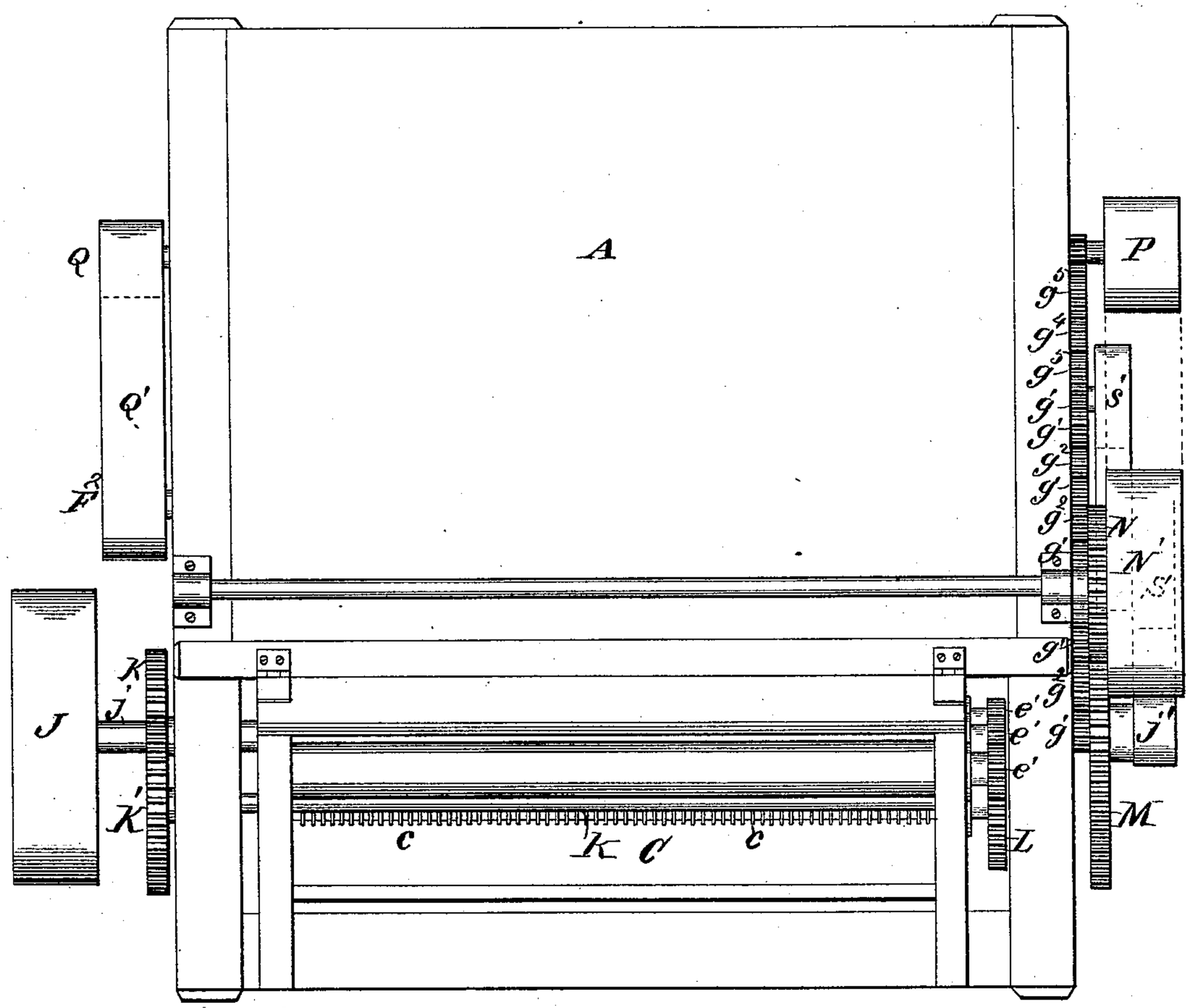
(No Model.) 3 Sheets—Sheet 1.

W. L. CROWSON.

COTTON GIN.

No. 255,943. Patented Apr. 4, 1882.

Fig. 1



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W. L. CROWSON.

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Fig. 2.

