(No Model.) 3 Sheets—Sheet 1.

J. C. POTTER.

EVENING MECHANISM FOR COTTON OPENERS.

No. 377,329. Patented Jan. 31, 1888.

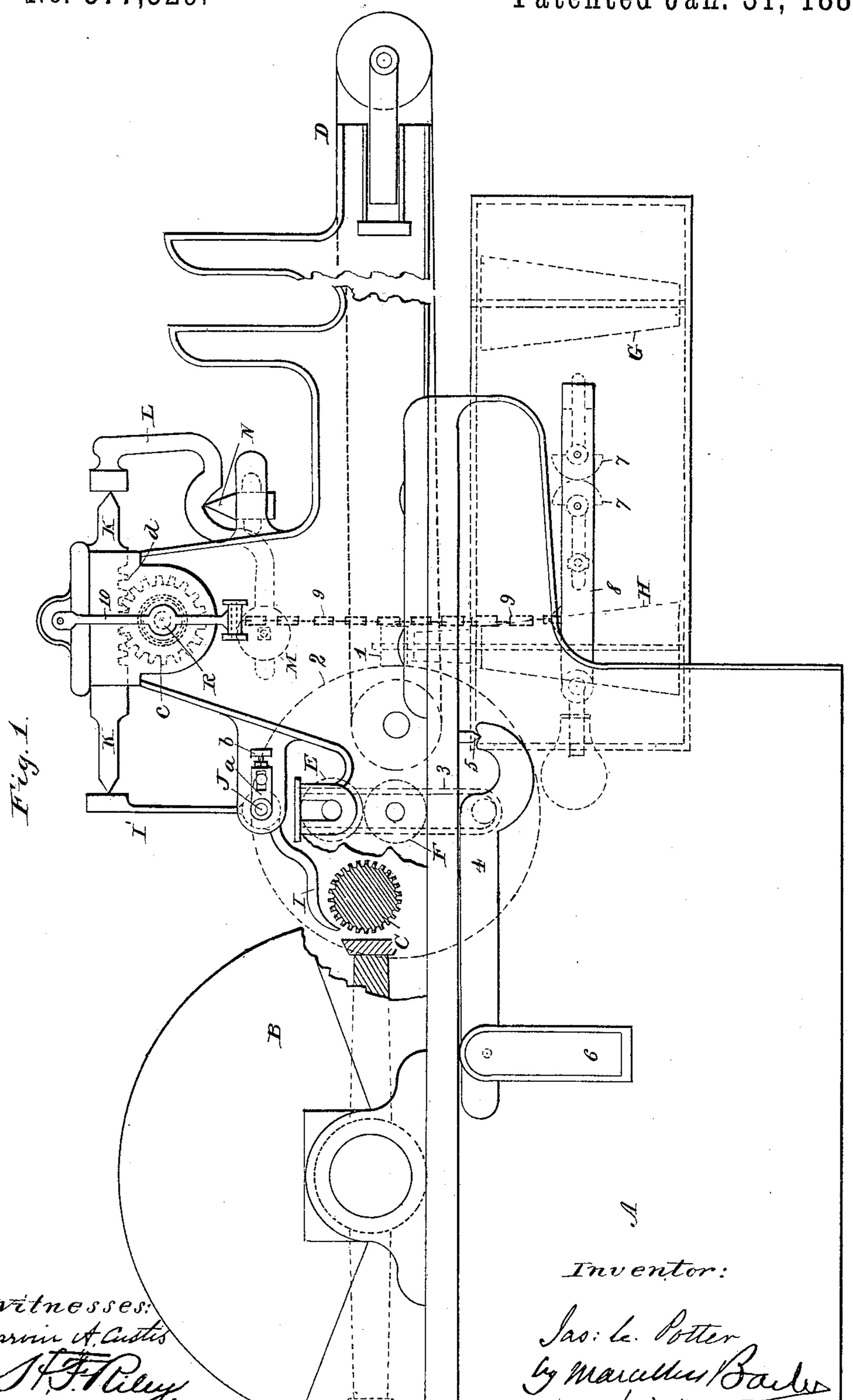

Fig. 1.

