(No Model.)

6 Sheets—Sheet 1.

C. S. HENSLEY.

SELF BINDING REAPING MACHINE.

No. 341,657. Patented May 11, 1886.

Fig. 1.

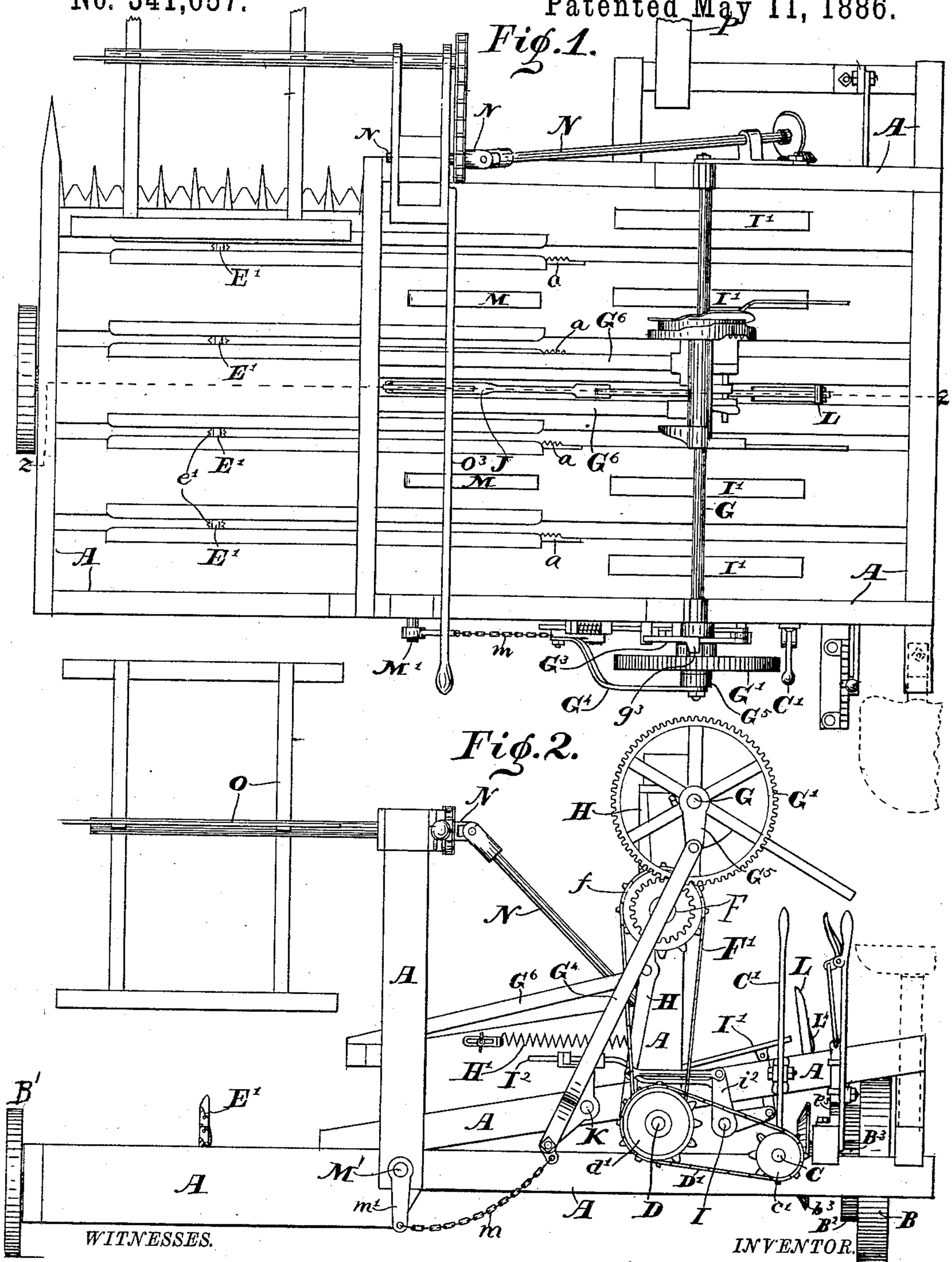

Fig. 2.

Chas. N. Leonard,

E. W. Bradford.

Chas. S. Hensley,

PER

C. Bradford.

ATTORNEY.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

6 Sheets—Sheet 2.

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Fig. 3.

