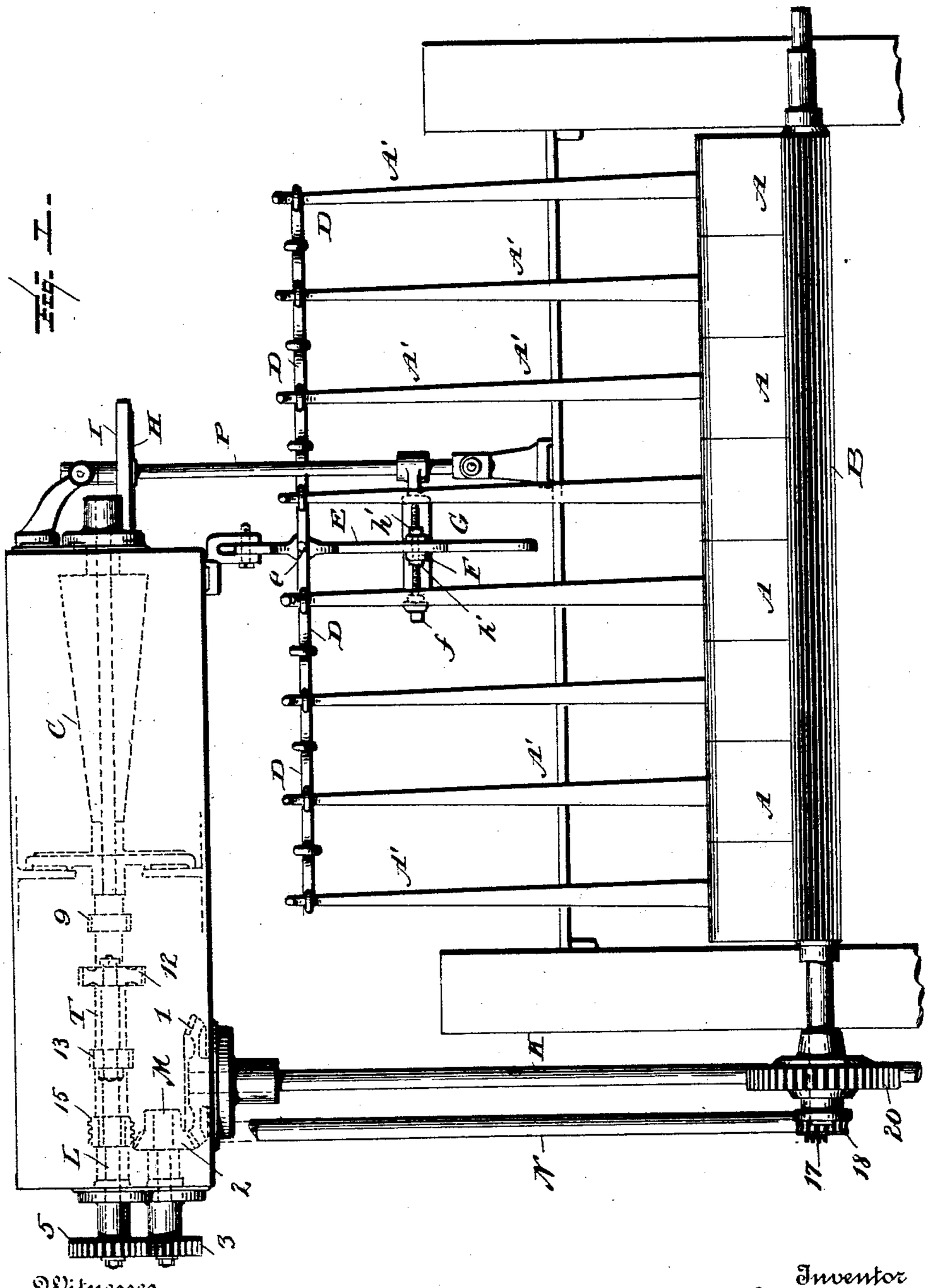
(No Model.) 3 Sheets—Sheet 1.