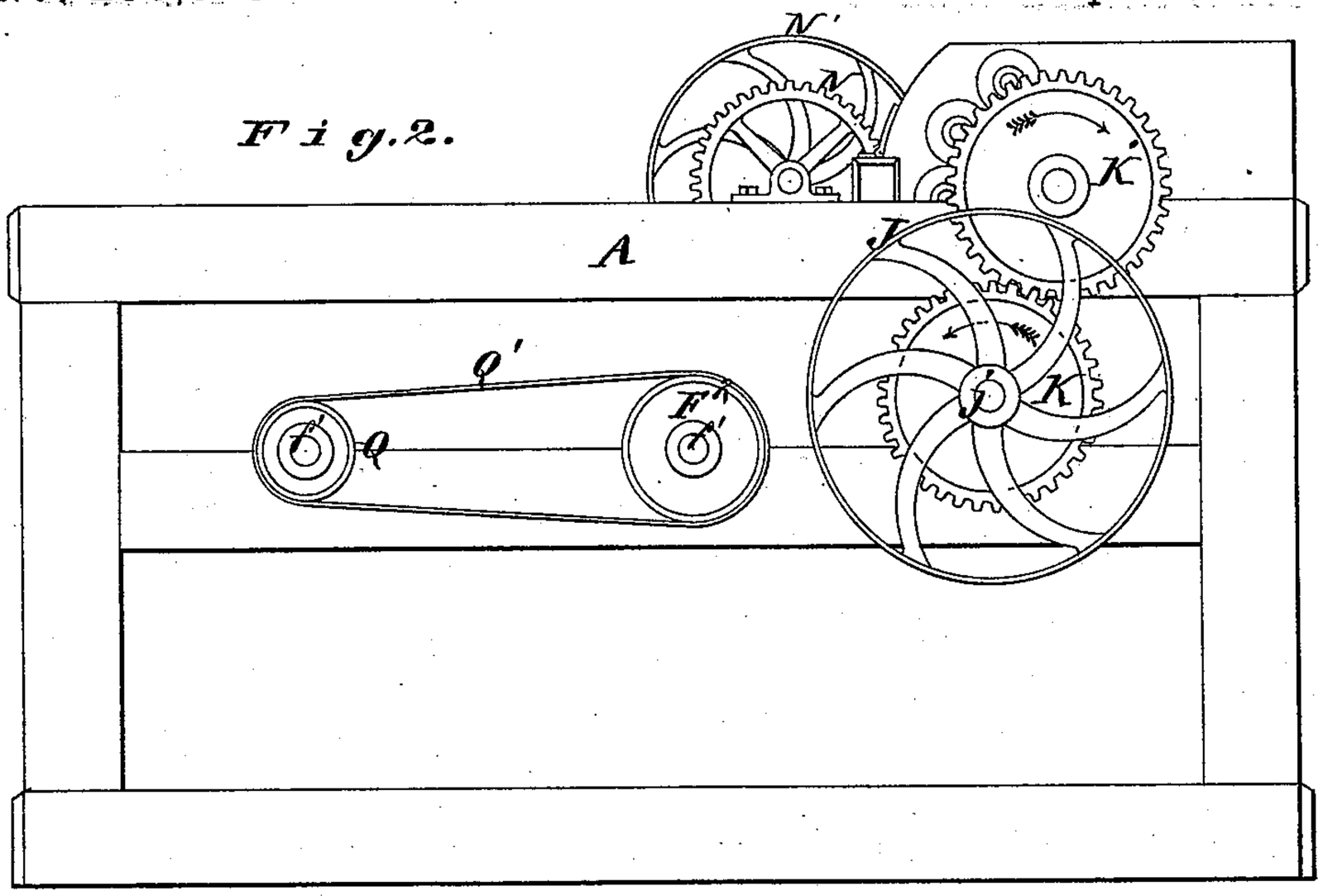
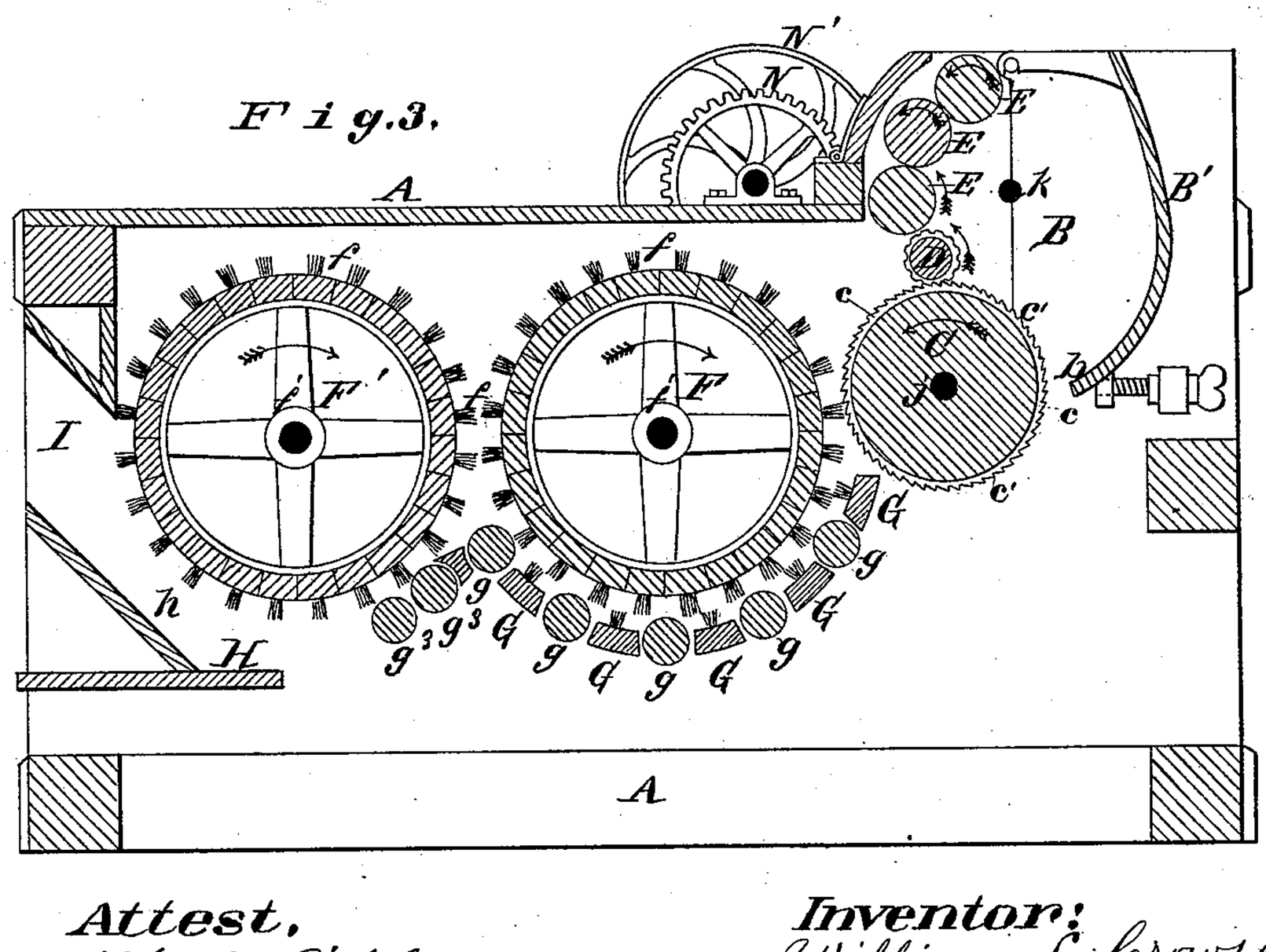


