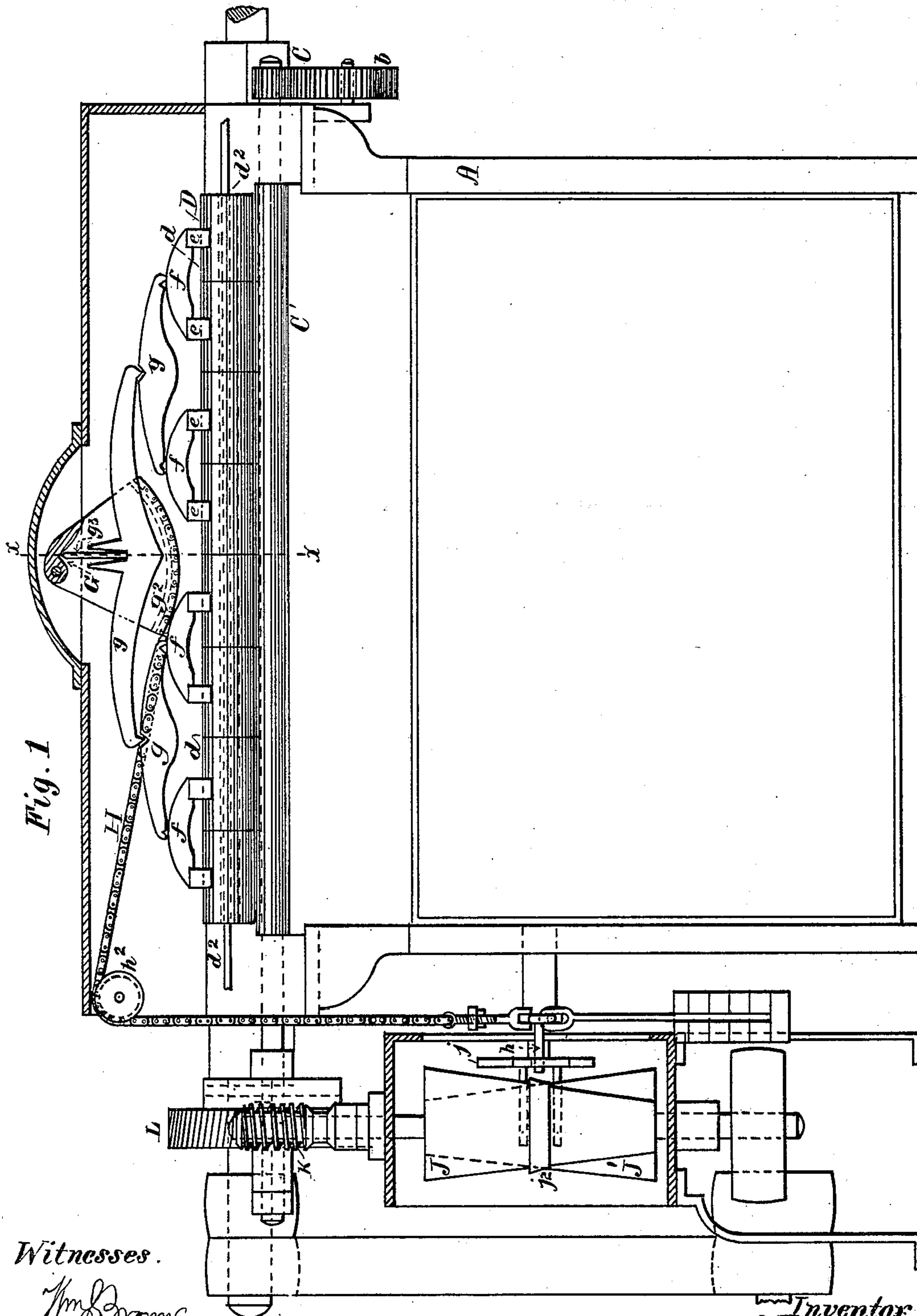


3 Sheets—Sheet 1.

No. 245,609.

Patented Aug. 16, 1881.



Witnesses.

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(No Model.)