J. C. POTTER.

EVENING MECHANISM FOR COTTON OPENERS, &c.

No. 520,334. Patented May 22, 1894.



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(No Model.) 3 Sheets—Sheet 2.

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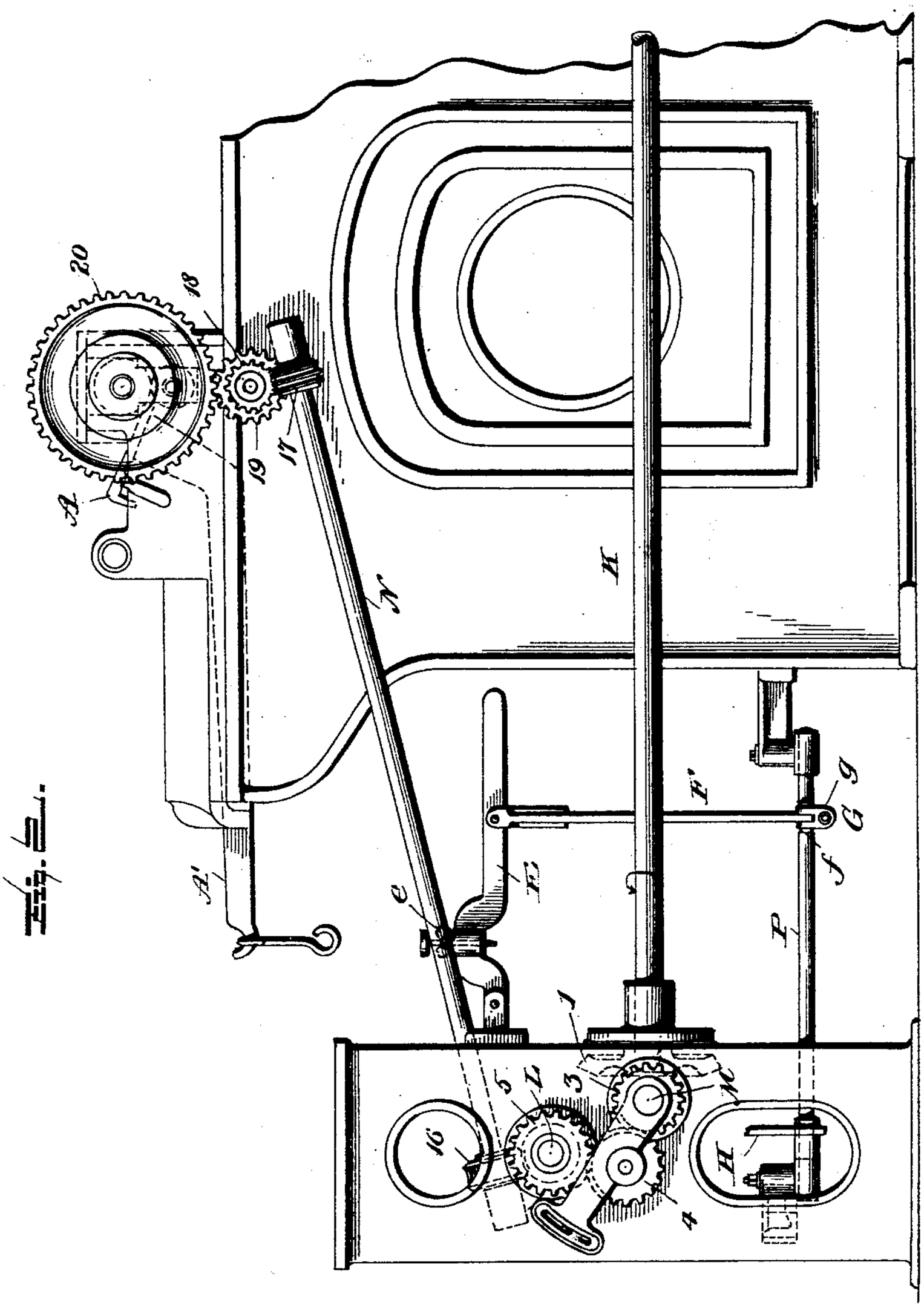

