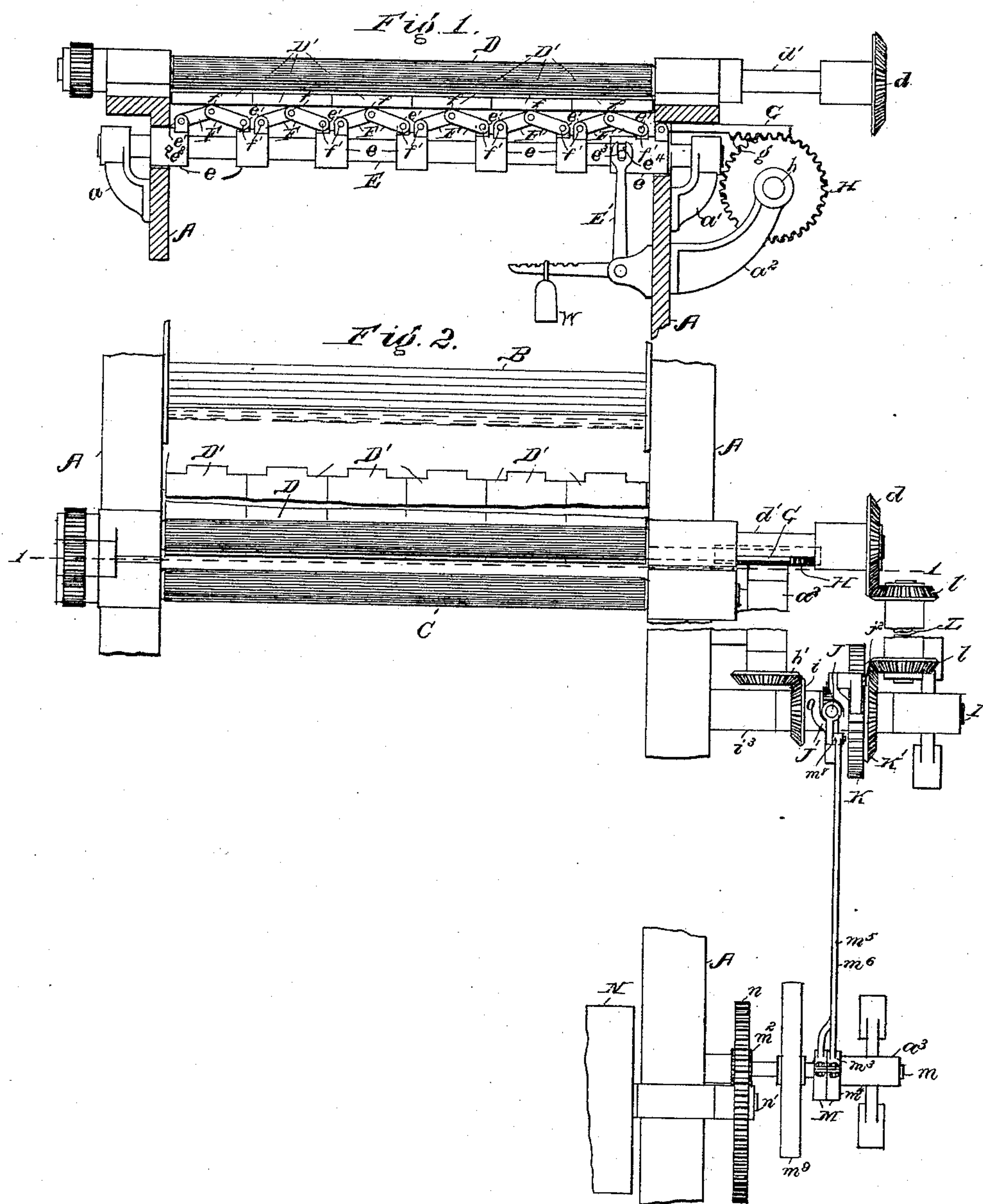


(No Model.)

3 Sheets—Sheet 1.

A. FALLS.
EVENING MECHANISM FOR COTTON OPENERS, &c.
No. 436,577.
Patented Sept. 16, 1890.



Witnesses—

Kirkley Hyde.

Myrtle C. Beale.

INVENTOR—

Alongo Falls
By Albert M. Moore,
His Attorney.

(No Model.)

