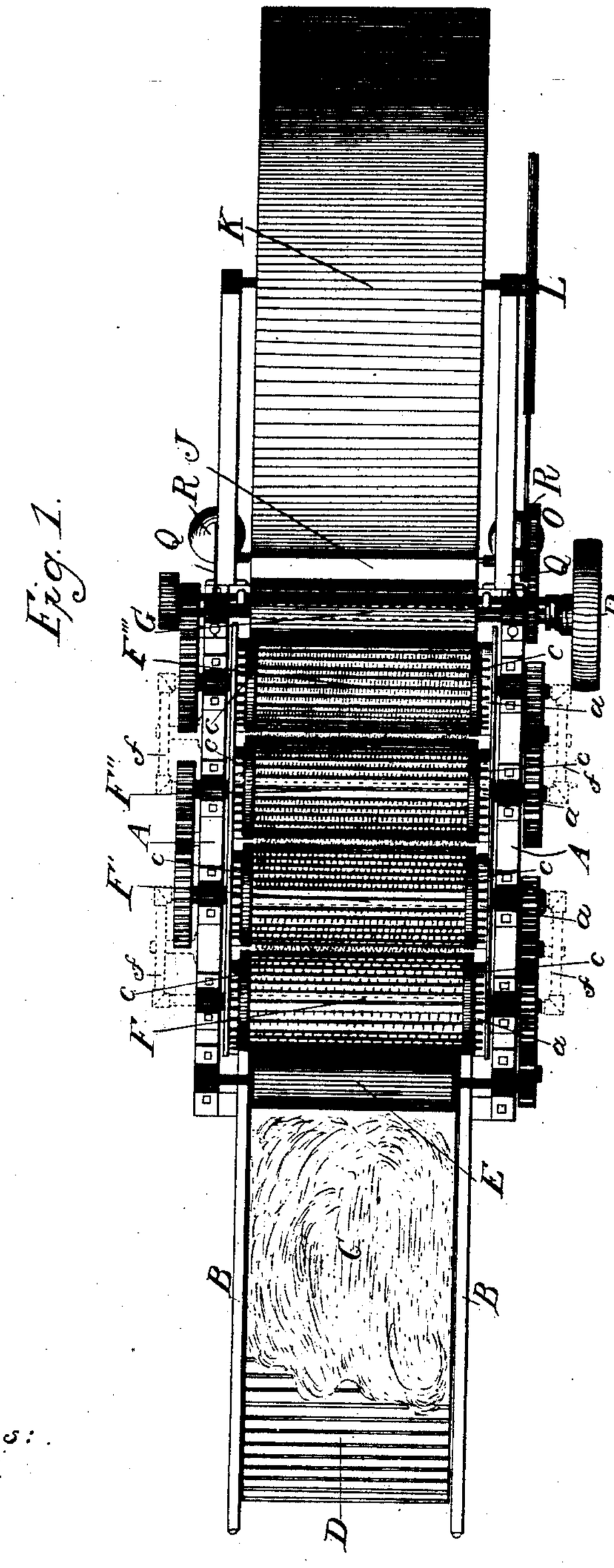
4 Sheets—Sheet 1.

C. WHIPPLE.

Machine for Preparing Cotton and other Fibrous Material.

No. 45,371. Patented Dec. 6, 1864.

Fig. 1.



Witnesses:
Roy F. Thurston.
Thos. H. Peabody

Inventor:
Cullen Whipple.

4 Sheet—Sheet 2.

C. WHIPPLE.

Machine for Preparing Cotton and other Fibrous Material.