Fig. 3.



Attest.
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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

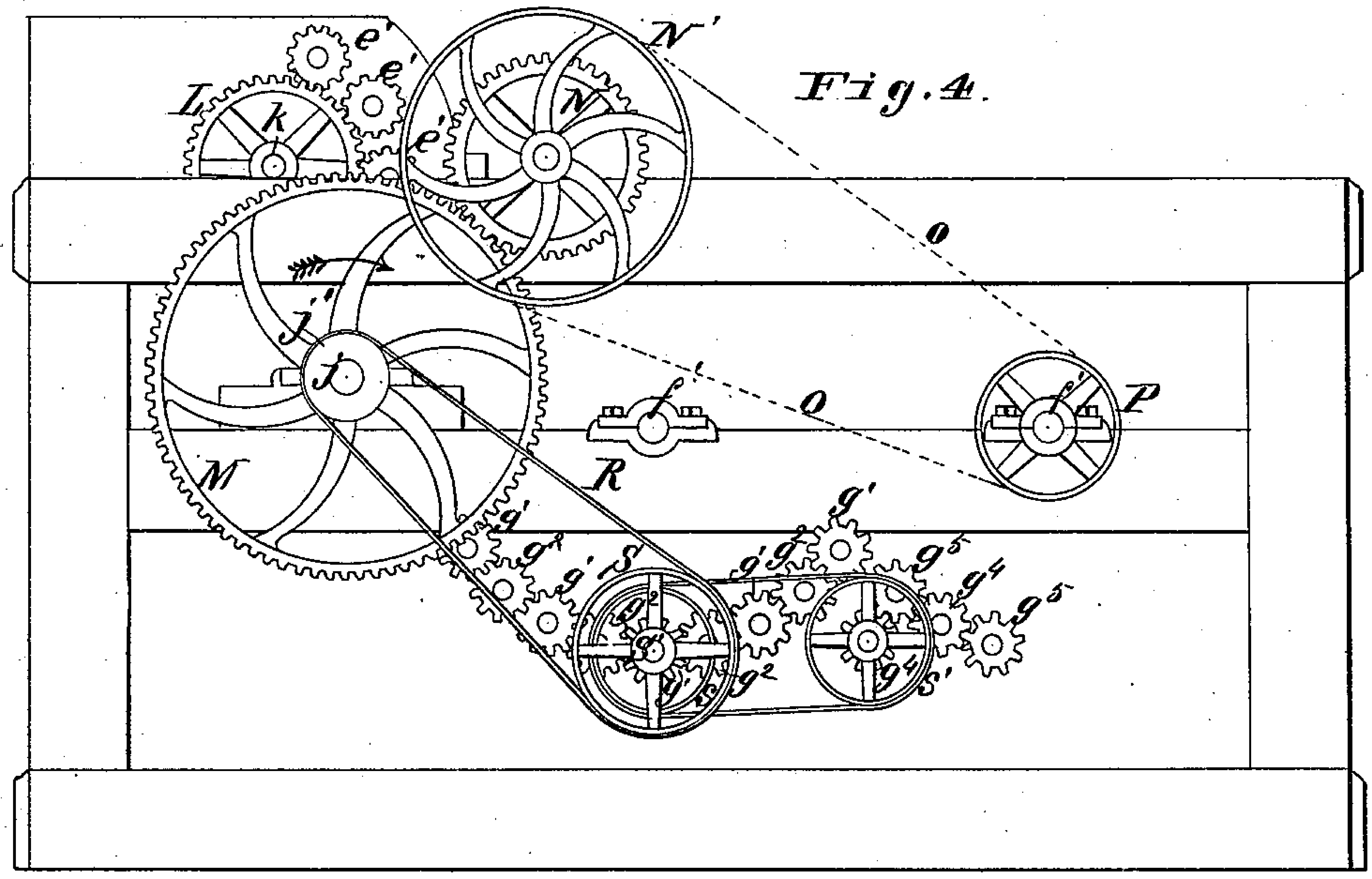


Fig. 5.