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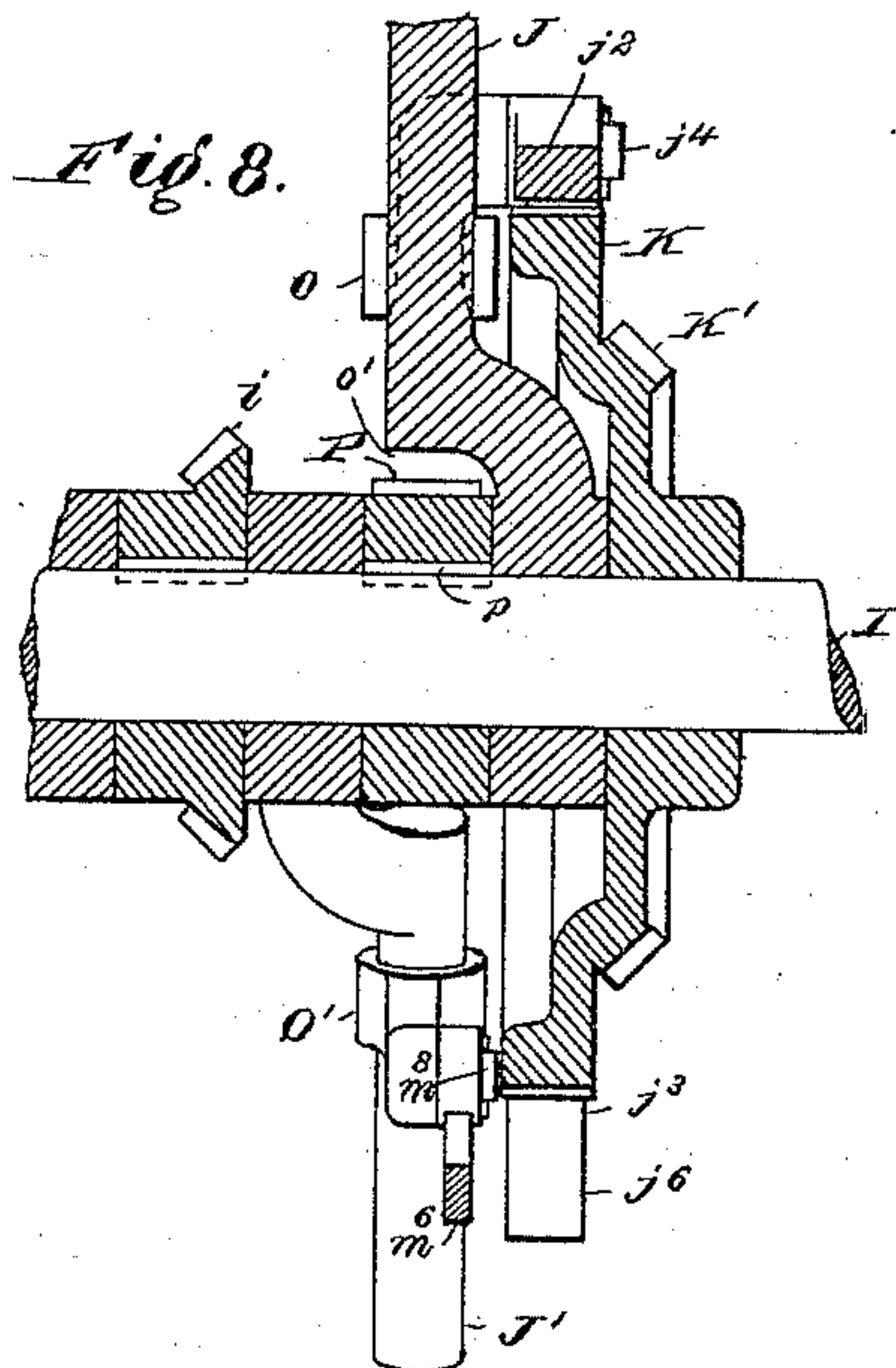