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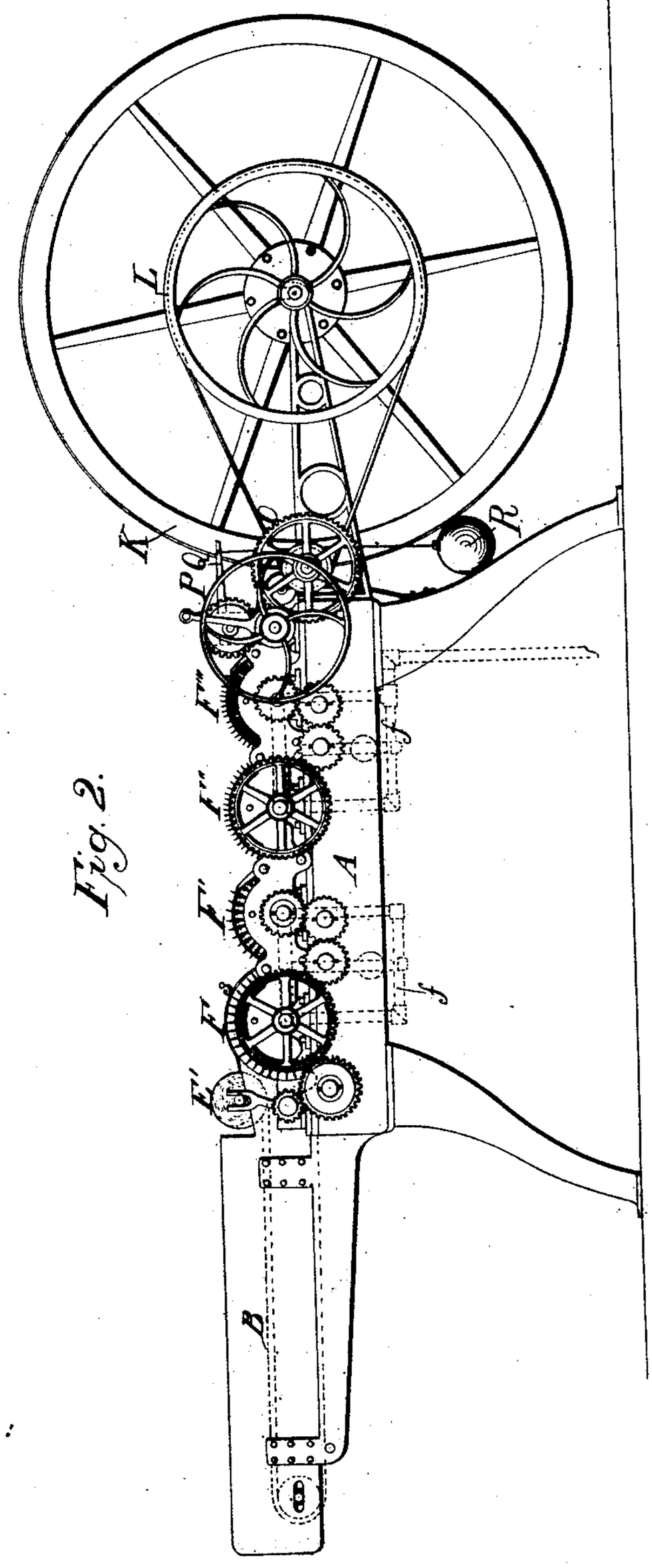

Fig. 2.

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4 Sheet—Sheet 3.

C. WHIPPLE.

Machine for Preparing Cotton and other Fibrous Material.

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Fig. 4.