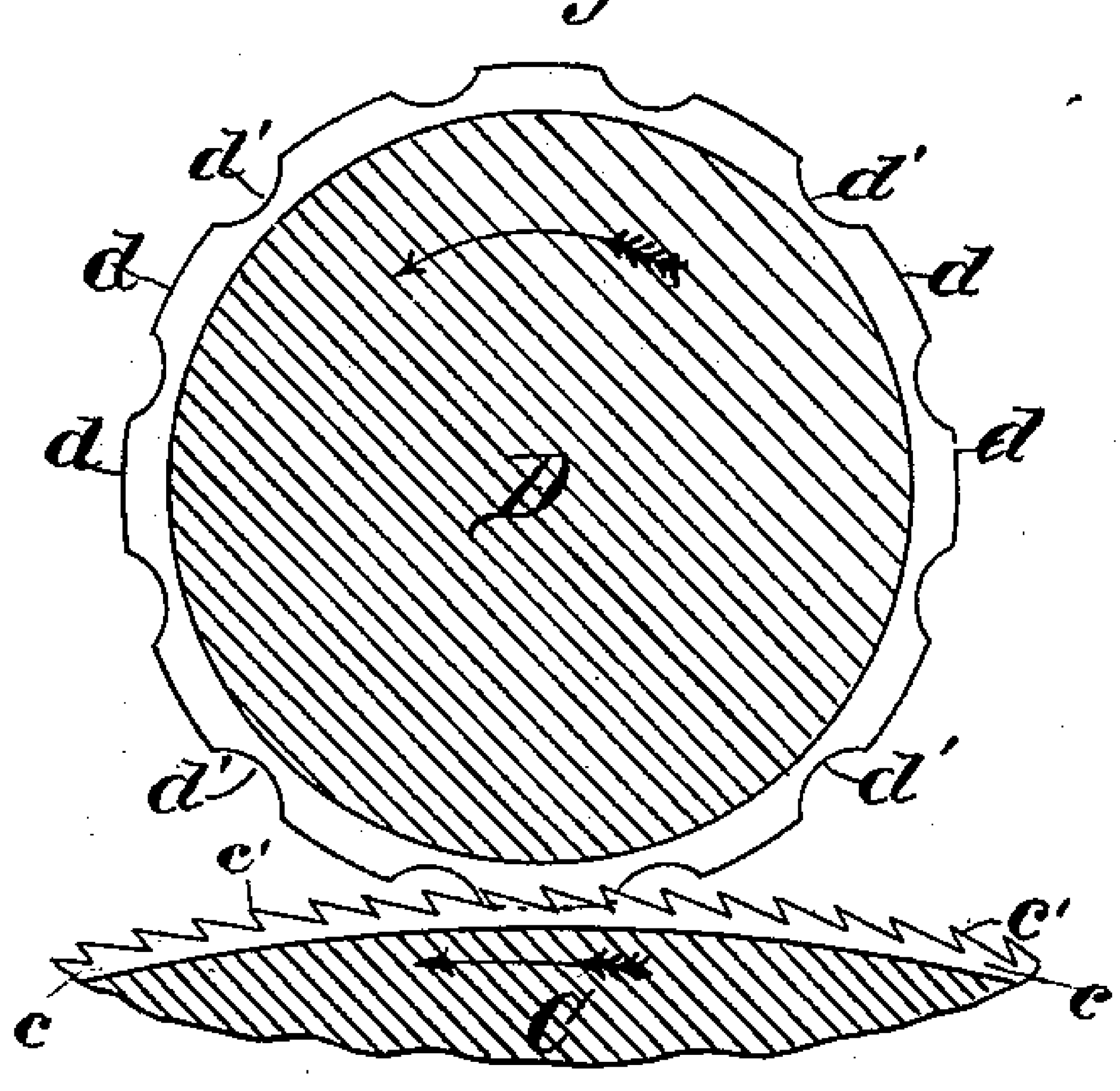


Fig. 6.