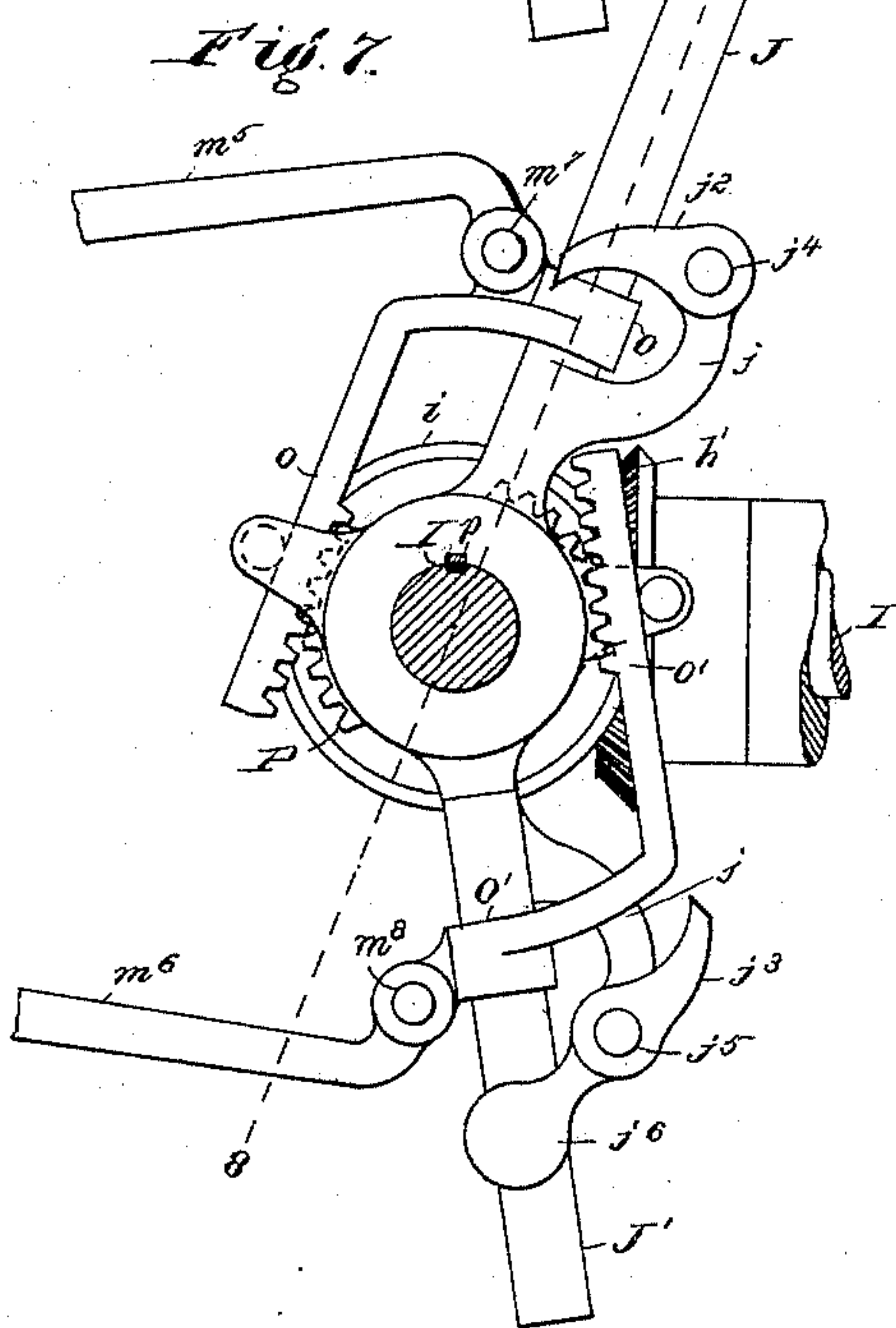
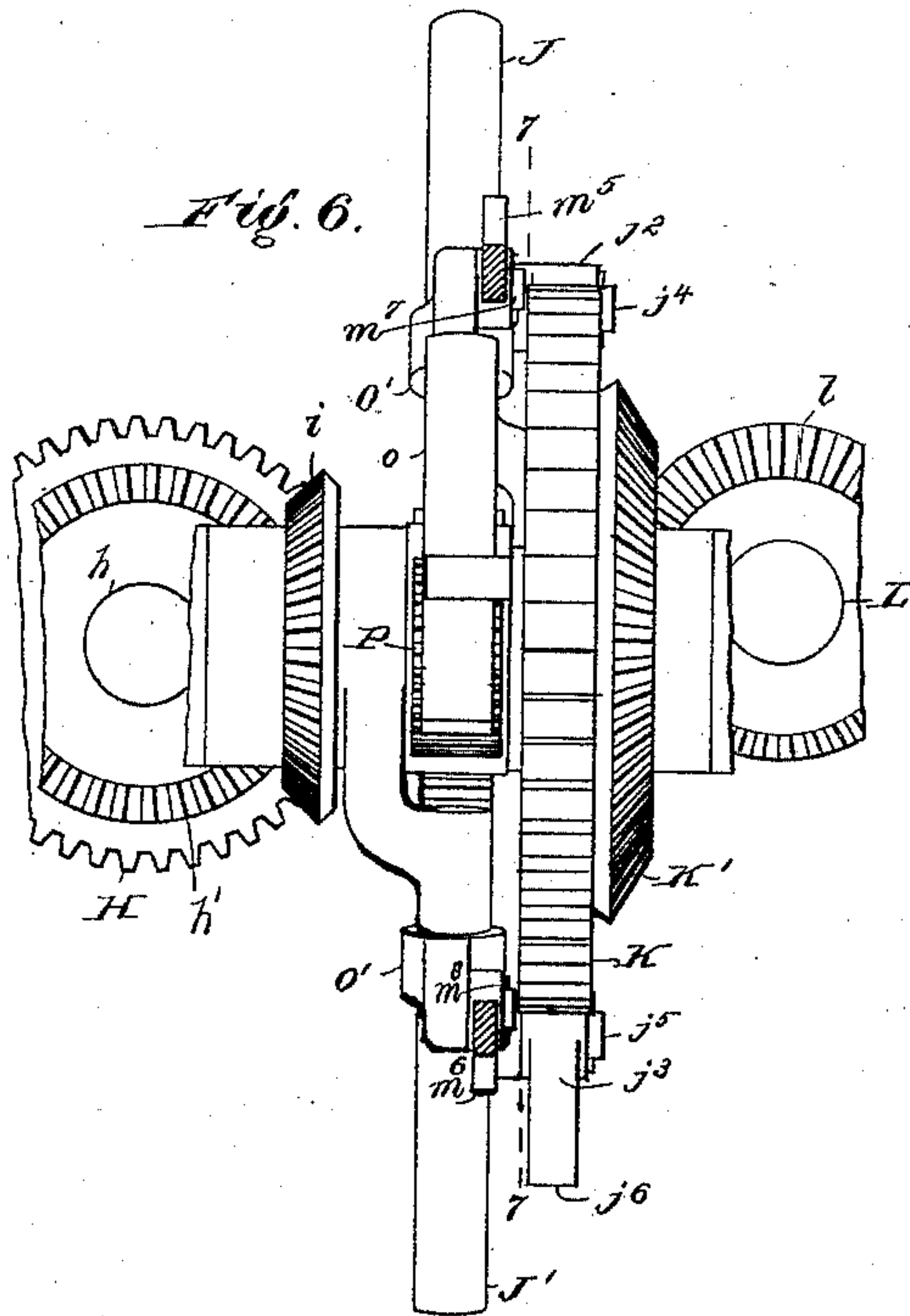