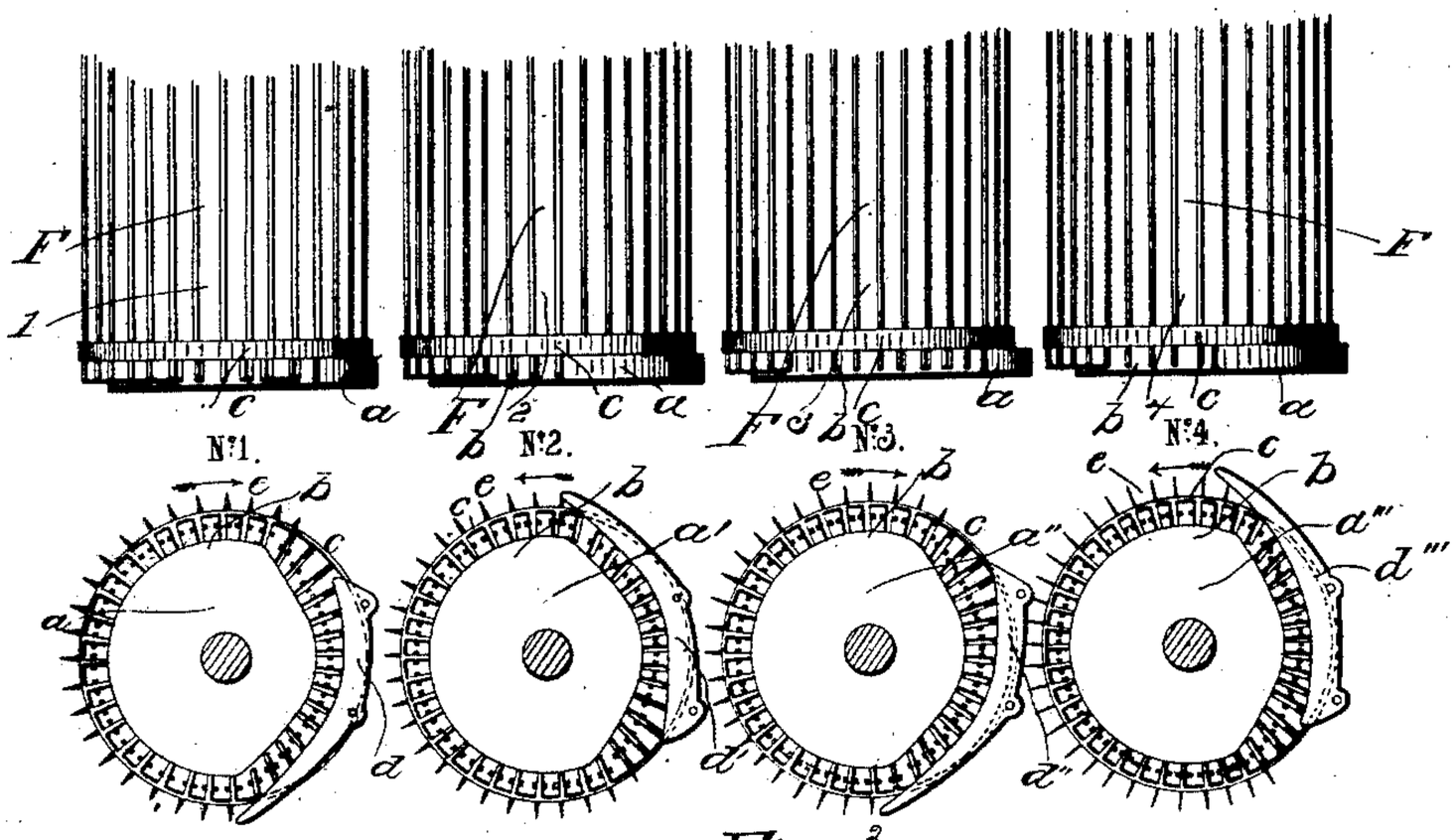