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

J. C. POTTER.

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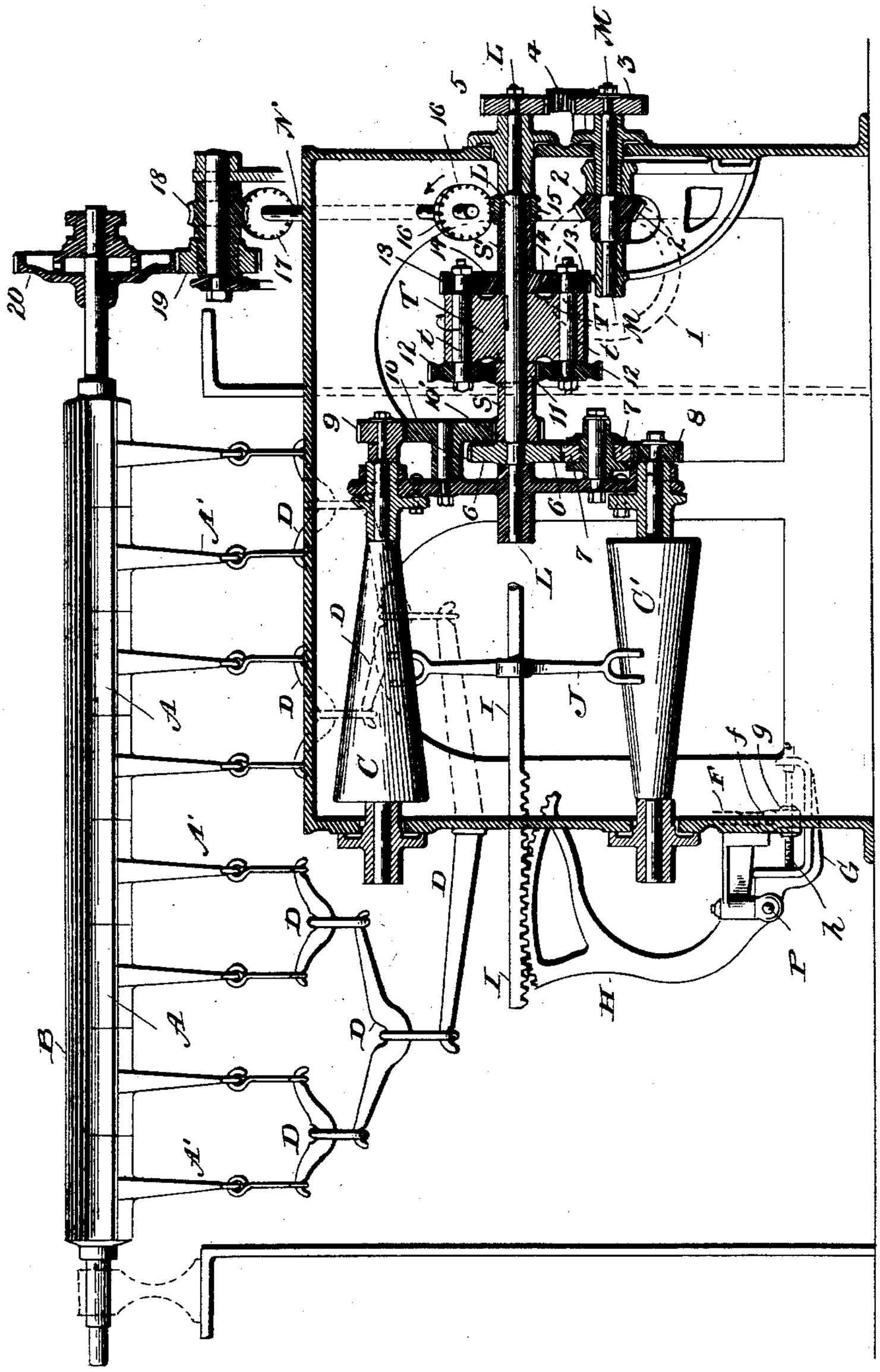

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UNITED STATES PATENT OFFICE.