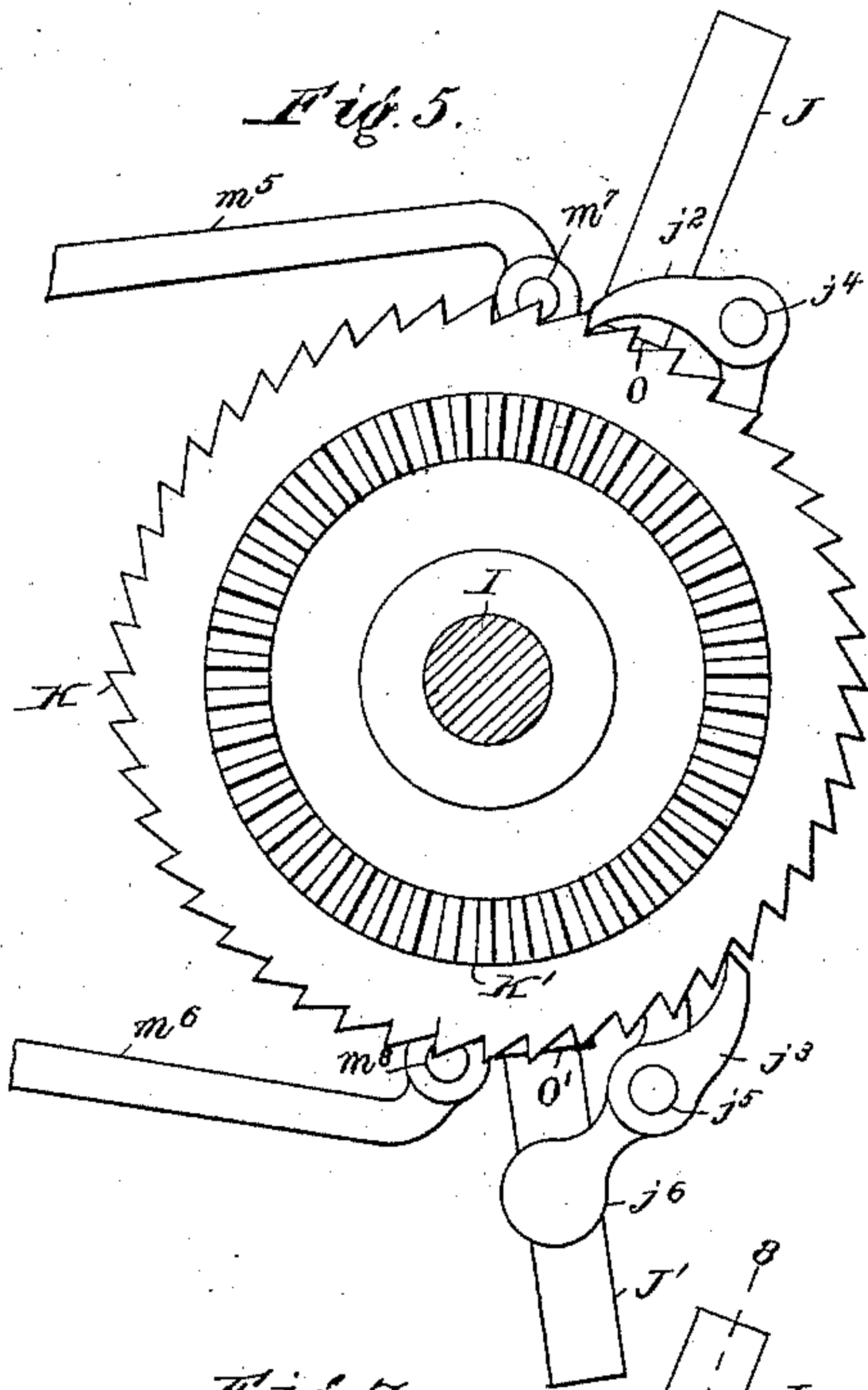
3 Sheets—Sheet 3.