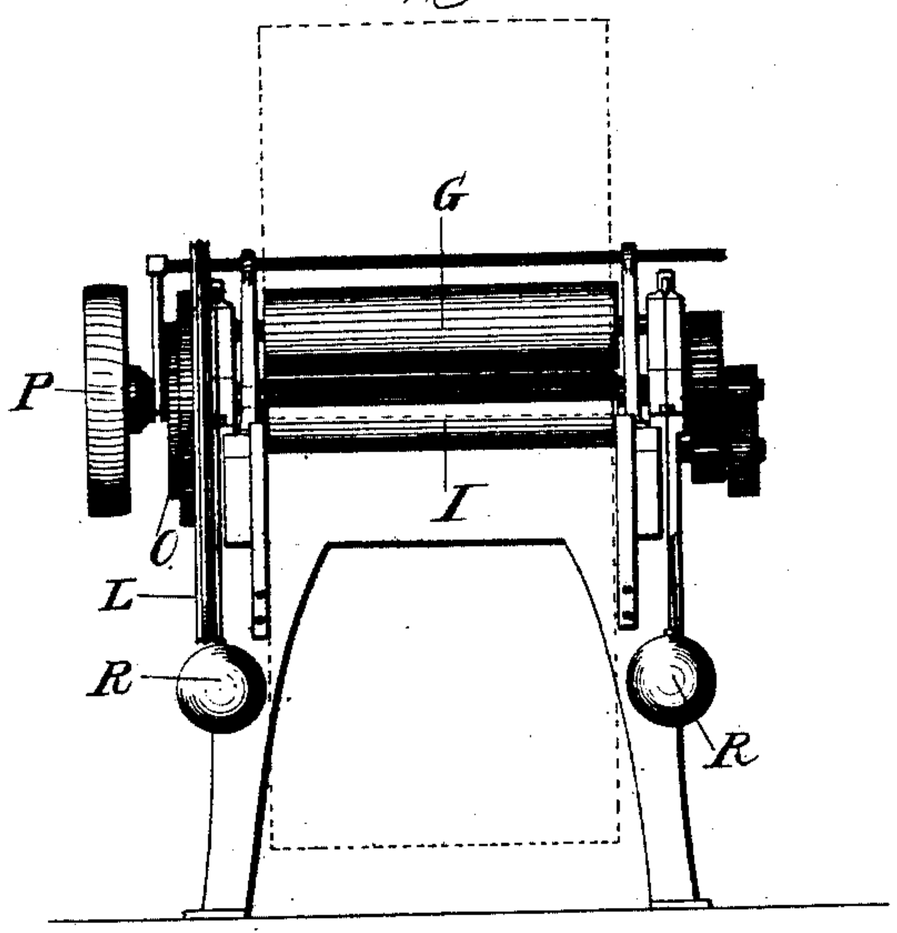