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Inventor:
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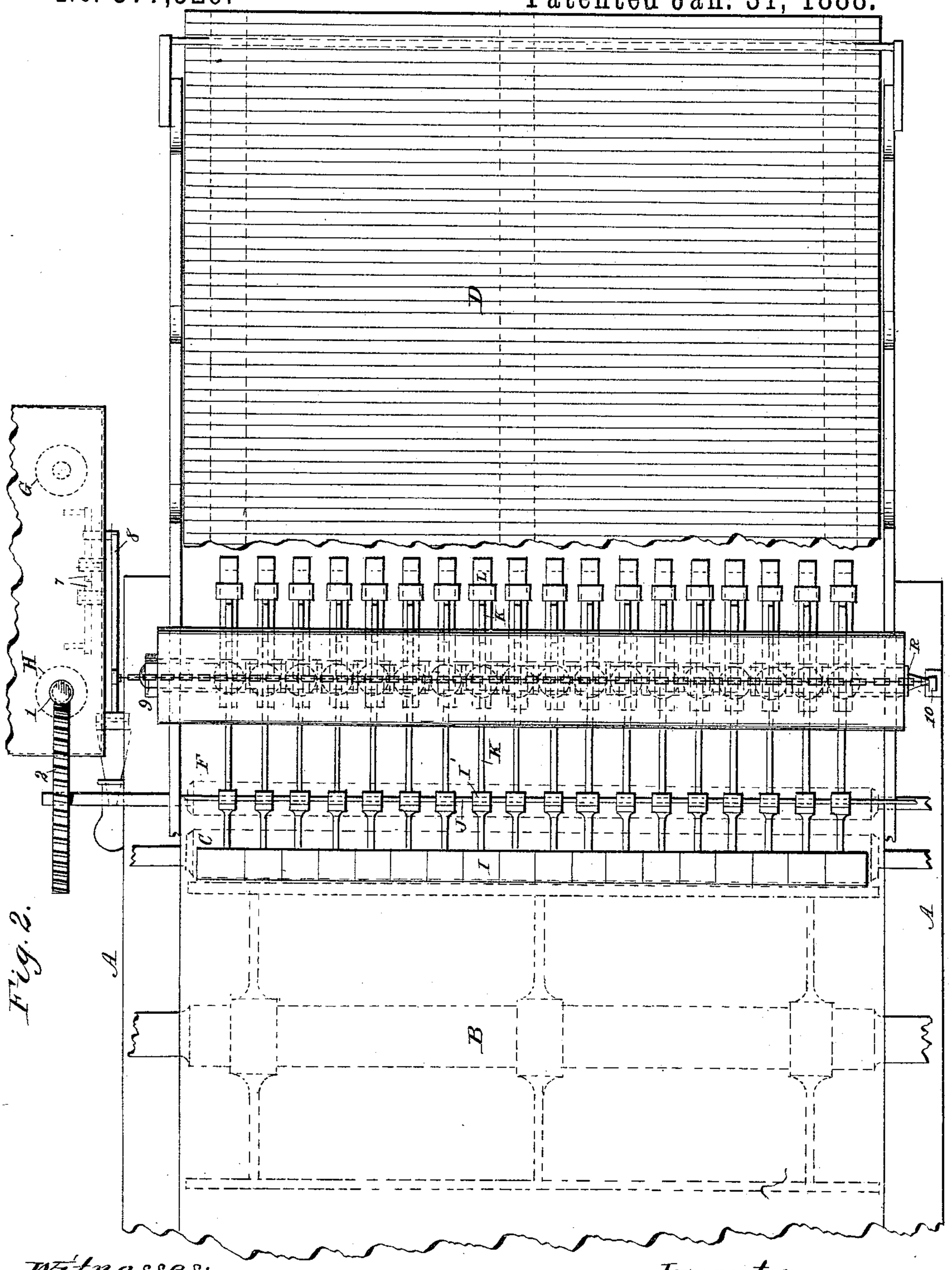

Fig. 2.