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Patented Sept. 16, 1890.



Witnesses—
Henry Hyde,
Myrtie E. Deale

Inventor—
Alonso Falls,
By *Albert M. Moore,*
His Attorney.

UNITED STATES PATENT OFFICE.

ALONZO FALLS, OF LOWELL, MASSACHUSETTS.

EVENING MECHANISM FOR COTTON-OPENERS, &c.

SPECIFICATION forming part of Letters Patent No. 436,577, dated September 16, 1890.

Application filed April 14, 1890. Serial No. 347,752. (No model.)

To all whom it may concern:

Be it known that I, ALONZO FALLS, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a new and useful Improvement in Evening Mechanism for Cotton-Openers, &c., of which the following is a specification.

My invention relates to evening mechanism for machines for preparing fibers for spinning, such machines including openers, pickers, lappers, carding-engines, lap-heads, and railway-heads; and it consists in devices and combinations hereinafter described and claimed, adapted to regulate the speed of the feeding mechanisms of such machines according to the quantity of material from time to time fed to the machine.

In the accompanying drawings, (on three sheets,) Figure 1 is a vertical transverse section of the frame of such a machine—as, for instance, a carding-engine—on the line 1 1 in Fig. 2, showing in rear elevation the eveners, roll, toggle-levers, collars connected by such levers, the bar on which said collars slide, the horizontal rack-bar operated by said levers, the gear engaged by said rack-bar, the bent lever and weight which resist the depression of the eveners-plates and restore the same to position when the pressure on said plates is removed, and said eveners-plates; Fig. 2, a plan of a part of a frame—such as is partly shown in Fig. 1—part of a feed-apron, the eveners-plates, eveners-roll, feed-roll geared to said eveners-roll, said rack-bar, its engaging-gear, the ratchet and gearing which connects said ratchet to said eveners-roll, part of a doffer, the shaft and gears by which said doffer is driven, a floor-bracket supporting said last-named shaft, the eccentric straps and rods which connect an eccentric on said last-named shaft with adjustable slides on the pawl-carrying levers which operate said ratchet, and a slide, pawl-carrying lever, and pawl; Fig. 3, a side elevation of the gear on the doffer-shaft, the shaft from which said gear is driven, the pulley which drives said shaft, said eccentric, straps, rods, pawl-carrying levers, pawls, ratchet, and a bevel-gear concentric with said ratchet; Fig. 4, a side elevation of said ratchet and last-named bevel-gear, an eveners-plate, feed-roll, eveners-roll, its

