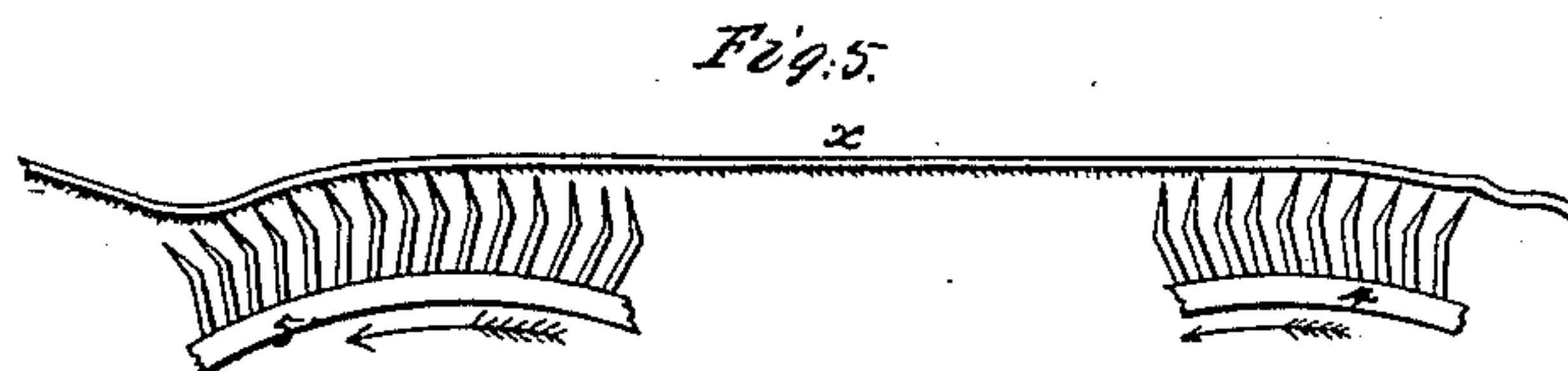
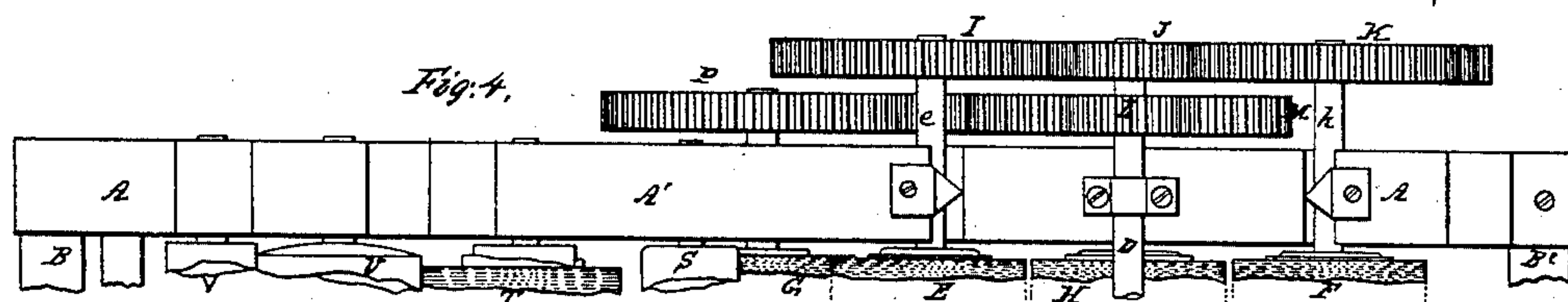