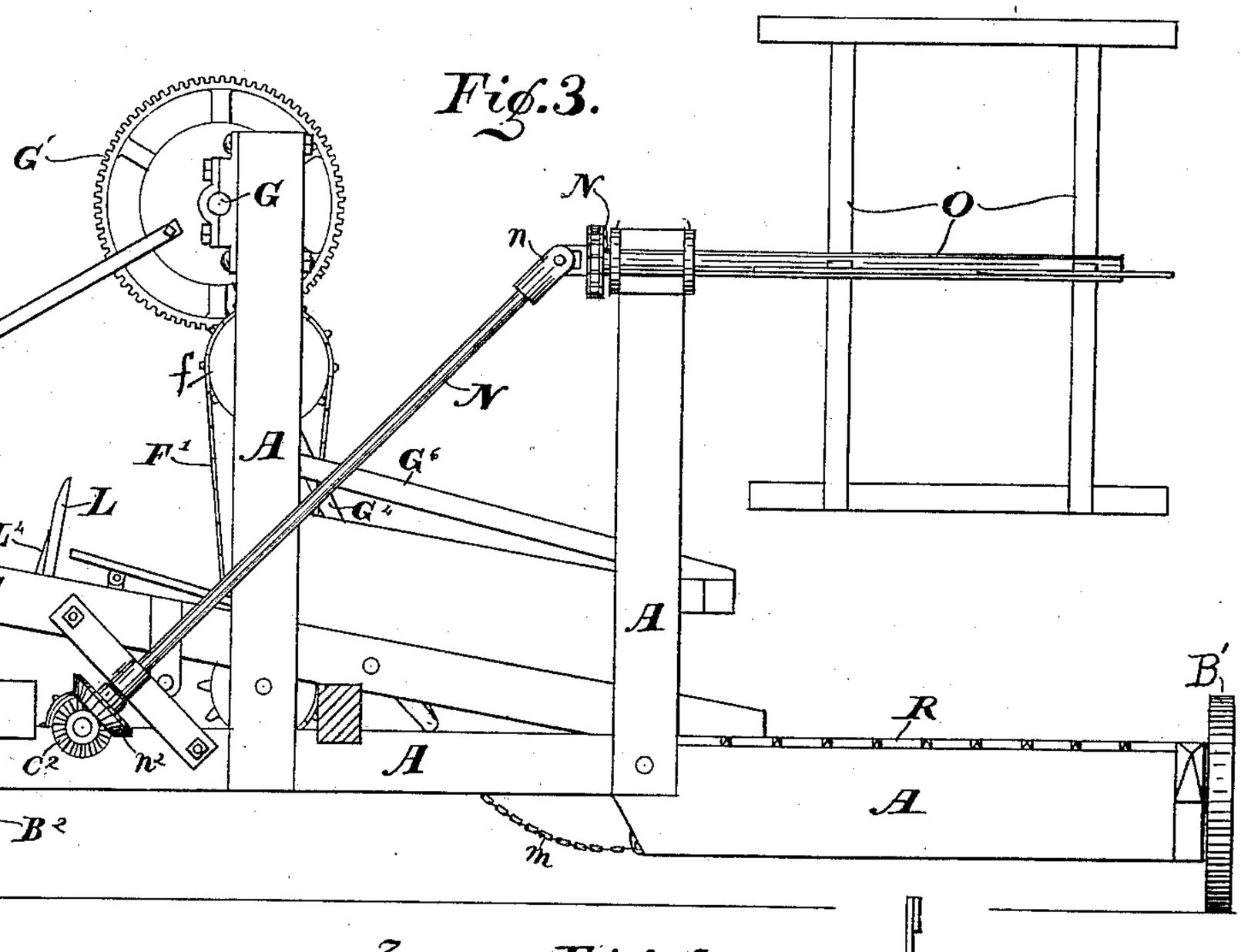
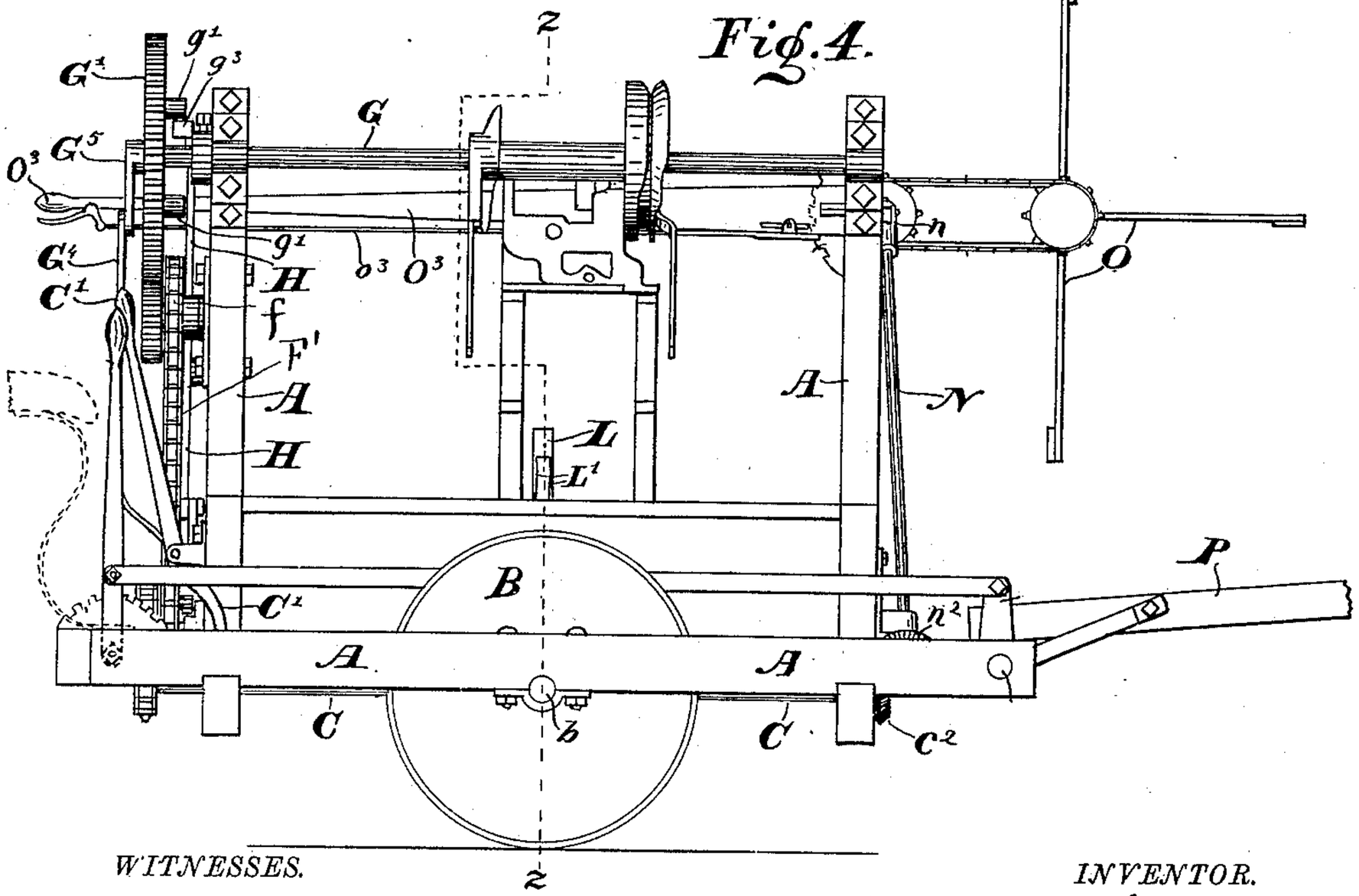


Fig. 4.