3 Sheets—Sheet 2.

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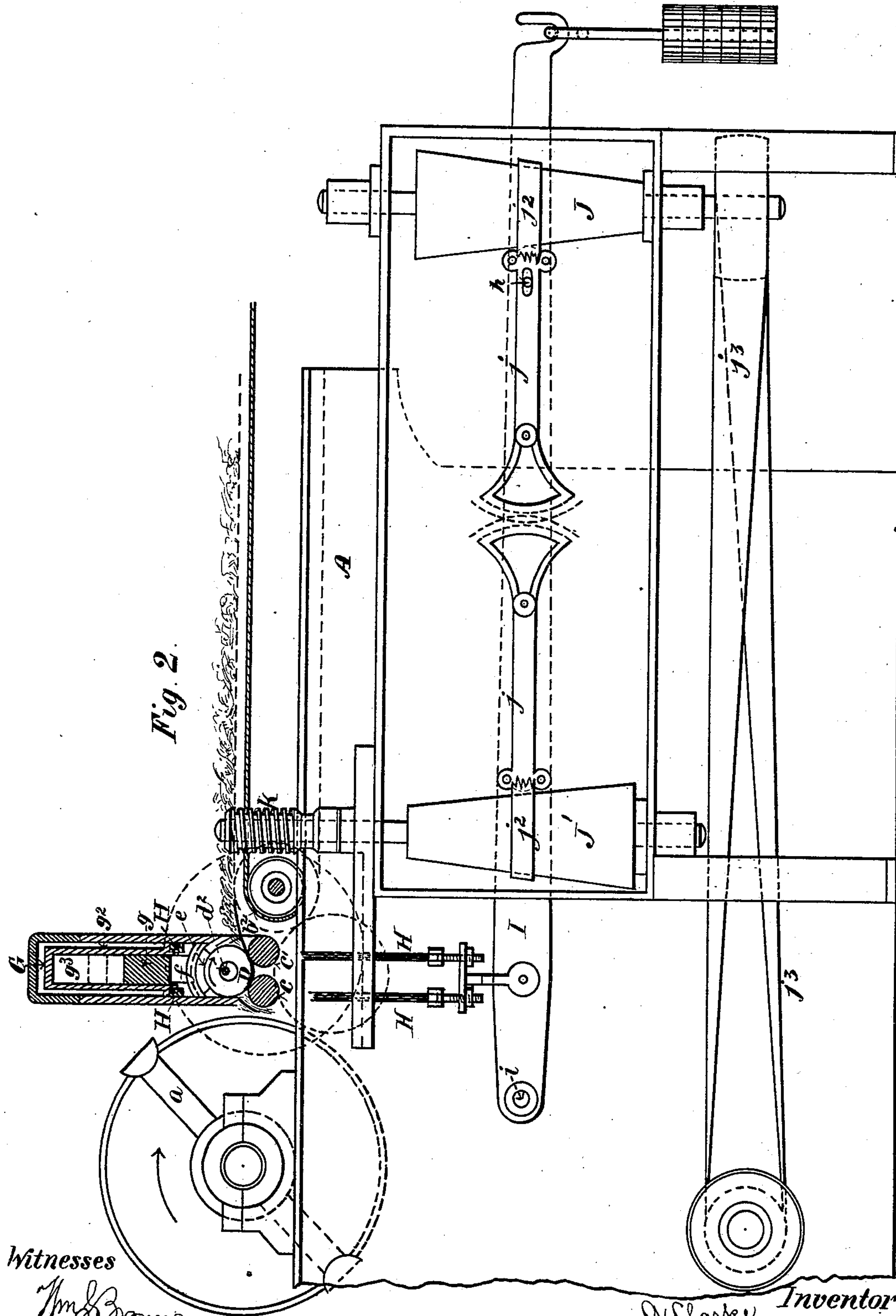


Fig. 2.