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Fig. 3.

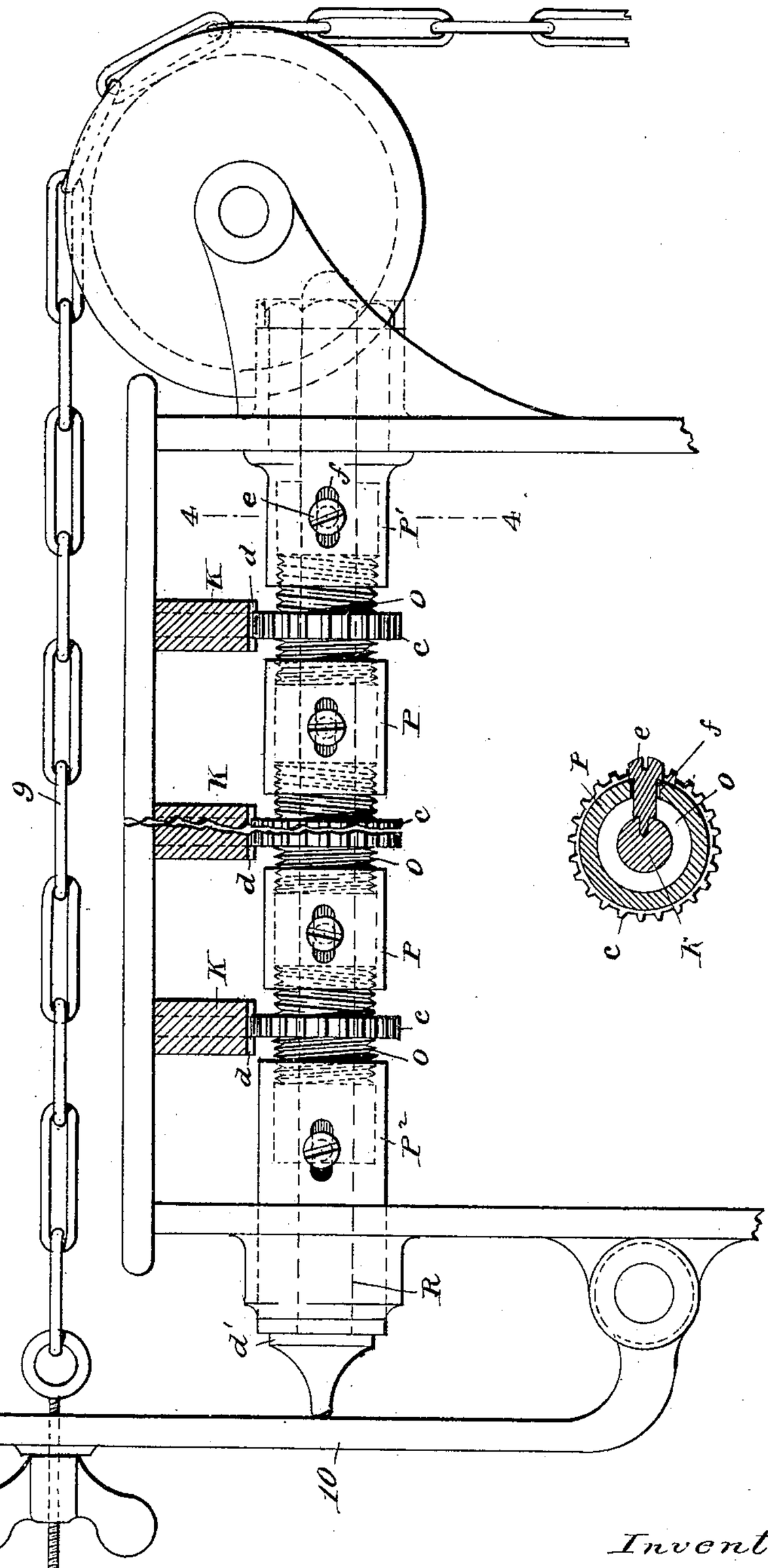

Fig. 4.