bevel-gear, the shaft and gears which connect said last-named gear to the bevel-gear on said ratchet, said rack-bar, the gear engaged by said rack-bar, and the shaft which carries said last-named gear; Fig. 5, an outside elevation of the ratchet and adjacent parts of the eccentric rods, the pawl-carrying levers and their pawls, and the slides adjustable on said levers and jointed to said eccentric-rods; Fig. 6, a rear elevation of the parts shown in Fig. 5 and of the mechanism which connects the rack-bar with the pawl-carrying levers and eccentric-rods, said eccentric-rods being in section, showing also in rear elevation a part of the bevel-gear which engages the bevel-gear secured to said ratchet; Fig. 7, a vertical section on the line 7 7 in Fig. 6, showing in side elevation the pawl-carrying levers, mutilated gear, slides adjustable on said levers and provided with arms having racks to engage said mutilated gear, the pawls, parts of the eccentric-rods pivoted to said slides, a bevel-gear, a vertical gear secured on the same shaft with the mutilated gear and engaging another bevel-gear, and a part of the shaft and stand which supports said last-named bevel-gear; Fig. 8, a section on the line 8 8 in Fig. 7 through the ratchet, its bevel-gear, one of the pawl-carrying levers, the mutilated gear, and a bevel-gear, the shaft which supports said gears being in elevation, the other pawl-carrying lever, the pawls, and a part of one of the eccentric-rods being in elevation.

As above stated, the invention herein described is applicable to a variety of machines, including nearly all the machines used in the manufacture of cloth from textile fibers, and which act upon the fibers preparatory to the process of spinning the same. In Fig. 2, however, the device is represented as applied to a carding-engine.

A is a frame, as of a carding-engine, adapted to support the other parts hereinafter described.

B is a feeding-apron of ordinary construction, on which the fibers are laid in the first instance, and by which said fibers are conducted to rolls, as feed-rolls, or to a feed-roll and plate of a so-called "shell-feed," indicating such a roll. It is customary, however, in some such machines to interpose between the

feeding-apron and feed-rolls or shell-feed an evening mechanism, consisting in part of a fluted evening-roll D and eveners-plates D', the same being pivoted in such a manner as to be depressed by fibers passing between said eveners-roll and eveners-plates, and each eveners-plate being capable of a motion independent of the other eveners-plates, so that a greater thickness of fibers passing over any eveners-plate will depress that plate to a correspondingly greater amount. I use an eveners-roll and eveners-plates of a usual construction. It is also customary to use in combination with such plates mechanism whereby the speed of the feed-rolls will be greater the thinner the sheet or layer of material passing between said plates and said eveners-roll, the efficiency of such contrivances as commonly constructed being lessened by the use of belts, which are liable to slip.

Immediately below the free ends of the eveners-plates I support a bar E in brackets α α' , secured to the sides of the frame A, and on said bar I arrange at intervals a series of collars e, each of said collars being provided with ears e' , and I connect adjacent collars by means of toggle-levers F, pivoted to each other and to the ears on said collars at f' , one of said collars e at the end of the series (at the left of the series in Fig. 1) being rigidly secured to the bar E by a set-screw e^2 or equivalent means, and the length of a pair of toggle-levers being such that their connecting-joint rises above the tops of the collars e.

On the joints f' of the toggle-levers F rest the free ends of the plates D', so that a depression of any or all of said plates causes the collars e to be spread apart from each other and to cause a horizontal rack-bar G, secured to the collar e farthest from the fixed collar, to move away from said last-named collar. The teeth g of the rack-bar G engage the teeth of a gear H and cause the same to rotate in one direction or the other with every movement of the eveners-plates.