WITNESSES.

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(No Model.)

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Fig. 5.

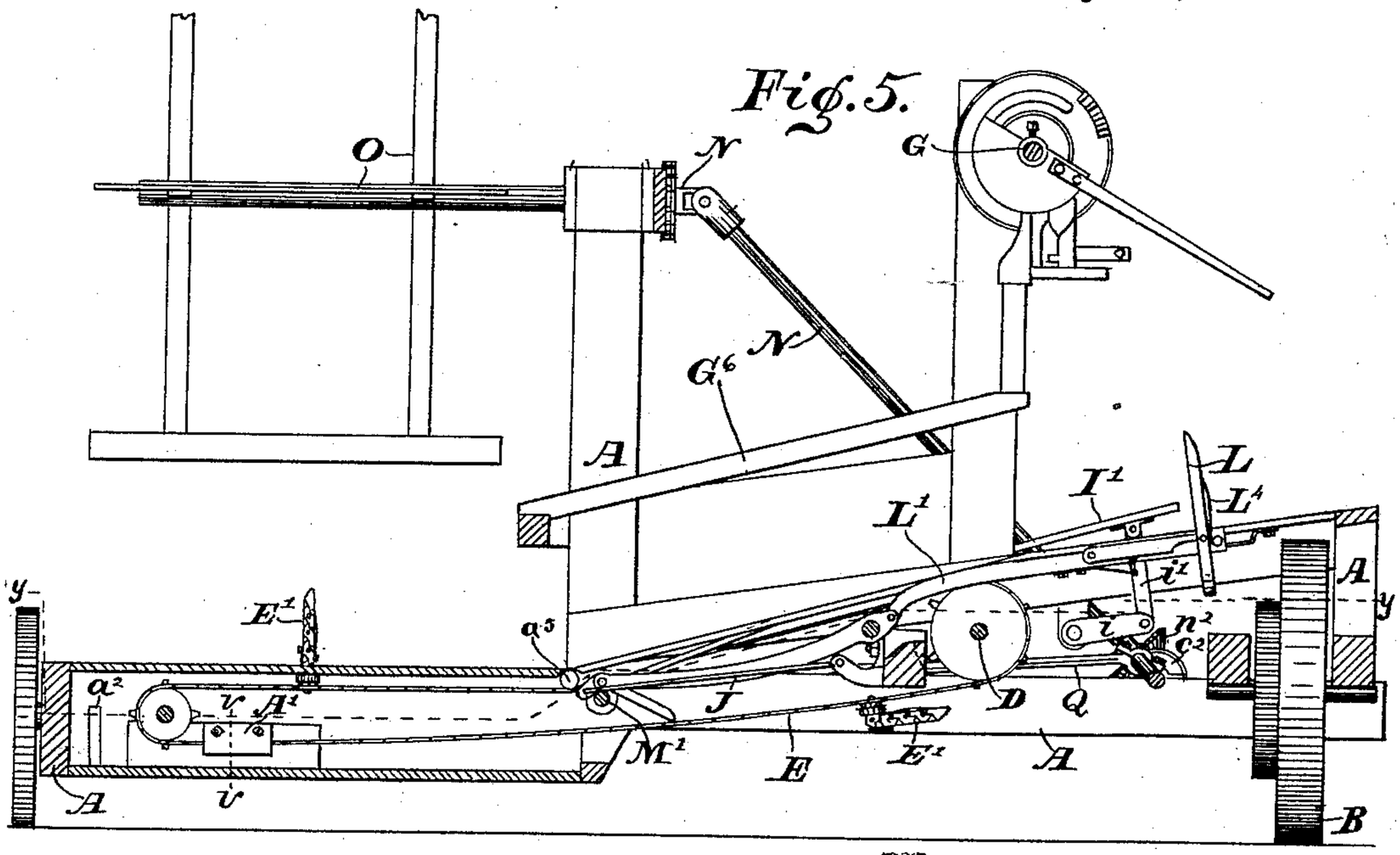
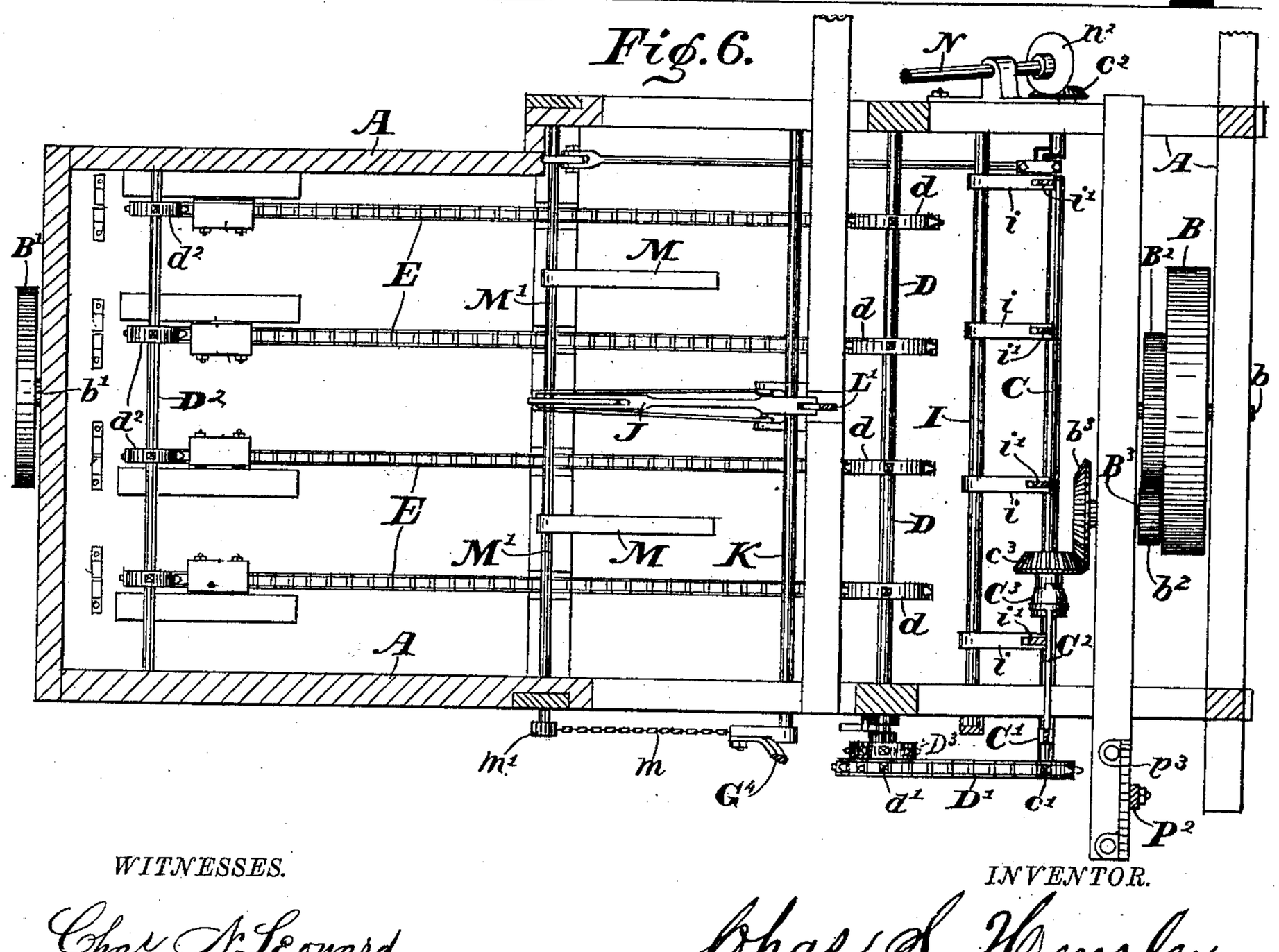