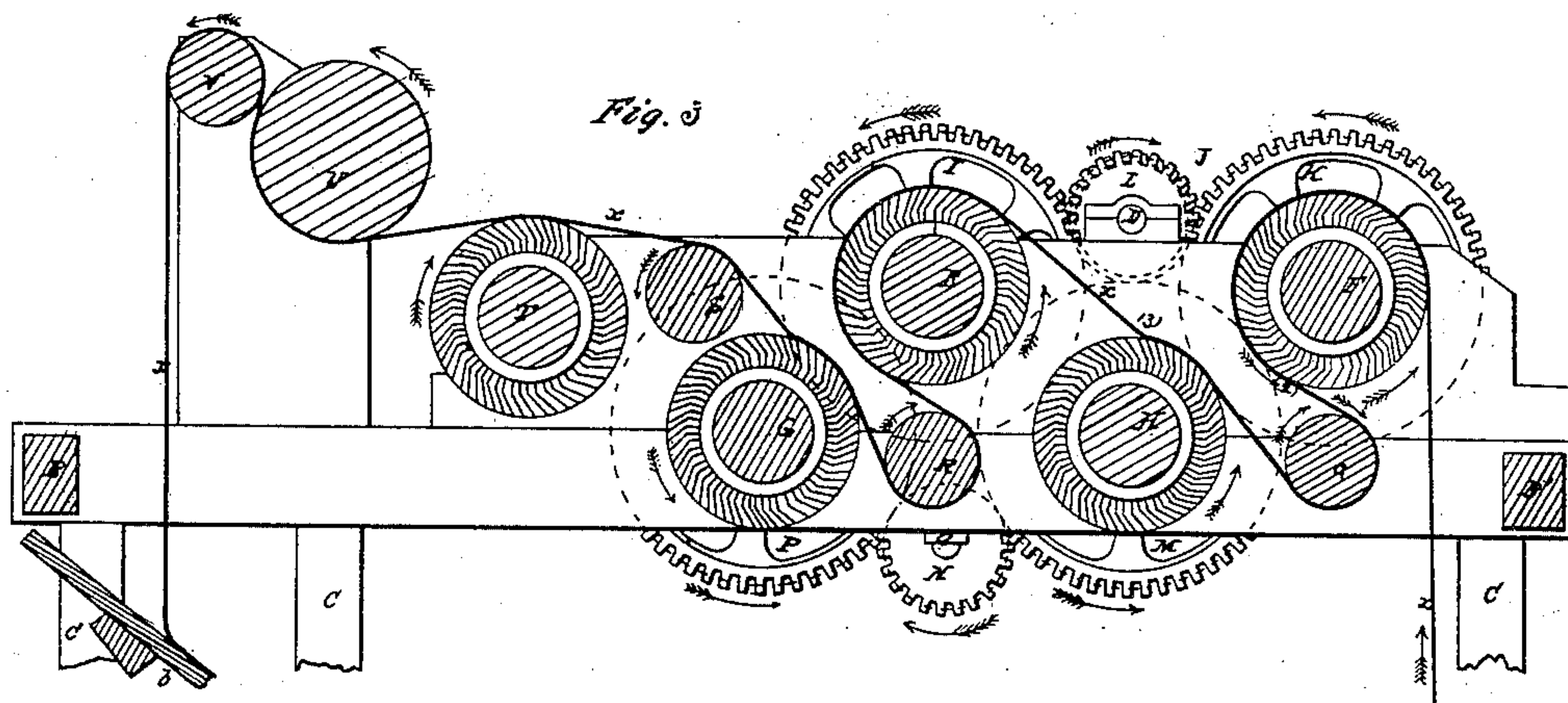
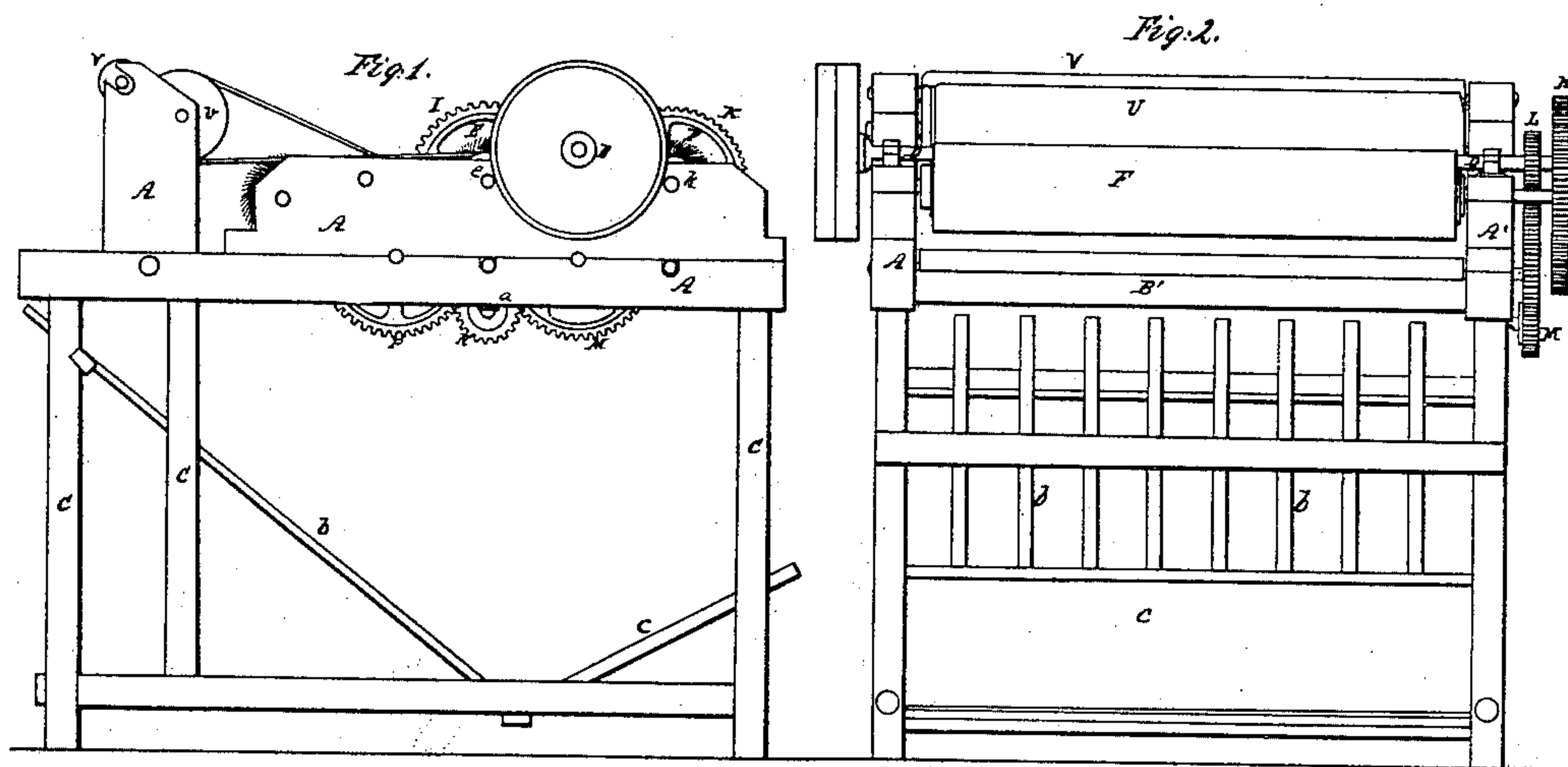