To the same collar which carries the rack-bar is secured a laterally-extending stud e^3 , which engages a slot e^4 in a bent lever E', the lower horizontal arm of said bent lever reaching toward the fixed collar e and carrying a weight W, which has a tendency to rock said lever and to restore said collars to their normal distances apart, and thereby to raise the eveners-plates to their normal positions whenever the pressure is removed from them. The gear H is fast on a shaft h, supported in the bracket α^2 , secured to or forming a part of the frame A, and at the other end of said shaft is secured a bevel-gear h' , which engages another bevel-gear i, splined or otherwise secured to a shaft I, which turns in a bracket i^3 , secured to or forming a part of the frame A. Radial pawl-carrying levers J J' have their fulcrums on the shaft I and turn freely thereon, said levers having arms $j j'$, carrying pawls $j^2 j^3$, adapted to engage the teeth of a ratchet K, which also turns freely

on the shaft I, the fulcrum of each of the said pawls being at an invariable distance from the axis of said shaft I.

To the ratchet K, concentrically therewith, is secured a bevel-gear K', which engages a bevel-gear l, secured to one end of a shaft L, and to the other end of said last-named shaft is secured another bevel-gear l', which engages a bevel-gear d, secured to the shaft d' of the eveners-roll, so that a rotation of the ratchet K will rotate the eveners-roll D, and the speed of rotation of said roll will depend upon the speed of rotation of said ratchet. The rotation of the ratchet is caused by the vibration of the pawl-carrying levers J J', and the vibration of said levers is caused by an eccentric M, secured on the shaft m, journaled in the frame A and in the floor-bracket α^3 in a well-known manner, said shaft m having a pinion m^2 , which takes into a gear n, (represented as fast on the shaft n' of the doffer N,) as the same is commonly used in a cotton-carding engine, the shaft m being driven by a belt (not shown) on the fast pulley m^9 . The shaft m may, however, be any shaft having a continuous uniform rotation. Around the eccentric M are placed eccentric-straps $m^3 m^4$, to which are attached ends of the eccentric-rods $m^5 m^6$ in the usual manner, the other ends of said eccentric-rods being pivoted at $m^7 m^8$ to collars or slides O O', which surround the pawl-carrying levers J J', respectively, so that a rotation of the shaft m will cause a vibration of said levers and a rotation of said ratchet K. The rotation of said ratchet is made substantially continuous instead of being intermittent by the fact that a single eccentric M is used to move the pawl-carrying levers simultaneously, and that said levers extend in nearly opposite directions from their common fulcrum on the shaft I, so that when one of the pawls $j^2 j^3$ engages and rotates said ratchet the other of said pawls is making its return movement or merely slipping over the teeth, said pawls being held in engagement with said ratchet above and below the same by gravity, the upper pawl by its own weight in front of its fulcrum j^4 and the lower by having a weighted arm j^6 , which extends on the opposite side of the fulcrum j^5 from the pawl proper, and both of said pawls pointing in the direction of the rotation of said ratchet. The slides O O' are adjustable on the pawl-carrying levers toward and from the shaft I to vary the angular movement of said levers, the slides being moved the same distance from the center of the shaft m by each throw of the eccentric M, and the nearer the slides to the shaft I the greater the angles through which said levers vibrate and the greater the rotation of the ratchet K at each such vibration.

The slides O O' are automatically adjusted on the levers J J' by means of a mutilated gear P, splined at p onto said shaft I, as shown in Fig. 8, said gear engaging arms o o', having racks and secured to said slides

O O', respectively, parallel with the radial parts of said levers; so that when the shaft is partially rotated by the rotation of the gears H h' and shaft h, caused, as above described, by the movement of the rack-bar G and evenner-plates, the slides O O' are moved on the levers J J' toward the free ends of said levers when the evenner-plates are depressed, and toward the fulcrums of said levers when said evenner-plates are raised, with the result of diminishing the speed of rotation of the ratchet K and the evenner-roll D' when any of said plates are depressed and of increasing such speed of said ratchet and roll when said plates are raised, the variations of speed of the evenner-roll being proportional to the amount of movement of said evenner-plates.

