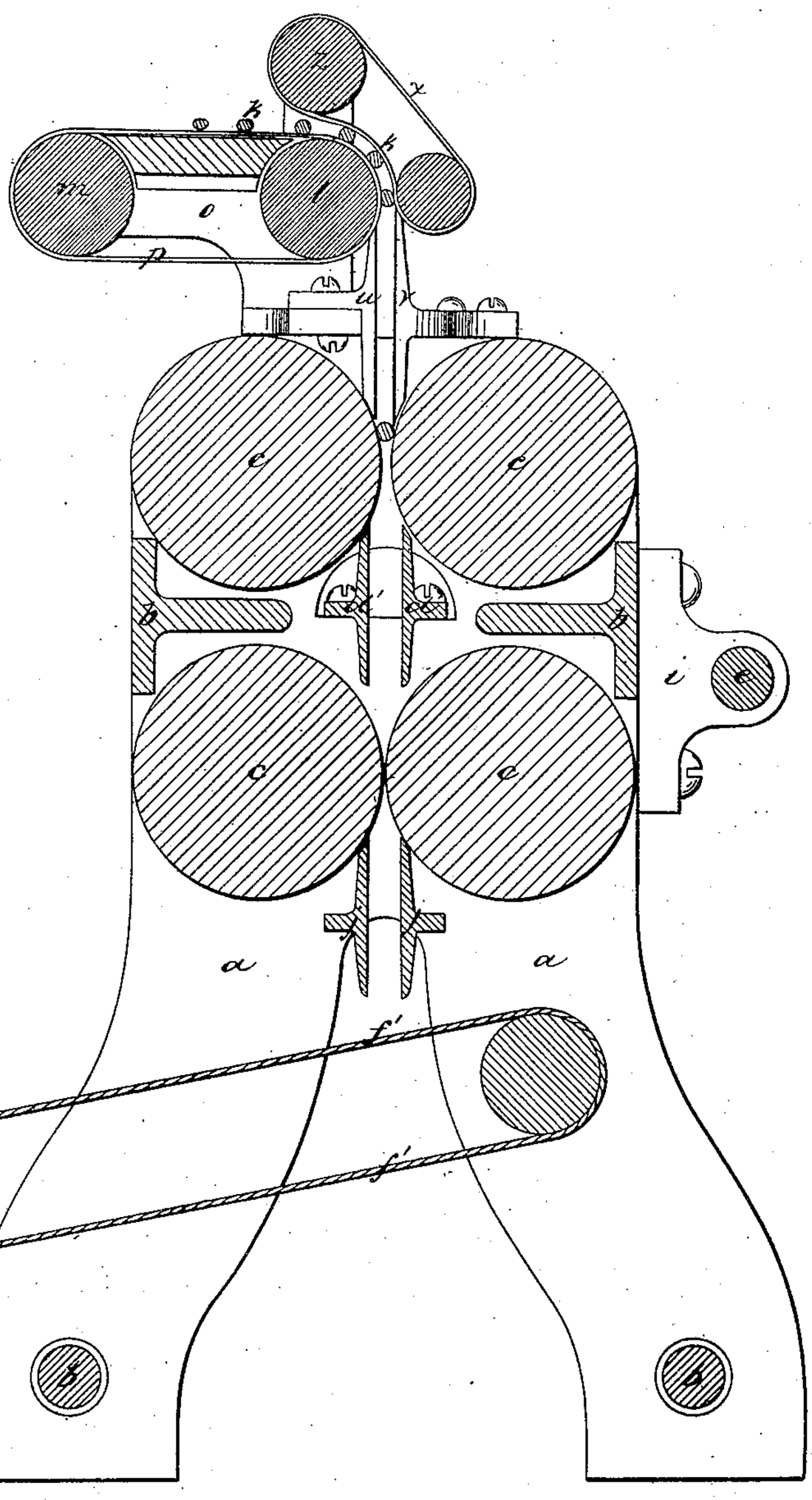
Sheet 5, 6 Sheets.

E. B. Bigelow.

Fiber Brake.

No. 101,089. Patented Mar. 22, 1870.

Fig. 5.



Witnesses.
Herbert T. Whitman.
Daniel P. Noyes.