Fig. 3.



Witnesses:
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4 Sheet—Sheet 4.

C. WHIPPLE.

Machine for Preparing Cotton and other Fibrous Material.

No. 45,371. Patented Dec. 6, 1864.

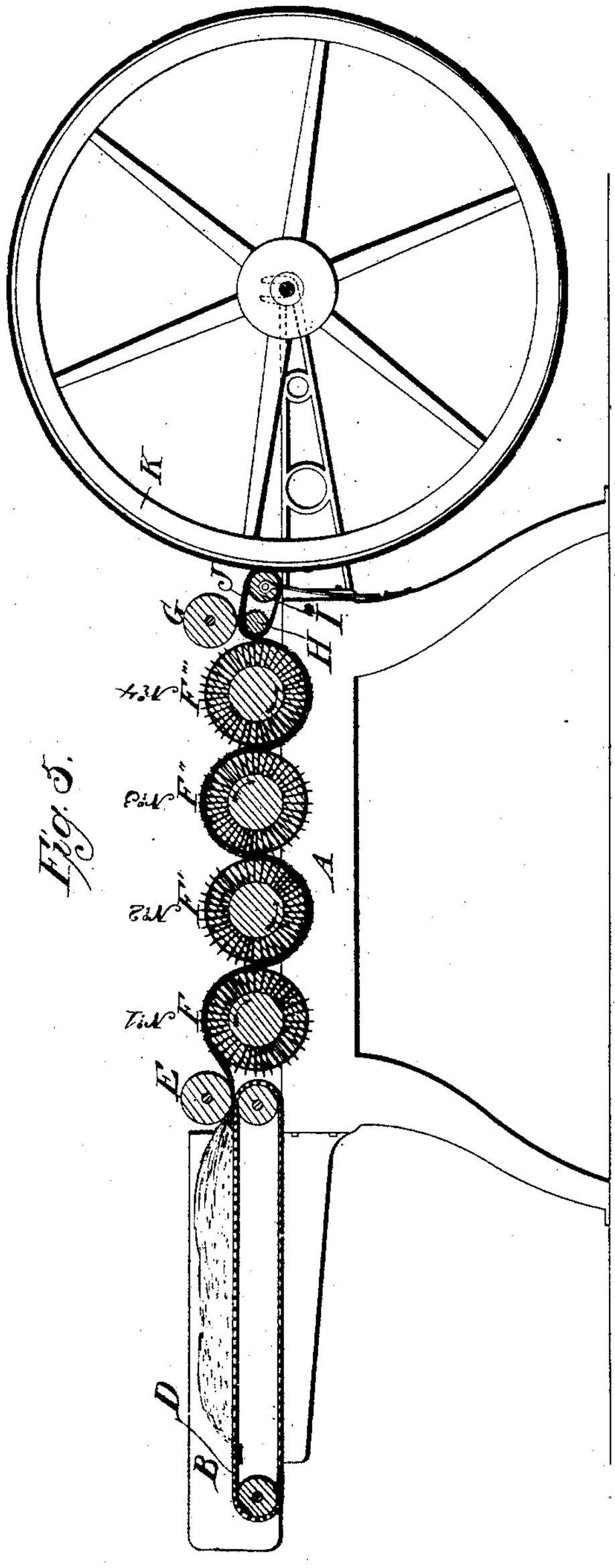

Fig. 5.

Witnesses:
Benj. F. Thurston.
Chas. H. Peabody.

Inventor:
Cullen Whipple.

UNITED STATES PATENT OFFICE.

CULLEN WHIPPLE, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN MACHINES FOR PREPARING COTTON AND OTHER FIBROUS MATERIALS.

Specification forming part of Letters Patent No. **45,371**, dated December 6, 1864.

To all whom it may concern:

Be it known that I, CULLEN WHIPPLE, of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Machine for Preparing Cotton, Wool, or other Fibrous Material; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a top view; Fig. 2, a side view; Fig. 3, an end view; Fig. 4, a view of the several cylinders without their gill-combs. Nos. 1, 2, 3, and 4 are transverse sections of the several cylinders, showing their gill-combs and the means by which the combs are controlled; and Fig. 5, a longitudial section of the machine with one of the sides of its frame removed.

It is well understood that in the process of working wool, cotton, or other fibrous material into yarn by the machinery now employed much of the fiber is broken and a corresponding waste of the stock occasioned. The purpose of my invention is to avoid this serious cause of loss by so preparing the materials for the subsequent operations, preparatory to its being spun into yarn, that while the fibers are straightened their natural length shall be fully preserved. This result is accomplished by the use of a machine which involves the principle of drawing the material through successive sets of gill-combs of increasing fineness by means of a series of cylinders, each of which is provided with a set of gill-teeth, and which, by the accelerated motion of each cylinder relatively to the preceding one, transfer the material from the first to the last of the series, and thereby not only straightens the fiber without breaking it, but also frees it from the coaser foreign particles.

In the accompanying drawings, F F′ F″ F‴ are the toothed cylinders for working the material, which are mounted on the frame A in suitable bearings. Motion is communicated to each of these cylinders from the driving-shaft, to which the pulley P is affixed, by means of toothed wheels and pinions, as shown, each cylinder transmitting its motion to the next in the series, but the rate of revolution of each cylinder is reduced from that of the one from which it receives its motion in a regular ratio, so that if the cylinder at the end of the machine where the material is first received will make, for example, two revolutions per minute, the next in order will make four, the next eight, and the last, at the end where the power is applied and the material taken off, will make sixteen revolutions per minute.