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Inventor:
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UNITED STATES PATENT OFFICE.

JAMES C. POTTER, OF LOWELL, MASSACHUSETTS.

EVENING MECHANISM FOR COTTON-OPENERS.

SPECIFICATION forming part of Letters Patent No. 377,329, dated January 31, 1888.

Application filed August 22, 1887. Serial No. 247,542. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. POTTER, of Lowell, in the State of Massachusetts, have invented new and useful Improvements in Evening Mechanism for Cotton-Openers and other Engines or Machines for Working Cotton and other Fibrous Materials, of which the following is a specification.

In the improved evening mechanism about to be described the scale-lever system heretofore usually employed is dispensed with. The evener-plates are individually and adjustably weighted, each independently of the others, and each evener-plate has its own individual and independent connection to the instrumentality (common to all the evener-plates) from which is transmitted the movement necessary to adjust the cone-belt upon its drums. The mechanism is rendered much more sensitive, and is so organized that it will respond more readily and quickly to any unevenness in the lap which passes between the evener-plates and the roll in connection with which they operate.

In my improved mechanism the evener-plates are placed above the evener-roll instead of below said roll, as has heretofore been the usual arrangement in practice. The advantage of thus placing the plates is that the cotton is held more firmly, and at the same time the jar and strain (due to the action of the revolving beater) to which the evener-plates are subjected when placed below the roll are entirely done away with.

I am aware that it is not new, broadly considered, to place the evener-plates above the roll. Such an arrangement is shown in Lord's English Patent No. 3,249, A. D. 1861; but in this patent the plates are formed as non-adjustably-weighted blocks which slide in a right line in a vertical plane. Aside from the fact that these plates or blocks lack the adjustable weighting which is indispensable in practical operation, their movement in a right line to and from the roll is materially objectionable on the score of preventing them from holding the cotton firmly. If, for instance, a thin layer of cotton is followed by a thicker layer, the blocks are raised by the cotton so as to allow the thinner portion in front to be drawn through without being successfully operated on by the beater. In my mechanism, however, the plates form part of pivoted levers which vibrate upon a horizontal axis, and the plates themselves are so formed and arranged that their front edges, which bite the cotton, are always nearer to the roll than the other portions of the plates, for which purpose I prefer to place the axis of vibration of the said evener-levers in a plane above the roll. Under this arrangement, while the evener-plates are relieved from all strain and jar such as would come upon them were they below the roll, it is impossible for the cotton to be drawn through by the beater in bunches.

I prefer to make the axis of vibration of the evener-levers adjustable to and from the evener-roll, for the purpose of varying the point on the roll at which the evener-plates shall bite the cotton, according to variations in the length of the staple to be worked. In some cases, however, practically only one length of staple may be worked, and in that case such adjustment would not be required.

The nature of my improvement and the manner in which the same is or may be carried into effect will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a broken side elevation of a cotton-opener (with some of the parts in section) embodying my invention in its preferred form, only so much of the machine being shown as required for the purpose of illustrating the invention. Fig. 2 is a broken plan of the same. In this figure the front portion of the feed-apron is broken away, the ends of the pivot-rod of the evener-levers are broken off, and the bearings of said rod, as well as of the fluted evener-roll, are removed. Fig. 3 is a front broken elevation on an enlarged scale of the device which engages the individual rack-bars of the evener-levers, and which transmits the motion thus obtained to the mechanism for shifting the cone-belt. The rack-bars are shown in section, and the central portion of the mechanism is broken away and removed. Fig. 4 is a cross-section on line 4 4, Fig. 3.

A is the frame of the machine.

B is the beater.

C is the fluted evener-roll.

D is the feed-apron.