Inventor:
Erastus B. Bigelow

Sheet 6, 6 Sheets.

E. B. Bigelow.

Fiber Brake.

No. 101,089. Patented Mar. 22, 1870.

Fig: 7.

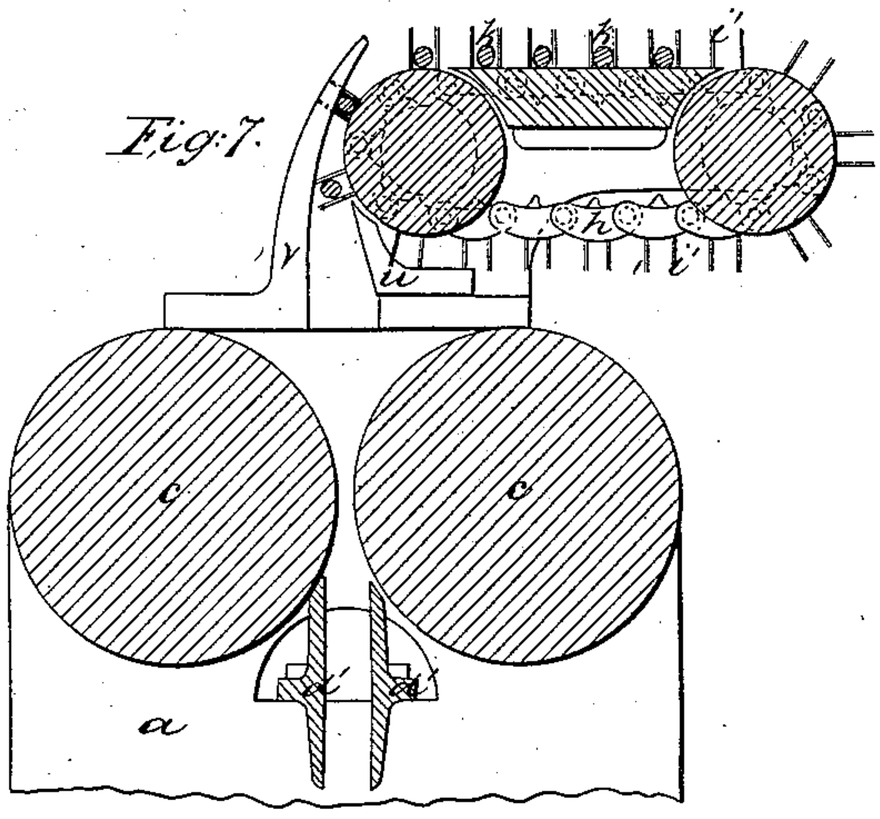
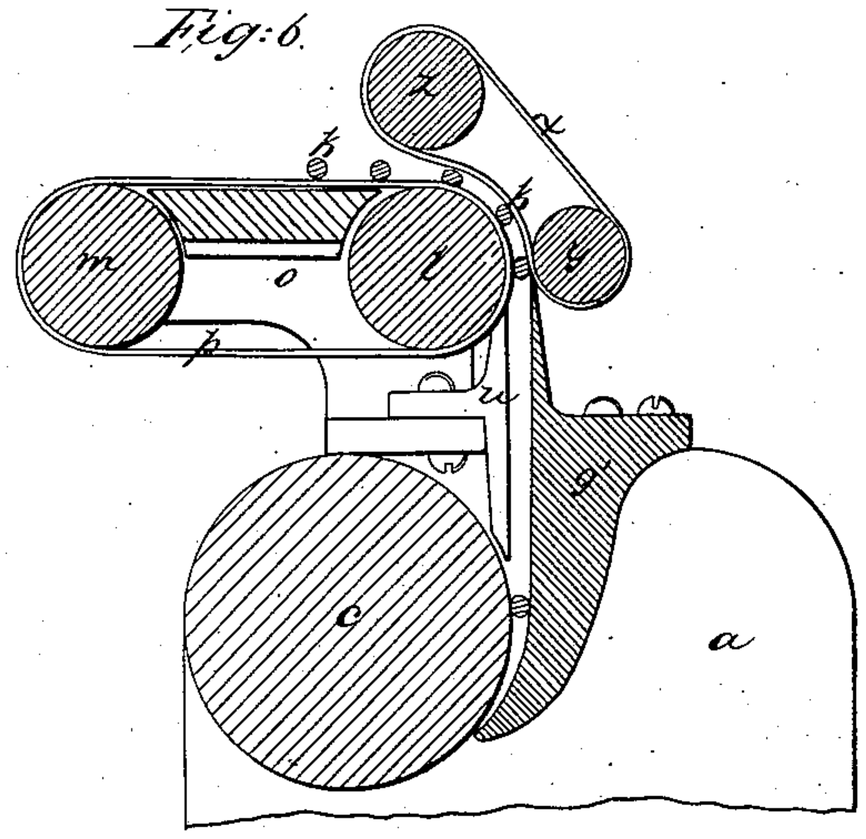