JAMES C. POTTER, OF PAWTUCKET, RHODE ISLAND.

EVENING MECHANISM FOR COTTON-OPENERS, &c.

SPECIFICATION forming part of Letters Patent No. 520,334, dated May 22, 1894.

Application filed January 25, 1894. Serial No. 497,975. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. POTTER, a resident of Pawtucket, in the State of Rhode Island, have invented certain new and useful Improvements in Evening Mechanism for Cotton-Openers and Analogous Machines, of which the following is a specification.

My invention relates to the differential motion mechanism which in cotton openers and other machines for working or preparing cotton is interposed in the motion transmitting devices between the driven cone and the device to be actuated thereby. In evener mechanism for example, the parts of the differential motion device are connected respectively to the driving cone or power shaft, to the driven cone and to the feed roll of the opener or scutcher. In a mechanism thus organized much of the power required to drive the feed roll is derived directly from the power shaft, thus lightening the load on the cone belt, so that the work performed by it through the driven cone is or may be but little in excess of that required to produce the variable speed for graduating the movement of the feed roll to the varying conditions of the work. To render the cone belt sensitive to slight pressure or force applied through the shipper—and it ought to be sensitive enough to respond to the slightest exercise of such pressure—it is indispensable that the cones around which it moves should revolve at high speed. If they revolve at a slow speed the belt is sluggish to respond, and is difficult to shift, thus rendering the action of the evener uncertain. I have organized and arranged the motion transmitting mechanism in such manner as to secure this high speed with a minimum of friction, strain and wear in the differential motion mechanism, and with such an arrangement of the gearing comprising that mechanism that all parts of it are readily accessible at all times for change or repair.

The nature of my invention and the manner in which the same is or may be carried into effect can best be explained and understood by reference to the accompanying drawings, in which I have represented so much of an evener for a cotton opener or picker, as required for purposes of explanation.

Figure 1 is a plan of the mechanism. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional end elevation.

A are the usual evener plates and B is the evener feed roll co-operating with said plates. The plates are carried by levers A′ which are hung on a transverse knife edge bar, and at their outer ends are connected to the system D of scale beams, the lower or terminal one of which comes under and sustains the pivoted lever E (the latter resting by its adjusting screw *e* upon the center of the terminal beam). Lever E is connected to the lever G below by rod F which above is pinned to the lever E and below is jointed at *f* to a hub *g* mounted to slide on a screw threaded rod *h* on lever G. Nuts *h′* on this rod serve to shift the hub *g* nearer to or farther from the fulcrum of lever G in order to vary the throw of the latter for any given throw of lever E. By this instrumentality the final adjustment of the mechanism for a given weight of lap per yard is obtained. Lever G is fast on a rock shaft P which constitutes the fulcrum or axis of the lever. This shaft (supported in proper bearings in the frame of the machine) carries the toothed quadrant H, which gears with the sliding rack bar I; and the latter carries the belt shipper J, by which is shifted the belt that extends between the driving cone C′ and the driven cone C. The cotton passes to the machine from the feed apron (not shown) over the evener plates A, between the latter and the feed roll B. Any unevenness in the sheet or lap is felt directly by these plates, and the motion of the latter is communicated at once through the scale beam system, and connected parts already described to the belt shipper J, which consequently shifts the belt on the driven cone C so as to correspondingly vary its speed and consequently that of the feed roll B.