I claim as my invention—

1. The combination of an evenner-roll, evenner-plates adapted to be moved by a variation of thickness of material passing between said roll and plates, a ratchet-wheel, pawl-levers, pawls carried thereby and engaging said ratchet, an eccentric having a uniform rotation, eccentric-rods operated by said eccentric and adjustably connected to said pawl-levers, means, substantially as described, of varying the points of connection of said eccentric-rods and said pawl-levers by the movement of said plates, and means, substantially as described, of rotating said evenner-roll by the rotation of said ratchet, as and for the purpose specified.

2. The combination, of an evenner-roll, evenner-plates adapted to be moved by a variation of thickness of material passing between said roll and plates, a ratchet-wheel, pawl-levers, pawls carried thereby and engaging said ratchet, slides adjustable on said pawl-levers, an eccentric having a uniform rotation, eccentric-rods connected to said eccentric and said slides, means, substantially as described, of varying the distance of said slides from the fulcrums of said pawl-levers by the movement of said plates, and means, substantially as described, of rotating said evenner-roll by the rotation of said ratchet, as and for the purpose specified.

3. The combination of an evenner-roll, evenner-plates adapted to be moved by a variation of thickness of material passing between said roll and plates, a ratchet-wheel, pawl-levers, pawls carried thereby and engaging said ratchet, slides adjustable on said pawl-levers and provided with arms having racks, a shaft on which said pawl-levers have their fulcrums, a gear secured on said shaft, an eccentric having a uniform rotation, eccentric-rods operated by said eccentric and pivoted to said slides, means, substantially as described, of giving to said shaft a partial rotation by the movement of said evenner-plates to vary the distance of said slide from the fulcrums of said pawl-levers, and means, substantially as described, of rotating said evenner-roll by the rotation of said ratchet, as and for the purpose specified.

4. The combination of the evenner-roll, evenner-plates arranged to be moved by a variation of thickness of material passing between said roll and plates, a connected series of toggle-levers, the distance between the ends of said series being adapted to be varied by the movement of said plates, one end of said series being fixed and the other end thereof being free to move an amount determined by the movement of said plates, and mechanism, substantially as described, of varying the speed of said evenner-roll by the movement of the free end of said series, as and for the purpose specified.

5. The combination of the evenner-roll, evenner-plates arranged to be moved by a variation of thickness of material passing between said roll and plates, a connected series of toggle-levers, the distance between the ends of said series being adapted to be varied by the movement of said plates, one end of said series being fixed and the other end thereof being free to move an amount determined by the movement of said plates, a rack-bar secured to the free end of said series, a shaft, a gear fast thereon engaging said rack and given a partial rotation by the movement thereof, another gear fast on said shaft, another shaft, a gear fast thereon and engaging said last-named gear, a mutilated gear fast on said last-named shaft, pawl-levers having their fulcrums on said last-named shaft, a ratchet loose on said last-named shaft, pawls pivoted on said pawl-levers and engaging said ratchet above and below the same, slides adjustable on said pawl-levers and provided with arms having racks which engage said mutilated gear, an eccentric having a continuous uniform motion, eccentric-rods operated by said eccentric and having their ends farthest from said eccentric pivoted to said slides, a gear secured to said ratchet, and means, substantially as described, for rotating said evenner-roll by the rotation of said last-named gear whereby the speed of rotation of said evenner-roll is varied by the movement of said evenner-plates, as and for the purpose specified.

6. The combination of an evenner-roll, a bar parallel with said evenner-roll, evenner-plates arranged between said evenner-roll and bar, a series of collars arranged on said bar, toggle-levers connecting adjacent collars of said series, the collar at one end of said series being fast on said bar and the other collars of said series being free to slide on said bar, means, substantially as described, of causing said last-named collar to approach said fast collar and to cause the toggle-joints of said toggle-levers to press against said plates, a ratchet-wheel, pawl-levers having fulcrums concentric with said ratchet-wheel and extending from said fulcrums in nearly opposite directions, pawls carried by said pawl-levers and engaging said ratchet, a shaft having a uniform rotation, an eccentric secured thereon, slides adjustable on said pawl-levers, eccentric-rods connecting said eccentric and

said adjustable slides, means, substantially as described, of moving said slides by the movement of said collars, and means, substantially as described, of rotating said even-
5 roll by the rotation of said ratchet, as and for the purpose specified.

In witness whereof I have signed this speci-

fication, in the presence of two attesting witnesses, this 11th day of April, A. D. 1890.

ALONZO FALLS.

Witnesses:

ALBERT M. MOORE,
MYRTIE C. BEALS.