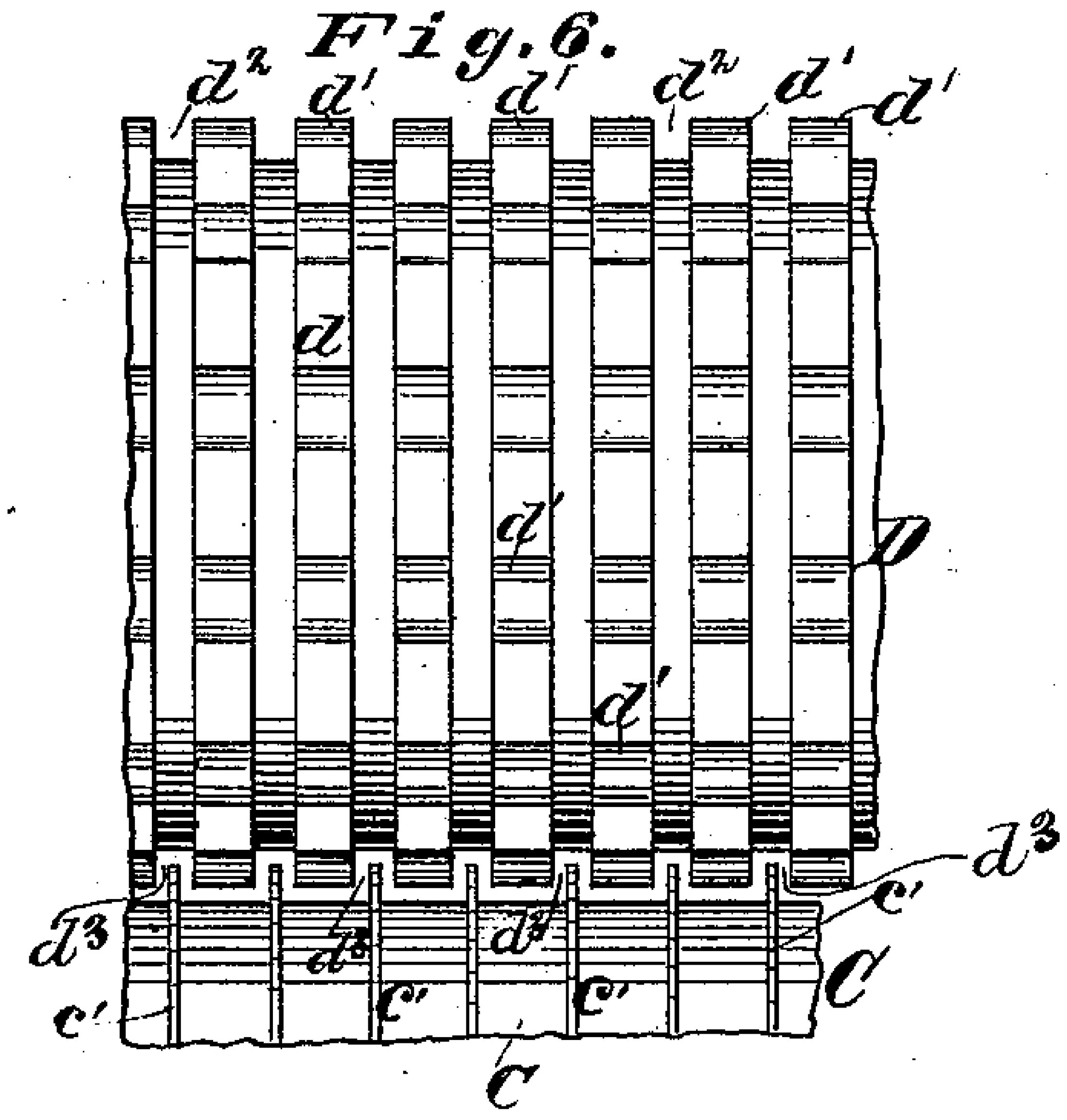
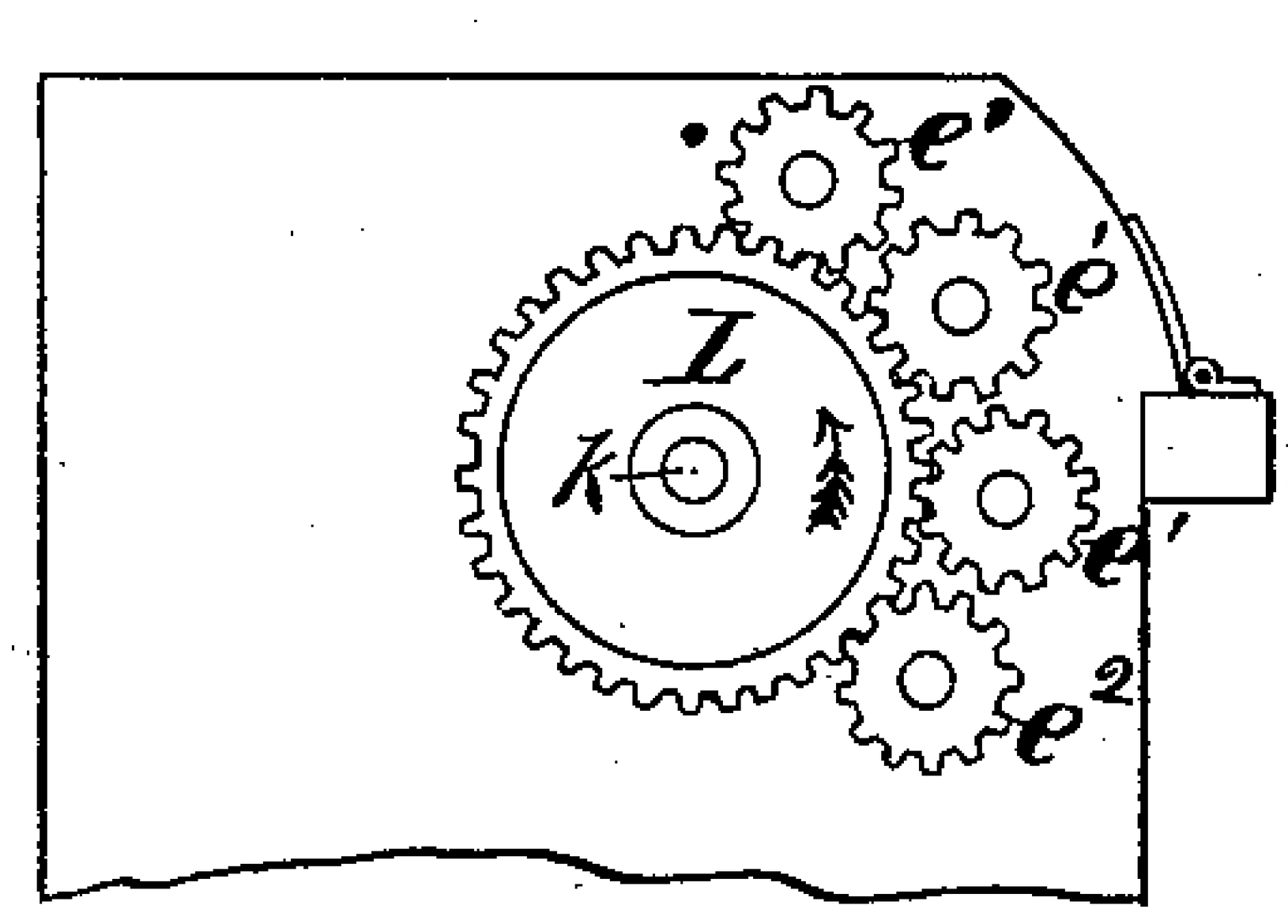


Fig. 7.



Attest:
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UNITED STATES PATENT OFFICE.

WILLIAM L. CROWSON, OF ST. LOUIS, MISSOURI.

COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 255,943, dated April 4, 1882.