Thus far there is nothing essentially new in the mechanism. I come now to the parts in which my invention is comprised; and in order that the same may be more fully and perfectly set forth, I embody in the description the proportions of the several gears used in the plan illustrated. Power is applied to the evener through the shaft K from (preferably) the calender rolls of the picker—supposing that this mechanism is applied to such a machine. This

shaft usually revolves five hundred times per minute. A forty-tooth beveled gear 1 on outer end of shaft K meshes with the twenty-tooth bevel gear 2 on stud M. On the other end of stud M is a twenty-four-tooth spur gear 3 which through a thirty-tooth intermediate 4 drives a change gear 5 (in this instance supposed to have twenty-eight teeth) on the outer end of shaft L. On the other end of shaft L is fast a thirty-seven-tooth spur gear 6 which through a twenty-eight-tooth intermediate 7 drives a nineteen-tooth gear 8 fast on the axle of the lower or driving cone C′. In this way motion is imparted to the driving cone—that motion being constant, and at the rate of about eighteen hundred revolutions per minute. The upper cone C (the maximum rate of revolution of which is about three thousand five hundred per minute and which is driven by belt from cone C′ as before explained) has fast on its axle a twenty-five-tooth spur gear 9, which through a fifty-six-tooth intermediate 10 drives a thirty-one-tooth gear 10′, which latter actuates the differential motion mechanism, in the manner now to be explained. The gear 10′, is on a sleeve *s* which is loose on shaft L. At the other end this sleeve has a twenty-five-tooth spur gear 11 which meshes with the forty-one-tooth spur gears 12, carried on one end of axles *t* mounted and capable of revolution in the head T which is keyed to and revolves with shaft L. On the opposite end of these axles are fastened twenty-five-tooth gears 13, which mesh with a forty-one-tooth gear 14, on one end of a sleeve *s′* loose on shaft L. I remark here that while it is possible to use only one axle *t* with its two gears 12 and 13, yet the other axle *t* and its corresponding gears are added not only to balance those first named, being for this purpose arranged on the other side of the shaft L diametrically opposite the others, but also to take their share of the work, thus prolonging the life time of the differential mechanism. Sleeve *s′* on its other end has a worm 15, which meshes with a worm gear 16 on inclined shaft N. At the upper end of this shaft is a worm 17, which meshes with a worm gear 18, having a spur gear 19, which meshes with and drives the gear 20 on the shaft of the feed roll B. In this way motion is imparted from the differential motion mechanism to the feed roll. By means of the worm and worm wheel speed reducing gearing, the feed roll is readily rotated at the slow speed required, say from six to twelve revolutions per minute, or less if required. Under the arrangement shown, and with the proportions of gears as above given, the load upon the belt is materially reduced, say about one half—the remainder of the work being performed by the shaft L directly—that is to say through intermediaries other than the belt. This proportion however can of course be varied by varying the relative proportions of the gearing employed. The sleeves *s*, *s′* revolve in the same direction with the shaft L on which they are mounted and friction and consequent wear and loss of power is thus largely reduced. Furthermore there are no internal gears or beveled gears, both of which are extremely objectionable in the differential motion mechanism. All the wheels of the differential motion or "jack-box" are spur wheels or external gears which can be got at with facility for removal or repairs and which can be replaced with ease.

My improvement with such modifications and changes as will suggest themselves to the mechanic skilled in the art to which this invention pertains can be applied not only to cotton openers or scutchers, but with equal facility to drawing and roving frames, cards and other machinery for working fibrous materials in which a "jack-in-box" or differential motion mechanism is employed.

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

In a differential motion transmitting mechanism for cotton openers and other machinery for working and preparing fibrous materials, the combination with the driving and driven cones and cone belt of the power shaft L driven at constant speed, the sleeves *s*, *s′*, loose on said shaft and provided with external gears 10′, 11 and 14, 15 respectively the head T fixed to said shaft and carrying the external gears 12, 13, meshing directly the one with external gear 11, the other with external gear 14, and gearing between the driven cone and sleeve *s* whereby the latter is rotated in the same direction with the shaft L on which it is mounted, under the arrangement and for operation as hereinbefore set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES C. POTTER.

Witnesses:
EDWARD W. BLODGETT,
DANIEL P. BROWN.