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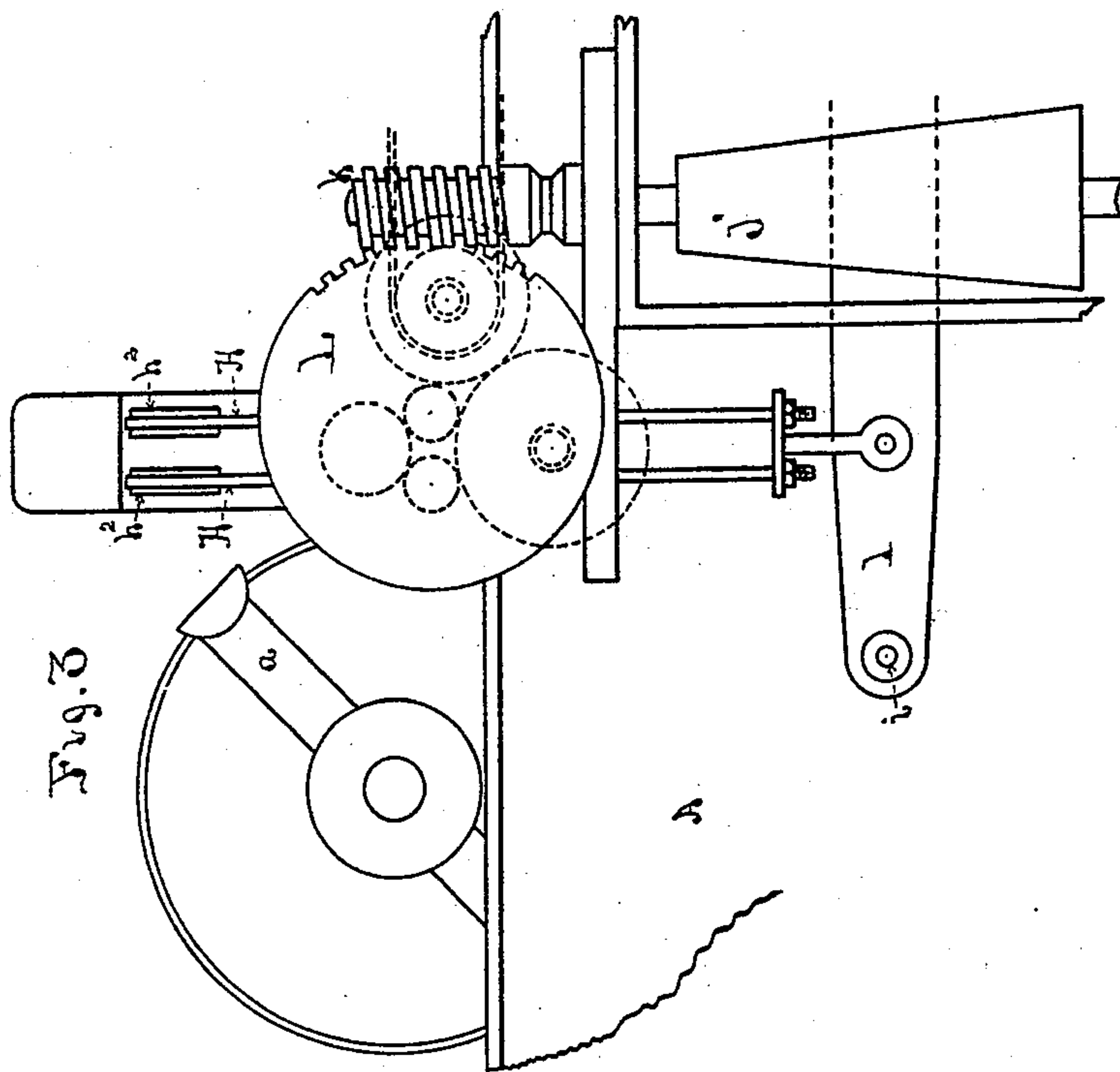