Application filed June 23, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. CROWSON, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Cotton-Gins, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to produce a cotton-gin which will gin the cotton more rapidly and at the same time make a smoother and better sample, a better grade of cotton for the market, and an article better fitted for the spinner than other cotton-gins in use. The great advantage of the saw in separating the cotton-seed from the cotton fiber is the rapidity with which it does the work, and the introduction of the saw-gin by Eli Whitney about the beginning of this century marked a new era in the production of cotton and the manufacture of cotton fabrics. The Whitney gin has undergone many changes in form and construction, but the same primary principles remain with the machine in all its changes, and the objections that were urged against the first gins manufactured of that kind have been but slightly modified in relation to the most improved cotton-gins of the present day. The strongest objection urged against the saw-gin from its first introduction is that it breaks and injures the fiber, and the extent of such damage cannot be discovered with any accuracy until the cotton passes into the hands of the spinners and is by them subjected to their cleaning and opening processes. Now, in my new gin I greatly increase the speed of the work by increasing the number of saws in a given space, gaining two hundred and fifty per cent., or, if desired, three hundred per cent., and by dispensing with the gin-ribs and permitting only the teeth of the saws to enter the grooves in a grooved cylinder incur no danger of breaking the fiber, even though the gin be run at an unusually high rate of speed. The cotton removed from the seeds passes between the peripheries of the ribs, the periphery of the saw-cylinder, and the sides of the saws in channels of ⊔ form.

Though I illustrate this gin in my drawings with two brushes and a cleaning apparatus, consisting of alternate moving rollers and stationary brush-sticks, these are are not indispensable appendages, though they serve a good purpose. The gin may be built with a single brush and the ordinary moting arrangements of other gins.

In the drawings, Figure 1 is a top view of the new cotton-gin, showing the relative position of the pulleys and gearing necessary to run it. Figs. 2 and 4 are side elevations, showing more in detail the banding and gearing of the gin. Fig. 3 is a longitudinal section taken in a vertical plane through the center of the gin, showing the relative position of the saw-cylinder, fluted roller, brushes, and also the moting and cleaning apparatus beneath them. Fig. 5 is a detail vertical section of the fluted roller and a portion of the gin-saw. Fig. 6 is a front view of the grooved and fluted roller as it stands above the saw-cylinder. Fig. 7 is designed to show the gearing (partly hidden in Fig. 4) by which the fluted and grooved roller and other rollers forming a part of the cotton-box are run.

A is the frame of the gin.

B is the cotton-box.

C is the saw-cylinder; *c c*, the bodies of the saws or saw-strips, and *c′ c′* the saw-teeth.

D is a roller that takes the place of the gin-ribs of an ordinary gin of the Whitney type. This I call a "fluted grooved roller," because it has a number of circumferential ribs *d*, with recesses *d′*, forming flutes. Between the ribs *d* are circumferential grooves d^2, in which the teeth *c′* of the saws work, said grooves being too narrow to allow the passage of the cotton-seeds.

E E E are rollers above the grooved fluted roller, assisting the rotation of the roll of cotton in the box B.

B′ is the adjustable seed-board.

b is the aperture for the escape of seed.

F is the brush-cylinder which removes the lint from the saw-teeth.

G G are brush-sticks carrying fixed brushes, and arranged in a series concentric, or nearly so, with the brush-cylinder, and serving, with the rollers *g g* between them, to support the lint.

F′ is a second brush-cylinder, which takes the lint from cylinder F.

g g are rollers, which press the lint against the cylinder F.

H is the mote-board, movable beneath the inclined board *h*.

I is the gin-flue leading to the condenser or lint-room.

The distinctive features of this gin will be seen in Figs. 5 and 6. In Fig. 5 is shown a sectional view of the fluted and grooved roller D as it stands above the saw-cylinder C. The rotation of the saw is in the direction of the points of the saw-teeth, while the adjacent surface of the grooved roller moves in the other direction. (See arrows.) The action of the roller is to force the cotton, while the seed is attached to it, back, or rather lift such of it as is not separated from the seed from the saws, and allowing such lint as becomes detached from the seed to pass through between the ribs *d* and periphery of the saw-cylinder in the ⊔-formed channel bounded by the sides of the saws and the ribs, as seen in Fig. 6.

By reference to Fig. 6 it will be observed that there is a small space, d^2, between the ribs *d* of the grooved roller, which space, while it allows the passage of the lint, is not large enough to allow the passage of a cotton-seed or any large substance. Hence by the movement of this roller the cotton-seeds, hulls, sticks, or any heavy or bulky substances are thrown back, while the cotton fiber alone can pass through.