Fig. 6.



WITNESSES.

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Fig. 7.

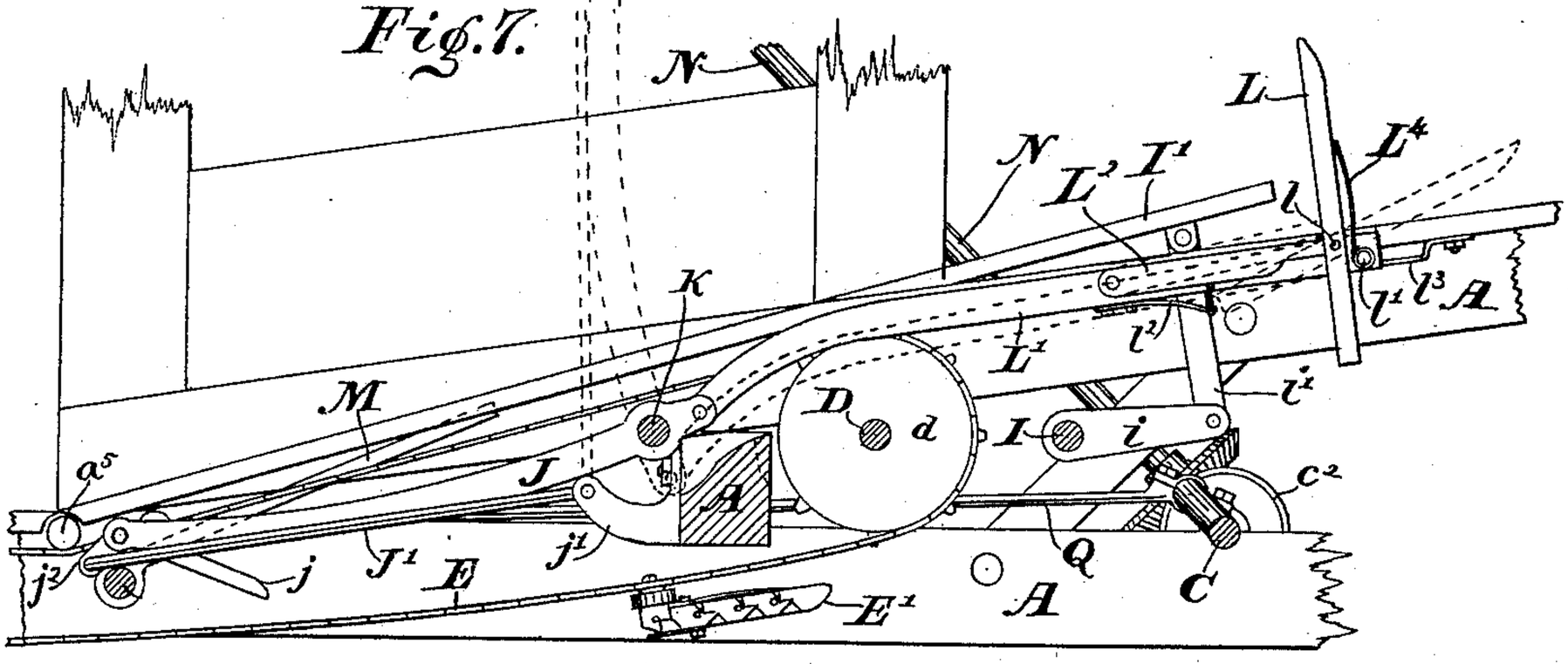

Fig. 8.