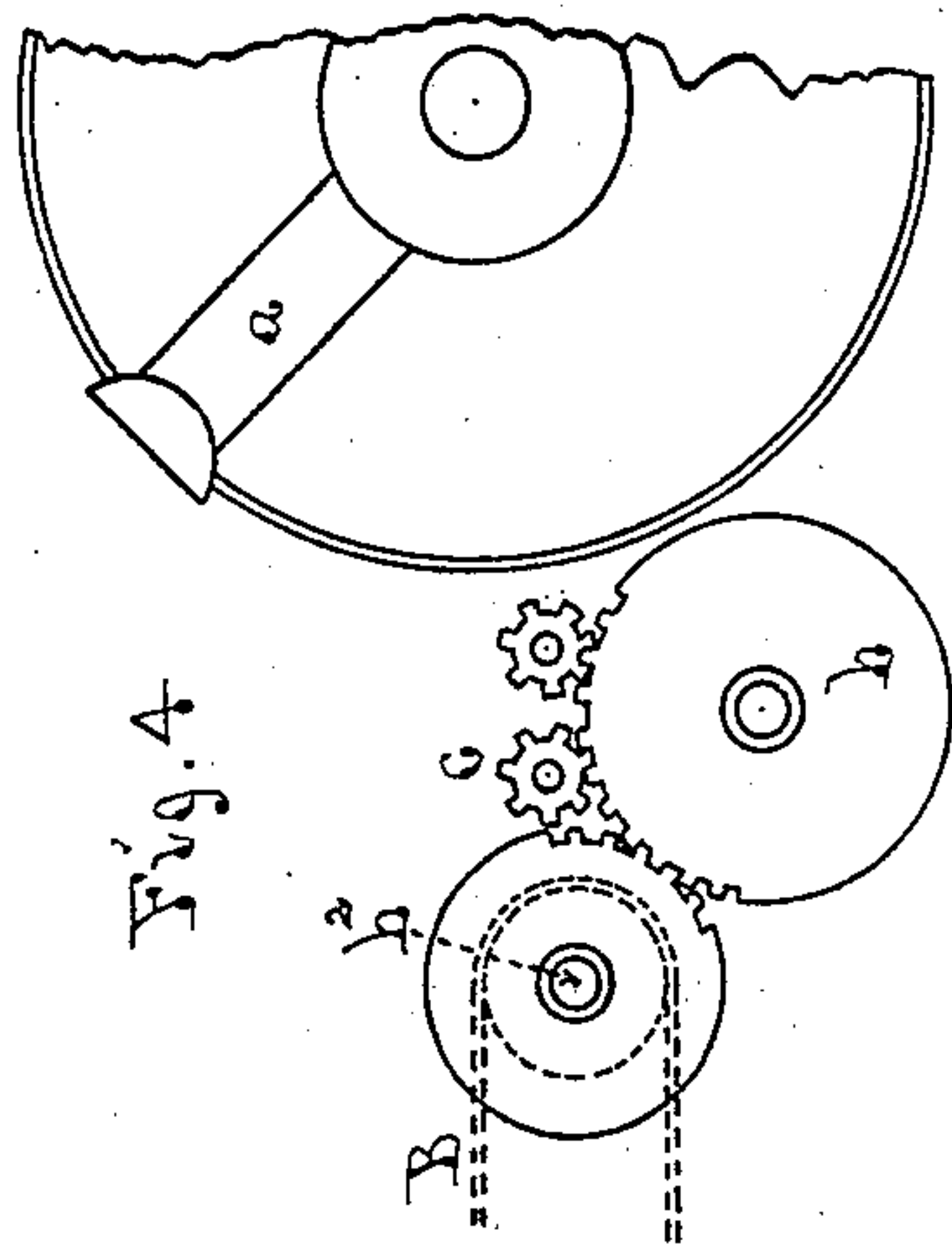
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UNITED STATES PATENT OFFICE.