Between the feed-apron and the evener-roll are the power-driven calender-rolls E F. These rolls are of value, in that they compress and

calender the fibrous material before it gets to the evener-roll, and thus put the material in a condition more favorable to the successful operation of the evener-levers. The feed-apron rolls, as well as the calender-rolls and the evener-roll, are driven from the cone-drum H. The latter drum receives its motion, as usual, from the cone-drum G through the medium of a belt, (not shown,) and said cone-drum G is driven from the beater shaft by pulleys and belting, which arrangement, being well known, requires no illustration. A worm, 1, on drum H drives a worm-gear, 2, fast on the shaft of lower calender-roll, F, and from the shaft of said roll F, by suitable gearing, (not needing illustration,) motion is imparted to the evener-roll and to the driving-roll of the feed-apron. The upper calender-roll, E, is journaled in vertically-movable boxes, each of which is weighted by means of a stirrup, 3, pinned to a lever, 4, fulcrumed on a knife-edge at 5, and weighted at 6. The position of the cone-drum belt is controlled, as usual, by shippers carried by the toothed quadrant-levers 7, (shown in dotted lines in Fig. 1,) which levers are operated by a pivoted lever, 8, whose movement is controlled by the chain 9 and lever 10. The movement of said lever 10 is due to mechanism which will presently be described.

Above the fluted evener-roll C are placed the evener-plates I. These plates form part of levers which are hung or pivoted on the cross-pivot rod J, and have their rear or upper ends, I′, in the path of horizontal sliding rack-bars K, supported in suitable bearings in the frame of the machine, and pressed forward at their rear ends by levers L, pivoted upon a knife-edge bar, N, and adjustably weighted at M, so as to press with more or less force upon their rack-bars, as desired. Each evener-lever has its own independent and separate rack-bar, K, and adjustably-weighted lever L.

The evener-plates are so formed and pivoted that (as indicated clearly in Fig. 1) their front edges, which bite the fibrous material, will, during the normal vibrations of the plates, be always nearest the fluted evener-roll. The object of this arrangement has been hereinbefore stated.

With a view to adjust the bite of the evener-plates, the pivot-rod J is supported at each end in a longitudinally-sliding box, *a*, adjustable by means of a hand-screw, *b*, or other known device suitable for the purpose. In this way the line on which the biting-edges of the evener-plates meet the evener-roll can be varied according to the length of staple operated on.

Just below the row of rack-bars K is a horizontal cross-shaft, which is longitudinally extensible and contractible. For this purpose it is composed of right and left screw-threaded tubular sections O, one for each rack-bar, connected by correspondingly internally-threaded tubular couplings, P, as seen more plainly by reference to Figs. 3 and 4. The coupling P at the right-hand end of Fig. 3, which I designate P′, is immovably fastened to the frame of the machine. The extreme coupling at the opposite or left-hand end in the same figure, designated P^2, is, on the contrary, free to slide lengthwise in its supporting-bearing. Each right and left screw-threaded section O, between its oppositely screw-threaded ends, has fixed to it a pinion, *c*, which engages with the rack *d* on the under side of its appropriate rack-bar K. Under this arrangement it will be noted that the longitudinal movement of the rack-bars will produce corresponding rotary movement of the pinions *c*, which engage those rack-bars. Rotary movement of said pinions will cause rotation of their sections O, and (assuming, as is the case, that the couplings P are held from rotary movement) the effect will be to turn said sections in their screw-threaded couplings, and consequently to draw the couplings together or to move them apart, according to the direction in which the parts O are rotated. In this way the length of the sectional shaft may be increased or diminished, the effect being to move the left-hand coupling P^2 outwardly or inwardly. Within this tubular sectional shaft is contained and fits the cylindrical rod R, which projects beyond the outer end of the left-hand coupling P^2, and has at this end a flange, *d′*, which bears against the outer end of said coupling. Said rod R at this end bears against the pivoted lever 10, and by said lever its flange *d′* is always kept pressed against the mouth of the coupling P^2. The rod is connected to the right-hand immovable coupling P′ by a set-screw, *e*, which passes into the rod through a slot, *f*, in said coupling, of a length equal to that of greatest range of movement of the rod. In this way the rod, while free to slide lengthwise in the coupling P′, is restrained from any rotary movement. Said rod has a similar slot and set-screw connection with each of the remaining couplings, the object of thus connecting it with said movable couplings being to prevent them from rotating while permitting their longitudinal movement. Under this arrangement it will be noted that the lengthening and shortening of the sectional shaft due to the action of the rack-bars upon the pinions will cause the said rod R to move toward or recede from the lever 10, with the effect of causing the latter, through the mechanism already described, to shift the cone-belt upon the drum according to the requirements of the work. The more evener-plates there are in movement the greater number of rack-bars there will be in operation, and consequently the greater will be the extension or contraction of the working length of the sectional shaft. Each evener-lever, however, influences the shaft by its own individual mechanism entirely independently of the others. The rack-bars are made of such width that the pinions *c* will remain in engagement with them notwithstanding the varying length of the sectional shaft.