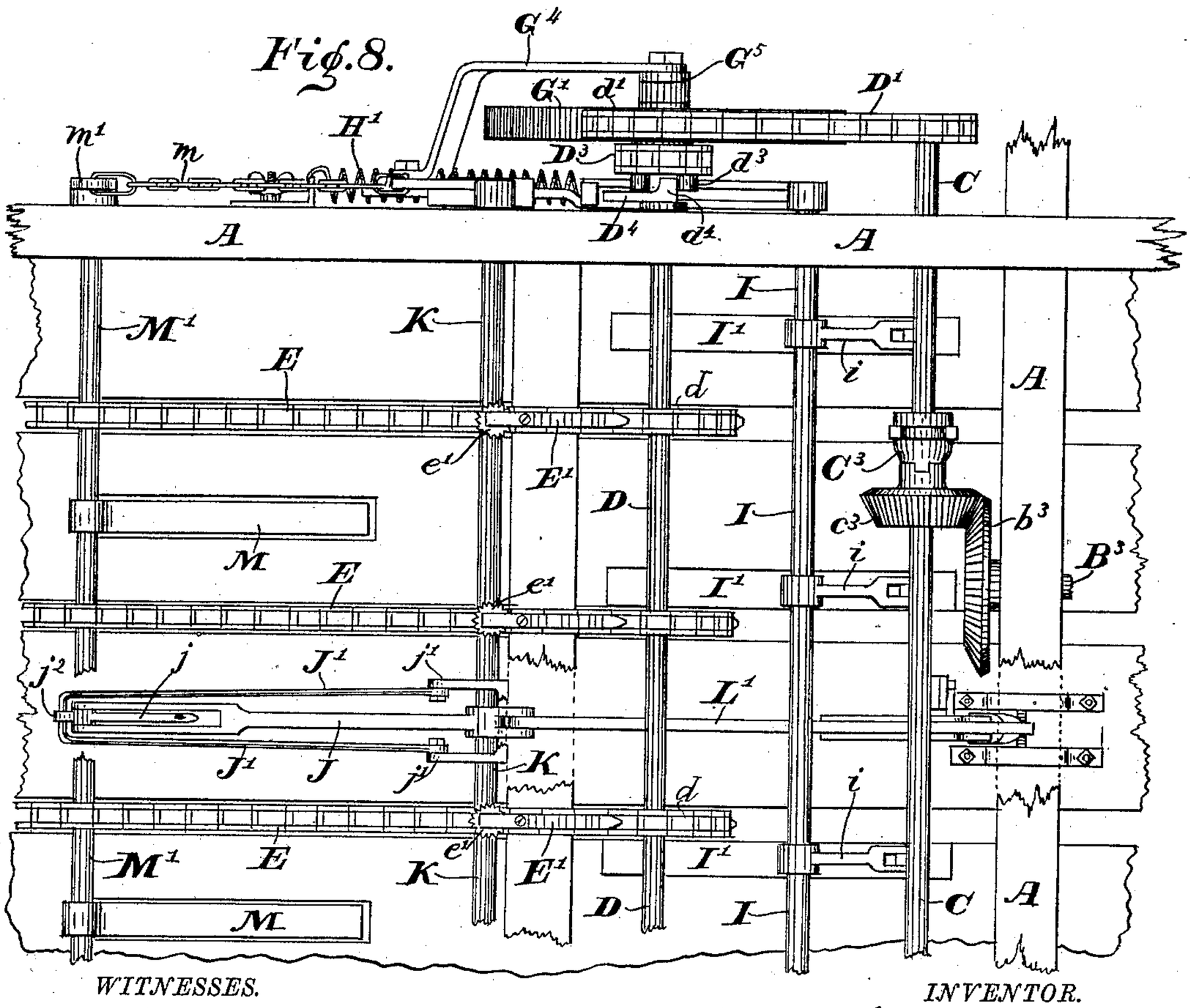

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Fig. 9.