Fig: 6.



Witnesses.

Herbert T. Whitman
Daniel P. Noyes.

Inventor

Erastas B. Bigelow.

United States Patent Office.

ERASTUS BRIGHAM BIGELOW, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 101,089, *dated March* 22, 1870.

IMPROVEMENT IN MACHINE FOR CRUSHING RAMIE AND OTHER FIBROUS STALKS.

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

I, ERASTUS BRIGHAM BIGELOW, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain Improvements in Crushing Ramie and other fibrous stalks, of which the following is a specification.

The object of my invention is to facilitate the process of separating the wood part of Ramie and other fibrous stalks from their fibrous part. Instead of acting at once on the stalks in the direction of their length, as heretofore done, I first crush and separate them longitudinally, preparatory to breaking their woody part transversely.

This I accomplish by means of crushing-rollers, between which the stalks are passed sidewise, the distance between the rollers being such as to compress the stalks, and, by the compressing action, force their woody fibers asunder. After the woody fibers of the stalks are thus, in a degree, separated from each other longitudinally they may be easily broken transversely, and removed from the textile fibers by the usual processes of breaking and hackling hemp and flax.

After the stalks have been crushed and separated longitudinally, as above described, they may be immersed in a chemical bath, suitably prepared, to free them from their natural gum, and then dried, preparatory to the breaking and hackling processes, or they may be dried, broken and hackled before being immersed in the bath.

The crushing mechanism is represented by the accompanying drawings, in which—

Figure 1 is a front elevation thereof.

Figure 2 is a plan.

Figure 3 is a right-hand end elevation.

Figure 4 is a left-hand end elevation.

Figure 5 is a transverse section taken on the line A B, drawn across fig. 2.

The frame of the machine consists of two upright standards *a*, supported by four cross-girths *b*.

The crushing-rollers, *c*, between which the stalks are passed, are grouped in pairs, and connected by gears *d*.

To facilitate the feeding in of the stalks, each pair is arranged in a horizontal plane, and one pair placed over the other, so that the stalks, when delivered from the upper pair, will fall to the bite of the lower pair by their own gravity. They revolve in bearings suitably formed in the standards *a*, the speed of the lower pair being accelerated to take up the increased width of the stalks produced by the compression of the upper pair.

They receive motion from the driving-shaft *e*, which carries a long pinion, *f*, which engages with the gear-wheels *g* and *h*, severally affixed to the axes *e* of their respective rollers *c*, the gear *h* being of less diameter than the gear *g*, to accelerate the speed of the lower rollers for the purposes before explained.

The driving-shaft *e* is supported by stands *i*, and by a pulley, *j*, receives motion from a prime mover connected with the motive power.

A feeding apparatus is applied to the upper part of the machine, by which the stalks, marked *k*, are delivered in succession, sidewise, to the crushing-rollers.

Two rollers, *l* and *m*, are supported at each end by stands *o*, affixed to the standards *a*, carry a series of bands, *p*, which form an endless feeding-apron.

A continuous rotary movement is imparted to the endless feeding-apron by one of the crushing-rollers *c* through the action of gears *q* and *r*, affixed respectively to the axes of the rollers *c* and *l*.

The attendant spreads the stalks *k* side by side upon and across the endless feeding-apron just described, abutting one end of the stalks against a guide-bar, *s*, to bring them into proper range with the crushing-rollers, the stalks and bands being supported by a table, *t*.