R. KERSHAW.
GIG MILL.

No. 34,038.

Patented Dec. 24, 1861.



Witnesses
Henry Howson
Charles J. Foster

Inventor
Robert Kershaw

UNITED STATES PATENT OFFICE.

ROBERT KERSHAW, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN GIG-MILLS.

Specification forming part of Letters Patent No. **34,038**, dated December 24, 1861.

To all whom it may concern:

Be it known that I, ROBERT KERSHAW, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Gig-Mills; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to improvements in gig-mills, for which Letters Patent were granted to James Shaw on the 28th day of August, 1860; and my improvement consists in raising a nap on textile fabrics by means of two or more card-rollers, the latter revolving at such a speed and the fabric being so guided by plain rollers that an alternate slackening and tightening of the said fabric will take place, thereby causing the wires of the rollers to penetrate the fibers and effectually raise the nap.

In order to enable others skilled in the art to practice my invention, I will now proceed to describe the manner in which I carry it into effect.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side view of my improved gig-mill; Fig. 2, an end view; Fig. 3, a longitudinal section of part of the machine, drawn to an enlarged scale; Fig. 4, a plan view of part of the machine; Fig. 5, diagrams illustrating my process of raising nap.

Similar letters and figures refer to similar parts throughout the several views.

A and A' are the opposite side frames of the machine, connected together by suitable transverse bars B and B' and supported on any convenient arrangement of legs C C. In the opposite side frames A and A' turn the journals of the rollers E, F, G, and H, which are geared together in the following manner: On the shaft *e* of the roller E is a wheel I, gearing into a pinion J on the driving-shaft D, which turns in suitable boxes on the opposite frames, this pinion gearing into a wheel K on the shaft of the roller F. On the same driving-shaft D is another pinion L, gearing into a wheel M on the shaft of the roller H, the latter wheel gearing into a pinion N, hung loosely to a stationary spindle *a* on the frame, and this pinion N

gearing into a wheel P on the shaft of the roller G.

It will be observed that the pinion J, which operates the rollers E and F, is smaller in diameter than the pinion N, which operates the rollers H and G, and consequently that the two upper rollers E and F move somewhat more slowly than the two lower rollers G and H. The object of this difference in the speed of the said rollers will be rendered apparent hereinafter.