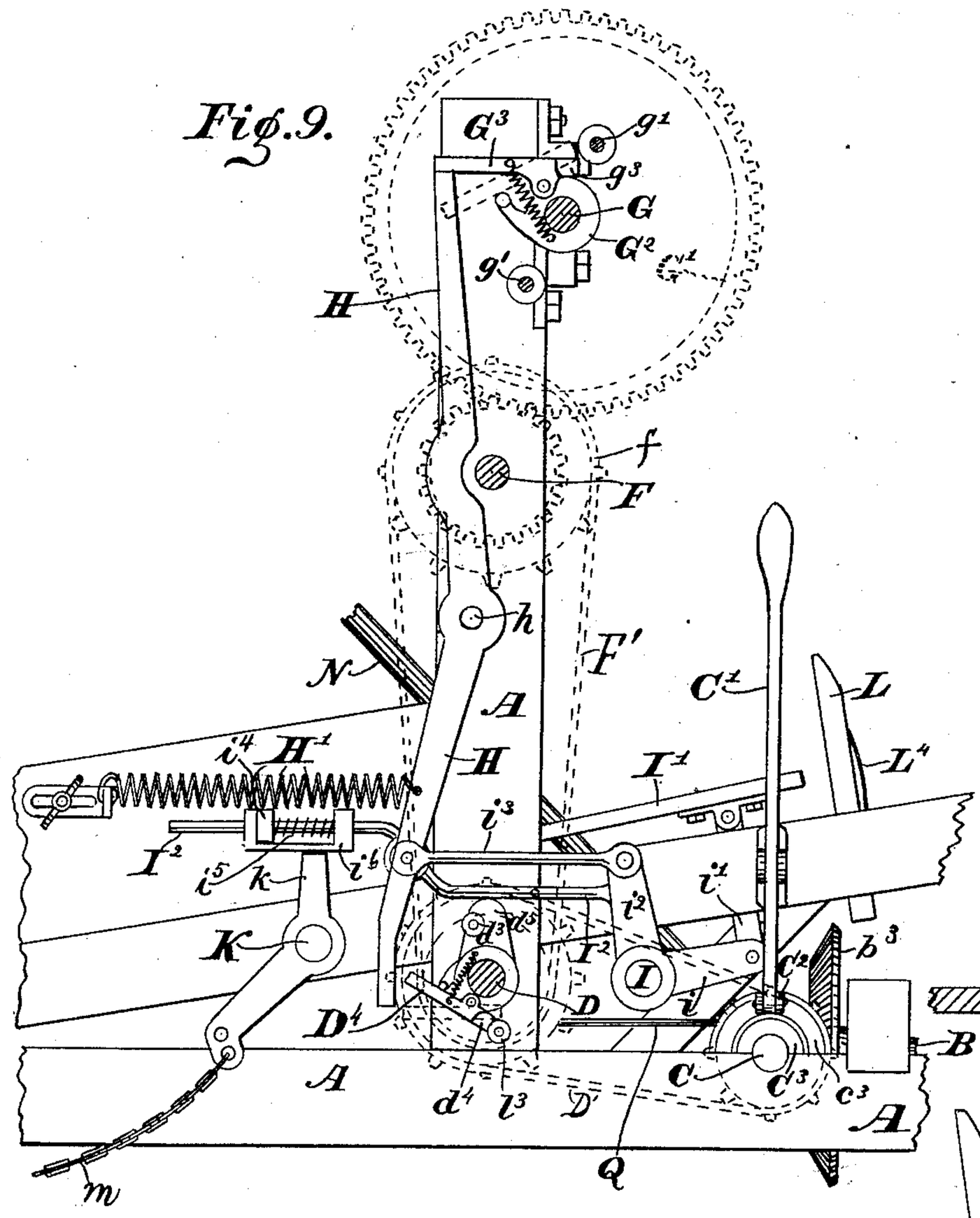


Fig. 12.

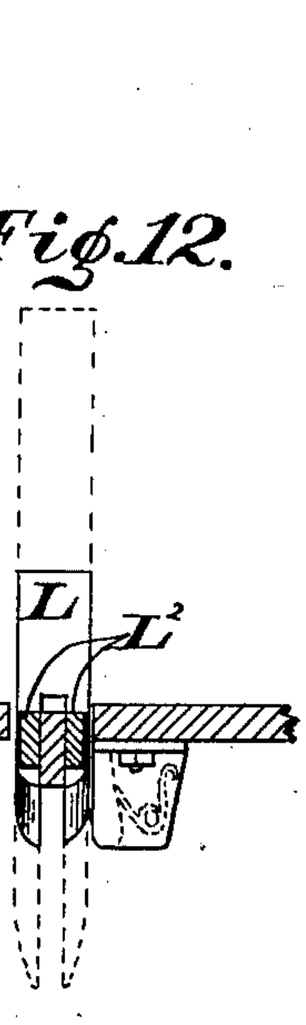


Fig. 10.

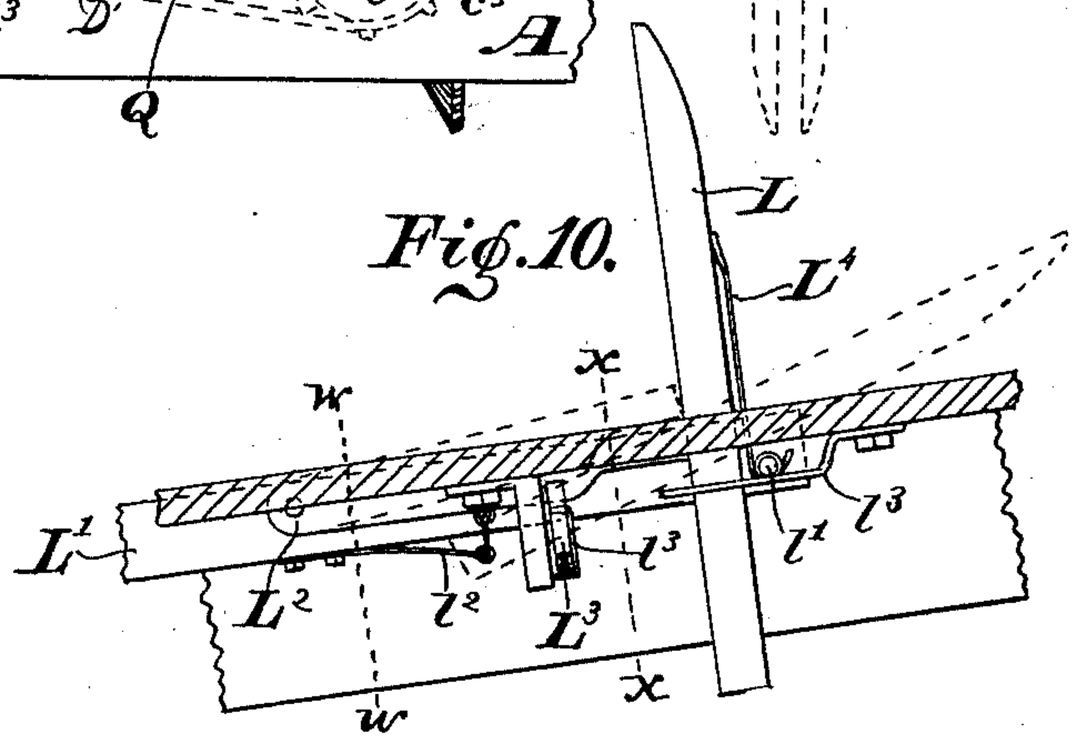
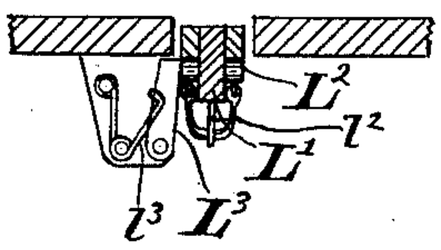


Fig. 11.