ALFRED CLARKE AND HAVEN C. PERHAM, OF LOWELL, MASSACHUSETTS.

COTTON-OPENER.

SPECIFICATION forming part of Letters Patent No. 245,609, dated August 16, 1881.

Application filed March 16, 1881. (No model.)

To all whom it may concern:

Be it known that we, ALFRED CLARKE and HAVEN C. PERHAM, both of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Cotton-Openers, of which the following is a specification.

Our invention relates to machines designed to take the cotton received in bunches or masses and open them out to form a lap therefrom.

The objects of our improvement are to provide a mechanism which will deliver to the beater of such machine a regular quantity of fiber; to provide an evener mechanism which shall have its operative parts above the feed-rolls to prevent their clogging with dirt, sand, or other foreign matter which may be conveyed to the machine among the fibers of the cotton; to provide an evening mechanism in which the inequalities in the sheet of cotton fed to the machine will change the speed with which the sheet or lap is fed to the beater without having to draw the cotton-fibers under pressure over any stationary surface. We accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation and partly in section of a cotton-opener with our improvements thereon, the feed-apron and its driving-roll being removed. Fig. 2 is a side elevation, with the feed-rolls, case, and working parts shown in section on line *x x* of Fig. 1. Fig. 3 is a side elevation, showing the connection between the speed-changing mechanism and the feed-roll. Fig. 4 is a detail, showing the connection between the feed-roll and feed-apron.

A is the frame of the machine.

a is the beater, rotating in the direction indicated by the arrow and driven by a belt from any convenient counter-shaft.

B is an endless apron, on which the cotton to be fed to the beater is placed.

b is an idler-gear, placed on a stud which engages with pinions on the ends of the lower feed-rolls and one on the end of the apron-roll shaft *b*², which is indicated by a dotted line on Fig. 2.

c c' are the lower feed-rolls, rotating both in the same direction and at the same surface speed, one of them having upon its shaft the

pinion C, which drives the idler *b*, which engages with and drives both the gear-wheel upon the apron-roll shaft and the gear-wheel upon the other feed-roll, *c*.

D is the upper feed-roll, which consists of a number of separate sections, *d d d*, which lie upon the lower feed-rolls. These separate sections are all placed upon the shaft *d*², which is made much smaller than the openings through the sections, and the shaft is so located in the machine that when the operative parts are in position the sections do not touch it, and will be permitted to rise considerably before being brought into contact with it; but if from the passage of some extraordinarily large mass of cotton the sections or any one of them is lifted above the level of the tops of the lower feed-rolls, such section or sections will not be liable to be thrown over the lower feed-rolls and displaced, being limited in their movement by the shaft *d*². The shaft *d*² may be placed central in the openings in the sections and be surrounded by some elastic material, if found desirable, and in some cases might without injury to the machine be altogether omitted. The upper feed-roll is held in position above the lower feed-roll by the saddles *e e e*. These saddles are connected together in pairs by the connecting-bars *f f*, which are each borne upon by one of the evener-levers *g g*, which in turn are borne upon by the quadrant-lever G, which has attached to it two quadrants, *g*² *g*², to the outer arc of which are attached chains H H.

*g*³ is a steel post, placed between the upper lever *g* and the quadrant-lever G. The chains attached to the quadrants *g*² extend out over the pulley *h*² and down to a lever, I, which is pivoted at *i* to a stud projecting from the frame A. This lever has attached to its other and longer arm a weight, which causes the lever to quickly fall when permitted by the slackening of the chains. The lever I, through the pin *h*, operates the belt-shifting levers *j j*, which shift the belt *j*² upon the cones J J'. The cone J is driven by a belt, *j*³, from any convenient shaft, and the cone J' is driven by the cone J through the medium of the belt *j*². The cone J' has upon its projecting shaft the worm *k*, which engages with the worm-wheel L, placed upon the end of the shaft of one of the lower feed-

rolls. This worm-wheel is indicated by a dotted circle in Fig. 2. Instead, however, of having two lower feed-rolls between which and the upper sectioned feed-roll the cotton passes, there need be only one lower feed-roll, the other roll being placed above the sheet of cotton passing to the beater, and acting only as a rear supporting-roll; or the under roll can, if desired, be placed under the sectional roll, and the saddles which support the sectional top roll have their ends carried down before and behind the roll sufficiently to retain it in position. We prefer, however, the method illustrated, because, besides acting as a supporting-roll, the rear feed-roll, feeling the effect of any inequalities in the lap or sheet passing between the feed-rolls, begins to move the eveners-levers. When these inequalities have passed on so as to be felt by both the lower feed-rolls, the full movement will be given to the eveners mechanism, and thus less sudden change will be imparted to it than with a single feed-roll.