The four rollers E, F, G, and H are clothed with angle-wire card, the points of the wires of the different rollers projecting in the different directions illustrated in Fig. 3, in which the fabric to be operated on is represented by the line *x*. By turning the driving-shaft D the fabric is caused to pass from below over the card-roller F, under and partially round the plain roller Q in contact with the wires of the card-roller H, thence over the card-roller E, downward to the plain roller R, partially round the latter in contact with the card-rollers G, over the plain rollers S in contact with the card-roller T, under the plain roller U, over the plain roller V, and down to a frame *b*, Fig. 1, of inclined slats, from whence it passes up the inclined plane *c*, and thence over and in contact with the same system of rollers as before, the opposite ends of the fabric being temporarily stitched together, so as to form an endless apron. It should be understood that the journals of these plain rollers Q, R, S, and V are at liberty to turn freely in the opposite side frames, and that the roller U is furnished with a pulley driven by a belt from a pulley on the driving-shaft.

The fabric passes loosely and unrestrained over the card-roller F, and the points of the wires have but little tendency to penetrate the body of the fabric in the first instance, inasmuch as the fabric itself traverses at the same speed as the circumference of the roller. As the fabric gradually approaches the point 2, however, there is a tension exerted on it in the direction of the arrow, this tension being caused by the peculiar position of the plain roller Q and the excess of the speed of the card-roller H over that of the roller F. The tension causes the points of the wires of the latter roller to gradually penetrate the fabric

as it approaches the point 2. When the fabric arrives at this point, it is drawn abruptly away from the points of the wires, which, adhering to the fibers of the fabric, will draw out the loose ends of the same or break the fibers and draw out the two broken ends from the body of the fabric, in either case raising the desired nap. As the fabric passes from the plain roller Q to the card-roller E, it is brought in contact with and bent partially over the card-roller H, and as the latter roller moves faster than the rollers E and F it will be evident that the fabric between the roller Q and the roller H will be drawn perfectly tight, while the fabric between the latter roller and the roller E will be slightly slack. It will also be evident that the fabric by being thus tightened between the rollers Q and H will be pressed against the latter roller, causing the points of the wires to penetrate the fabric, the fibers of which will adhere to the said wires until the point 3 is reached, the fabric, by its slackness between the two card-rollers E and H, allowing the wires of the latter to draw the fabric to the curved position represented in the drawings, so that the points of the wires releasing themselves will raise the nap in a position nearly at right angles to the body of the fabric. The card-roller G acts on the fabric between the rollers S and R with precisely the same result as that accomplished by the roller H on the fabric between the rollers E and Q. As the fabric passes from the roller S to the roller U, it is acted upon by the card-roller T, which is caused to revolve in the direction of the arrow by a belt or any suitable system of gearing and serves the purpose of a brush to lay the nap. When the nap is required to stand up at right angles to the fabric, this brushing-roller is dispensed with.

It will be observed that as the endless fabric is submitted to the above-described system of plain and card rollers an alternate slackening and tightening takes place. It must be understood, however, that the fabric passes to-

ward and from the system of rollers at a uniform speed, the above-described tightening having the effect of temporarily stretching the fabric at a particular point, the portion thus stretched recoiling or contracting when the slackening takes place.

A more thorough understanding of my process will be attained by referring to the enlarged diagram, Fig. 5, which illustrates the principles of my invention without reference to any peculiar arrangement or manner of gearing the rollers. The fabric approaches the card-roller 4 in a slack state; but after passing a short distance in contact with the circumference of that roller it is drawn tight by the action of the roller 5, which moves faster than the roller 4, so that the fabric is pressed tight onto or against the points of the wires which penetrate the fabric. When the latter leaves the circumference of the roller, therefore, the teeth must draw out the nap, as before described. In the meantime by the same tightness of the fabric between the rollers and by the excess of the speed of the roller 5 the fabric is pressed tight onto the latter with precisely the same result as regards the raising of the nap.

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

As an improvement on the aforesaid patent of James Shaw, raising a nap on textile fabrics by means of two or more card-rollers, the latter being caused to revolve at such a speed and the fabric being so guided by plain rollers that an alternate slackening and tightening of the said fabric will take place, thereby causing the wires of the rollers to penetrate the fibers and effectually raise the desired nap.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT KERSHAW.

Witnesses:

HENRY HOWSON,
J. R. CUMING.