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(No Model.) 6 Sheets—Sheet 6.

C. S. HENSLEY.

SELF BINDING REAPING MACHINE.

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Fig. 13.

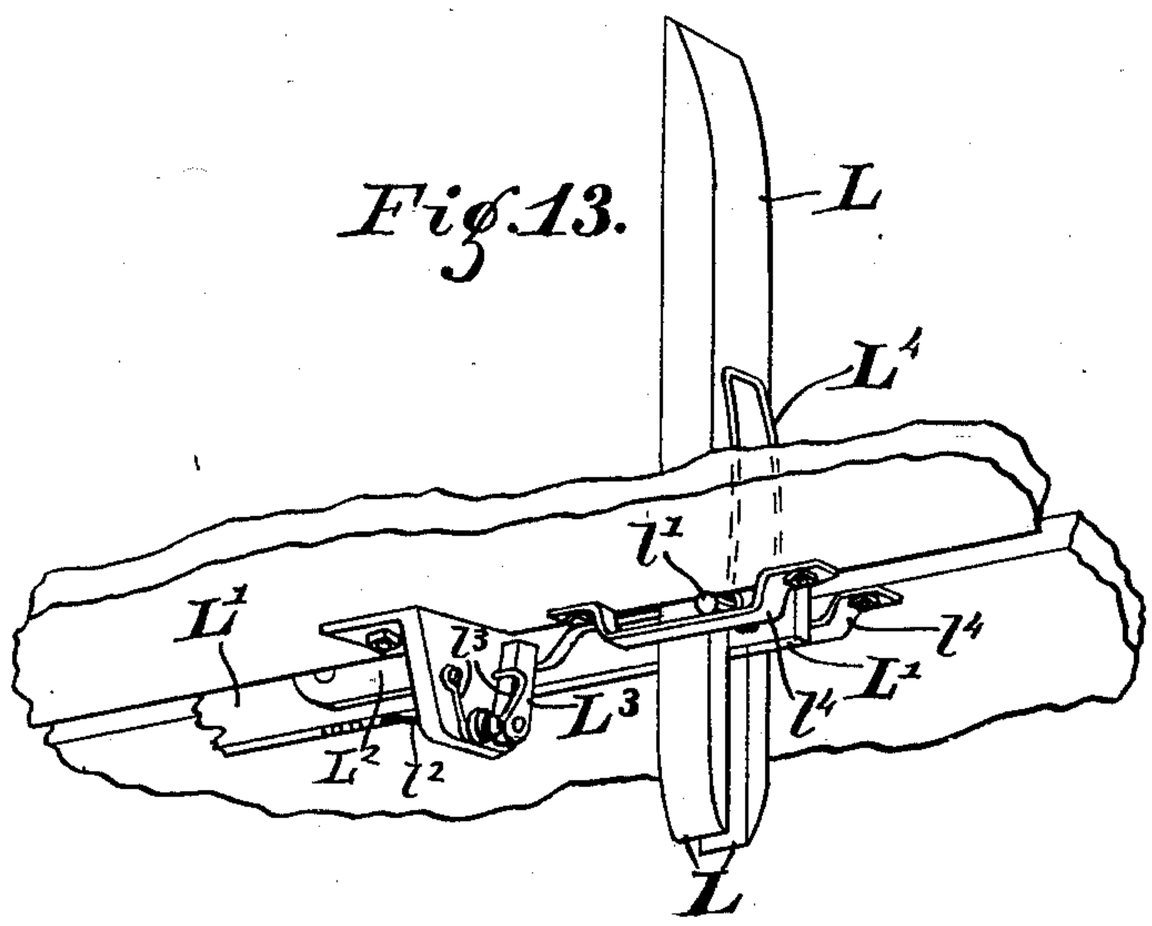


Fig. 14.