As the eveners-levers, quadrant, and connecting-chain and belt-shifting levers are so arranged that the belt will be shifted toward the smaller end of the driving-cone when any part of the eveners-levers are raised, the lower feed-rolls will, by any rising of the eveners-levers or any part thereof, be driven at a slower rate in consequence of such slower speed given to the cone J' , and as the eveners-levers bear upon the upper roll firmly through the saddles in contact with its several sections, any change in the thickness of the sheet passing between the upper and under rolls will act to immediately change the speed of the rolls, so that, when the feed-roll mechanism is adjusted to pass to the beater any given thickness of the sheet or lap of cotton, any change in that thickness will alter the speed with which it is fed to the beater, and thereby maintain a constant quantity.

To make the mechanism so that it may accommodate itself to inequalities in the lap or sheet being fed to the beater which do not extend its entire width—such as hard lumps or masses of unopened cotton—we make the upper feed-roll in sections, so that any lump or mass passing toward the beater will not raise the whole roll, and thereby release the cotton from their grasp the whole of their length and permit the beater-blades to act upon cotton not held by them. If with the sectional roll a lump passes between it and the lower roll, only that section with which the lump comes in contact rises, and the eveners-levers are affected in only the proportion that the length of that section bears to the length of the entire roll.

The roll D has its bore much larger than its shaft d^2 , and consequently its sections d d d are free to rise and fall independent of one another, thus allowing them to always hold all parts of the lap fed to the beater while it is being acted upon with equal pressure, regardless of its different thickness in its different

parts. The saddles extend over the top of the roll and down around it, so as to bear against its upper surface at points far enough down upon its sides to prevent it from mounting either of the lower feed-rolls and leaving its operative position with the ordinary and usual irregularities in the lap fed to the machine. The saddles are provided at their bearing-points with bearings of metalline or some anti-friction material; or friction-rollers may be substituted, if desired.

When a sheet or lap of cotton is fed by our device to the beater, it passes between the upper and under feed-rolls, all of which, being in rotation, can be compressed upon it very firmly, so that any change in the thickness of the passing sheet will be more quickly felt than in a machine in which the cotton passes between a plate or lever and a roll, because in such machine it cannot be so firmly compressed, and consequently when a slightly thicker portion of the lap passes it will be more easily compressed, so as to pass the feed-roll without actuating the speed-changing mechanism.

The evening-levers and sectional roll, being above the sheet of cotton, are not subject to become clogged and choked and their operative capacity lessened by the sand or dirt falling from the cotton operated upon in the machine, as is the case with all machines in which the eveners mechanism is placed below the cotton entering the machine.

As all the surfaces with which the cotton comes in contact while being held and fed to the beater move in the same direction as the cotton, much less power is required to operate the machine than when the cotton is drawn over a stationary plate or lever by a feed-roll.

What we claim as new and of our invention is—

1. The combination of a beater and the feed-roll c , whose speed is regulated by the action of the roll D upon a speed-changing mechanism, with the sectional roll D and such speed-changing mechanism, substantially as described.

2. The combination of the beater a and sectional feed-roll D with the two feed-rolls c c' , saddles e e , eveners-levers g , quadrant g^2 , and a connected speed-regulating mechanism by which the speed of the feed-rolls is regulated, substantially as described.

3. The combination of a sectional feed-roll and eveners-levers, placed above said feed-rolls and connected to a speed-changing mechanism, with a lower feed-roll, speed-changing mechanism, and beater, substantially as described.

4. The combination, with the beater a , of the feed-rolls c c' , sectional feed-roll D, the endless apron B, and mechanism by means of which the speed of the said apron and rolls are automatically changed by the movement of the sectional feed-roll D, substantially as set forth.

5. The combination of the sectional feed-roll

D and feed-rolls *c c'* with the beater *a* and a speed-regulating mechanism actuated by the sectional roll and operating the feed-roll, substantially as described.

5 6. The combination of the feed-roll *c*, shaft *d*², and sectional roll D, having an opening through it much larger than said shaft, with saddles *e e*, which bear upon the several sections of the roll D, a system of evening-le-

vers connected with said saddles, and a speed- 10 changing mechanism, substantially as described.

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