By reference to the sectional view, Fig. 3, the whole operation will be more easily understood. The seed-cotton is dropped into the cotton-box B on the saw-cylinder C, where a portion of the fiber is caught by the saw-teeth *c*, which move in the direction of the arrow, bringing the whole bulk to the fluted and grooved roller D. This roller lifts the cotton that is still attached to the seed from the saws, which, when there is sufficient cotton in the box B to form a roll, is still further carried up by the rollers E E E, when it falls forward on the front of the cotton-breast B′, and again down to the saws, forming a continuous roll. When the seeds are thoroughly cleaned of lint they drop out of the box through aperture *b*, over the points of the saw-teeth *c* in front of the saw-cylinder. The swinging breast or seed-board B′ (in front) is made adjustable, so that sufficient space *b* can be left to allow the seeds to be freely discharged when cleaned of lint. The lint, as it is detached by the action of the saws and grooved roller, is taken by the brush-cylinder F from the saws, and is carried over the brush-points of the brush-sticks G G, &c., which are so arranged that the brush F will barely miss them in its rotary motion. The rollers *g g*, &c., whose surfaces move in the same direction as the brushes upon the cylinder F, are raised slightly above the level of the brushes on the sticks G, so that the points of the brushes on cylinder F will lightly touch them in revolving, thus serving to beat the dust, trash, and motes out of the lint, and the movement of the rollers carries the motes, &c., out through the spaces between the brush-sticks and the rollers under the gin-stand, while the brush-points, when any heavy or large locks are passing, will serve to comb them out and greatly assist in straightening the fiber. Brush F′ rotates at a higher speed than brush F, and serves to take the ginned cotton fiber from brush F, and should be made of stiffer bristles, or more of them should be used. This brush, after whipping the cotton over moving rollers g^3 g^3, passes it over the movable mote-board H, which can be moved under the board *h* until there is sufficient space exposed between the roller g^3 and the board H to allow any motes that may be left in the cotton to escape at this point, while the cotton is discharged into the lint-room or condenser through the gin-flue I.

The driving mechanism is as follows: The large band-wheel J on the shaft *j* (see Fig. 2) drives the whole machine, and the gear-wheel K, attached to the same shaft, drives the gear-wheel K′ above it. This upper gear moves a shaft, *k*, which, by reference to Fig. 4, it will be seen carries a gear-wheel, L, which conveys motion to the pinions e' e' e', which are on the shafts of rollers E E E, and by reference to Fig. 7 (where the same is more fully shown) it will also be seen that it (L) conveys motion to pinion e^2, Fig. 7, which actuates the fluted and grooved roller D. The saw-shaft *j* also carries a spur-wheel, M, which engages a pinion, N, upon a shaft carrying a belt-pulley, N′, connected by a belt (see dotted line at O) with a pulley, P, upon the shaft of brush-wheel F′. The shaft of the brush-wheel F′ carries a belt-pulley, Q, (see Fig. 2,) connected by a belt, Q′, with a pulley, F^2, upon the shaft of the brush-cylinder F. The pulley F^2 has a diameter greater than pulley Q, so that the rotation of the brush-cylinder F′ will be faster than the cylinder F, so that the cylinder F′ will remove the cotton from the other cylinder. The shaft *j* carries a pulley, *j′*, (see Fig. 4,) connected by a belt, R, with a pulley, S, upon a shaft, S″, carrying a spur-wheel, *g′*, upon one of the rollers *g*. The spur-wheel *g′* engages with two idler spur-wheels, g^2, which in turn engage with other spur-wheels *g′* upon other rollers *g*. Other idler-wheels g^2 communicate motion to other spur-wheels *g′* of the upper pair of rollers, *g*. The rollers g^3, running beneath the brush-cylinder F′, are turned by a train of spur-gearing, g^4 g^4 g^5 g^5, actuated by a belt extending from a pulley, *s*, on shaft S′ to a pulley, *s′*, on the shaft of one of the spur-wheels g^4. g^5 g^5 are spur-wheels on the rollers g^3 g^3.

I am aware that circumferentially-grooved rollers have been used in connection with ribbed breasts and saw-cylinders. Such ribbed cylinders and grooved rollers I do not therefore claim broadly.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the saw-cylinder C, having saws *c c′*, and the retarding-cylinder D,

having circumferential grooves d^2, forming ribs d, the retarding-cylinder being mounted to receive only the teeth c' in its grooves, leaving spaces d^3 on each side of the teeth c' and the bodies c of the saws, and the periphery of the saw-cylinder forming ⊔-shaped channels in connection with the ribs through which the cotton is drawn while the seeds are kept from passing, as set forth.

2. The saw-cylinder C, having saws c c', and retarding-cylinder D, having circumferential grooves d^2, forming ribs d, provided with small recesses d', the said cylinders being so arranged that the teeth only of the saws can work within the grooves, and thus provide ⊔-formed channels for the cotton removed from the seeds to pass through, as set forth.

3. The combination of the saw-cylinder C, brush-cylinder F, fixed brush-strips G, and rollers g, substantially as set forth.

4. The combination, with the brush-cylinder F, fixed brush-strips G, and rollers g, of the additional cylinder, F′, and moving rollers g^3 g^3, the said additional cylinder being provided with means for giving it faster rotation than the first brush-cylinder, as set forth.

WILLIAM L. CROWSON.

Witnesses:
SAML. KNIGHT,
GEO. H. KNIGHT.