The rate of speed which I have given and the ratio of increase of speed in each cylinder are merely arbitrary. The speed, as well as the ratio of increase, will depend upon the quality, condition, and character of the material to be worked, but this can easily be determined by experiment, the essential principle to be preserved being an increase of speed in the successive cylinders of the series in a regular progression.

The cylinder at the end where the material is first received is provided with coarser and stronger teeth than the other cylinders, whose teeth increase in number and fineness toward the end of the series. With this difference the cylinders are alike, all being of the same length and diameter and similarly constructed. The teeth are set in bars which are fitted to longitudinal grooves, planed at regular distances in the surface of the cylinder, between the heads *c c*, Fig. 4. As these grooves or slots extend through the shell of the cylinder, the under side of the bars which hold the teeth rest upon the peripheries of two cam-disks, *a a′ a″ a‴*, Fig. 4 one at each end. These cam-disks remain stationary on the axle of the cylinder, while the shell revolves. One side of each cam-disk is cut away from a true circle, so that in the course of the revolution of the cylinder the plates which hold the teeth, as they successively arrive at this part of the disk, are made by means of the guide-plate *d d′ d″ d‴*, which acts upon their upper edges to follow the periphery of the cam-disk, and draw the teeth below the surface of the cylinder. The object of this arrangement is to effect the transfer of the cotton or other material which is being worked from one cylinder to the next, which can only be done by withdrawing the teeth from the material at the point at which it is to be taken up by the teeth of the next cylinder in the series.

In Fig. 5 the course of the fibrous material in its passage through the machine is shown. It is placed in a mass upon the endless apron

D, between the side-boards B, and is fed to the machinery by the apron, to which a slow motion is imparted by a belt from the driving-shaft. A portion is led under the pressure feed-roller E′ to the first cylinder, and which revolves from left to right, as indicated by the arrow. Over this cylinder, and just above the points of the teeth, is placed a metallic shell, S, Fig. 2, the only office of which is to crowd the material to be worked among the teeth. No such arrangement is necessary for the succeeding cylinders, as the stock is liable to pile only upon the first. The second cylinder revolves from right to left, and so near to the first that its teeth will take up the cotton as soon as the teeth of the first have been withdrawn, in the manner previously described, and in a similar way the material is transferred from each cylinder to the next throughout the series, passing, as will be seen in the drawings, Fig. 5, over the first, under the second, over the third, under the fourth, and so on in a wave line of regular curves to the point where it is discharged. Now, it is obvious that the increased speed of each successive cylinder causes a drawing operation to be performed upon the fibers of the material worked, not only straightening them, but also causing all foreign particles larger than the spaces between the teeth to be removed. These effects are repeated under increased advantages with each successive cylinder, so that the batting which is delivered by the drawing-rollers G H to the toothed drum K from the last cylinder has its fibers evenly laid and of their natural length The receiving-drum K has its periphery covered with teeth, and is the most effectual means for taking off the material in a sheet; but it can be taken off in the form of a sliver through a bell-mouthed funnel in the usual way. If the drum is employed, an endless belt, J, should be used for conveying the batting, the constant pressure of which against the teeth of the drum can be maintained by the weight R.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The mode of operation by means of which the fibrous material is transferred from each cylinder to the next in succession, such mode of operation consisting in causing the rows of combing-teeth to be sheathed below the surface of the cylinder, and thereby to be withdrawn from the material at the points and for the length of time in the revolution of the cylinder that will allow the teeth of the next cylinder to take off the sliver, substantially as herein described.

2. Causing the material to be combed to travel throughout the series of combing-cylinders alternately over and under each in a wave line of regular curves, for the purpose of drawing out the stock without breaking the fiber, substantially as described.

CULLEN WHIPPLE.

Witnesses:

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THOS. H. PEABODY.