The stalks, as the endless feeding-apron revolves, are carried forward to a position over the bite of the crushing-rollers, whence they descend, in succession, by their own gravity, being guided in their descent by guide-stands *u* and *v*, affixed respectively to the stands *o* and standards *a*.

To hold the stalks in position as they advance to the line of descent, and to cause them to drop as nearly parallel to the crushing-rollers as may be, a revolving holding-apron, composed of a series of bands, *x*, carried by rollers *y* and *z*, is employed.

The holding-apron is caused to move in harmony with the feeding-apron by gears *a'* and *b'*, respectively affixed to the rollers *l* and *z*, the stalks being held between the two aprons (as represented in the drawings) until they are delivered between the guide-stands *u* and *v*, before mentioned, and to facilitate the entrance of the stalks between the guide-stands, their upper ends are imbedded in recesses *c'* formed in the rollers *l* and *y*.

The stalks, as they drop from the feeding apparatus, pass between the upper pair of rollers, by which they are partially crushed, and then descend to the lower pair, by which the crushing is completed, the latter pair being placed nearer together than the former pair, in proportion to the increased crushing action required.

As the partially-crushed stalks descend from the upper to the lower pair of rollers they are guided in their descent by guide-bars *d'*, affixed to the standards *a*, which guide-bars *d'*, by having their upper edges in contact, or nearly in contact, with the surfaces of the upper rollers, (as represented in the drawings,) also serve as clearers to remove from the rollers the partially-crushed stalks which may adhere to them.

Bars *j'*, similar to the bars *d'*, just described, may be applied to the lower rollers (as represented in sec-

tion in fig. 5) to clear off the fully-crushed stalks, and guide them in their descent to a moving endless apron, *f*, by which they may be conveyed to the chemical bath before mentioned, or deposited in heaps.

It will be obvious to persons acquainted with mechanics that my invention may undergo many modifications without departing from its distinguishing principles, as, for instance, the surfaces of the crushing-rollers may be smooth, as represented in the drawings, or they may be fluted, as may be most effective, and to increase their drawing action for separating the wood fibers of the stalks, the surface of one of the rollers of each pair may be moved faster than the surface of the other roller.

The number of pairs of rollers to be used may also be varied, according to the condition and requirements of the stalks to be crushed, and the bearings in which they revolve may be made adjustable. When two, three, or more pairs are required, the rollers of each succeeding pair should be placed nearer together and driven faster than the preceding pair.

Instead, also, of rollers working in pairs, as above described, one roller may be used, and a stationary guard or shell substituted for the other roller, as represented in section in fig. 6, the stalks *k* being compressed and drawn apart between the stationary guard or shell *g'* and roller *c*.

Instead, also, of the feeding and holding-aprons, above described, for delivering the stalks *k* in succession, sidewise, to the crushing-rollers, endless chains, with guide-pins, may be substituted, as represented in fig. 7, the stalks being placed across the endless chains *h'*, between the guide-pins *i'*, and carried forward and delivered between the guide-stands *u* and *v*, by which they are guided to the bite of the crushing-rollers.

Having described my invention, and pointed out some of the modifications of which it is susceptible without departing from its distinguishing principles,

What I claim as new therein, and desire to secure by Letters Patent, is—

1. The feeding mechanism herein described for receiving and delivering in succession the stalks to the crushing-rollers sidewise, substantially as specified.

I also claim, in combination with the first pair of the series of pairs of rollers for crushing Ramie and other fibrous stalks, herein described, guide-stands for receiving and guiding the stalks to the bite of said rollers, substantially as specified.

I also claim two or more pairs of rollers for crushing Ramie and other fibrous stalks, when the succeeding pairs of the series are placed nearer together, as specified, and are speeded up to to compensate for the flattening of the stalks by the preceding pair, by means of the gearing of different diameters or speed, as specified.

I also claim, in combination with two or more pairs of crushing-rollers, arranged as herein described, guide-bars for clearing the stalks from the rollers and guiding them from one of the series to the next succeeding series, substantially as specified.

ERASTUS B. BIGELOW.

Witnesses:

HERBERT T. WHITMAN,

DANIEL P. NOYES.