It will also be noted that by weighting the

evener-plates (or the levers carrying those plates) in the manner hereinbefore set forth the mechanism intervening between the extensible sectional shaft (which is common to all the levers) and the belt is independent of and unaffected by said weight, thus rendering said mechanism much more sensitive than it would be were the plates weighted through the intermediary of said mechanism, as has heretofore been customary.

It will be understood that the rod R is used in the main as a support for the sectional shaft and as a convenient means of securing the longitudinally-movable couplings against rotation. The same result, however, can be attained in other ways, as will be apparent to the skilled mechanic. The end of the left-hand coupling P^2 itself might be finished off to act as a pusher instead of using the end of the rod R for that purpose.

Having described my improvements and the best way now known to me of carrying the same into practical effect, I desire it to be understood, in conclusion, that I do not restrict myself to the details of construction and arrangement hereinbefore described and illustrated, because manifestly the same can be varied to a considerable extent without departure from my invention; but

What I claim herein as new and of my own invention is—

1. In an evener mechanism, the combination, with an evener plate and lever and a sliding rack-bar and means whereby said rack-bar is held up against said lever with yielding pressure, as described, of a rotatable section geared with said rack-bar, a non-rotatable section with which said rotatable section is connected by a screw-joint, so that the rotary movement of the rotatable section shall cause a longitudinal movement of the one section relatively to the other, and belt-shifting mechanism operated from or by said longitudinally-moving section, substantially as and for the purposes hereinbefore set forth.

2. The combination, with the evener-roll, of pivoted evener-levers, pivoted adjustably-weighted levers, one for each evener-lever, and intermediate slide-bars, one for each evener-lever, bearing at one end against their appropriate weighted levers and at the other end against their appropriate evener-levers, substantially as hereinbefore set forth.

3. The combination, with the sliding rack-bars and belt-shifting mechanism, of the longitudinally-extensible sectional shaft composed of alternate rotatable and non-rotatable sections, the former geared with said rack-bars, respectively, substantially as and for the purposes hereinbefore set forth.

4. The right and left externally-screw-threaded longitudinally movable and rotatable sections, each provided with a pinion, and the correspondingly internally-screw-threaded non-rotatable couplings alternating therewith, one, P′, of which non-rotatable sections or couplings is secured against longitudinal movement, and the sliding rack-bars engaging said pinions, in combination with the pusher-rod contained within and moved lengthwise by said devices, and belt-shifting mechanism operated by said rod, substantially as and for the purposes hereinbefore set forth.

5. The combination, with the evener-roll, the evener-levers provided with evener-plates placed above the evener-roll, the sliding rack-bars, and the weighted levers, of the longitudinally-extensible shaft having its rotatable sections geared with said rack-bars, respectively, and belt-shifting mechanism operated by or from said shaft at the times and in the manner substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 18th day of July, 1887.

JAMES C. POTTER.

Witnesses:
ABEL T. ATHERTON,
HIRAM SPEARING.