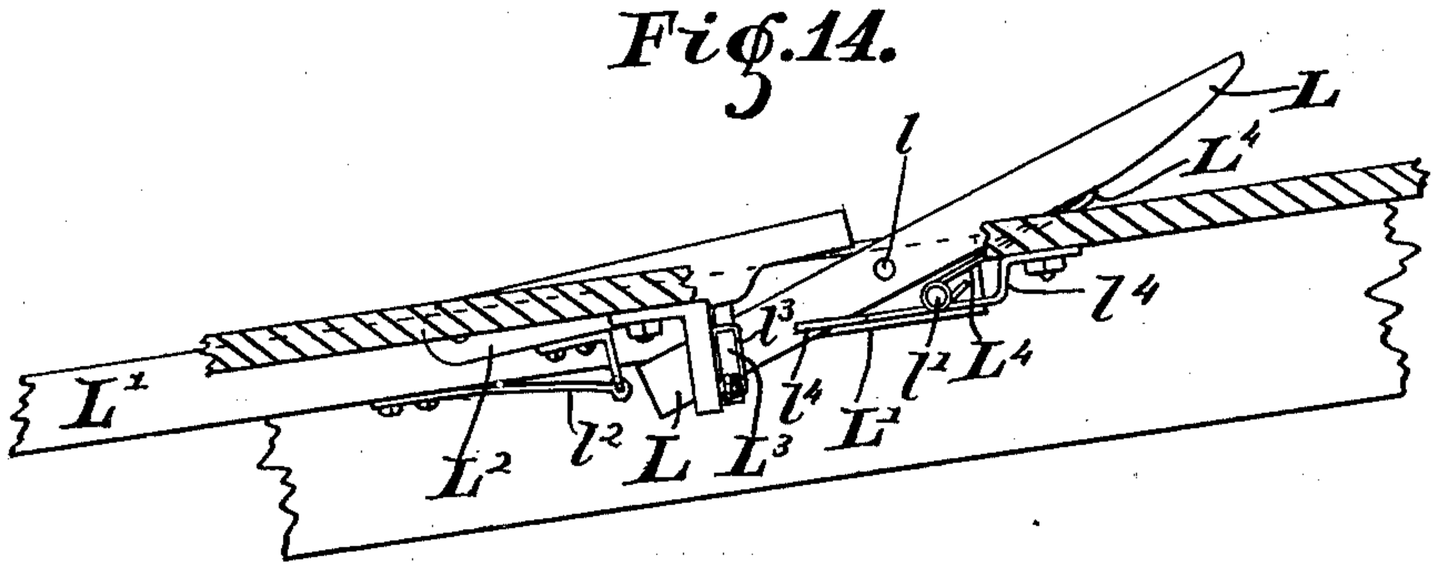
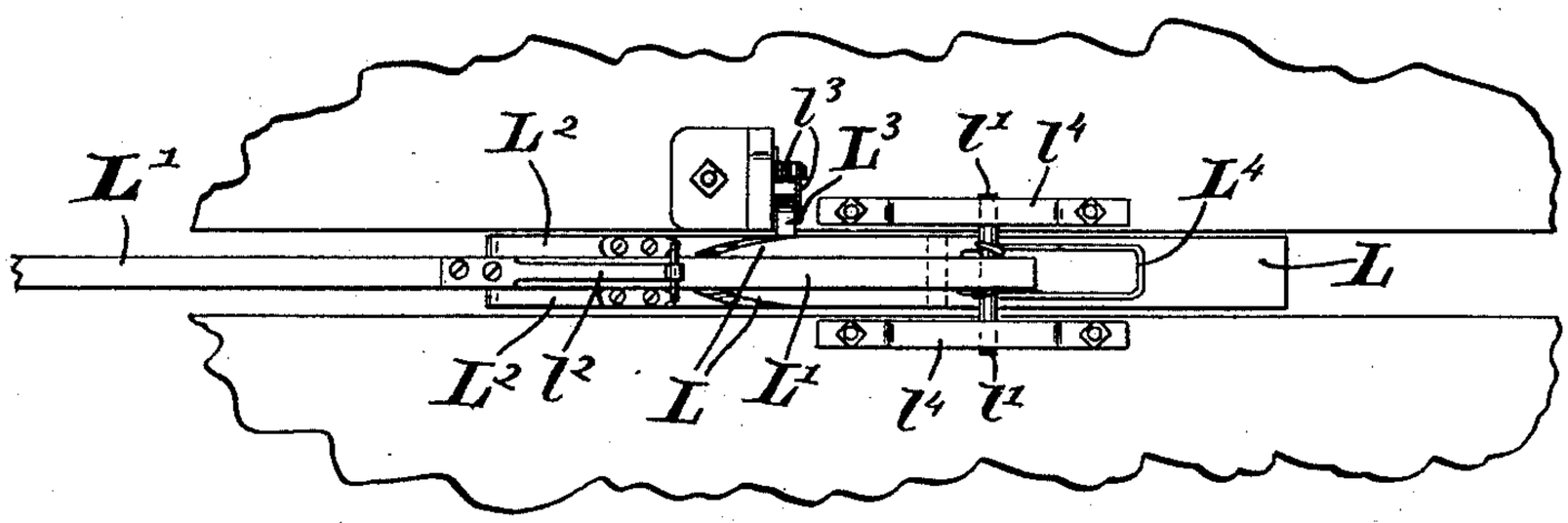


Fig. 15.



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UNITED STATES PATENT OFFICE.

CHARLES S. HENSLEY, OF LAWRENCE, INDIANA, ASSIGNOR OF ONE-HALF TO WILLIAM HENSLEY, OF SAME PLACE.

SELF-BINDING REAPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 341,657, dated May 11, 1886.

Application filed December 5, 1883. Serial No. 113,636. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. HENSLEY, of the town of Lawrence, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Self-Binding Reaping-Machines, of which the following is a specification.

My said invention consists in a new and improved construction of several of the details of self-binding reaping-machines, whereby the operation of such machines is simplified, and their cost lessened, as will be hereinafter particularly described.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a top or plan view of a machine embodying my said invention; Fig. 2, a rear elevation of the same; Fig. 3, a front elevation; Fig. 4, a side elevation; Fig. 5, a transverse vertical sectional view, looking toward the front of the machine from the dotted line *z z* in Fig. 1; Fig. 6, a horizontal sectional view, looking downwardly from the dotted line *y y* in Fig. 5; Fig. 7, a view similar to a portion of Fig. 5. on an enlarged scale; Fig. 8, an under side plan of substantially the portion shown in Fig. 7; Fig. 9, a view on an enlarged scale, similar to a portion of Fig. 2, except that the wheels, &c., are removed to show the portions just inside the wheels more plainly, said wheels, &c., being, however, indicated by dotted lines; Fig. 10, a detail view, on a still further enlarged scale, of the fingers against which the grain packs as it is drawn up under the binder and adjacent parts; Fig. 11, a cross-section of the same looking to the left from the dotted line *x x*, Fig. 10; Fig. 12, a cross-section thereof, looking to the right from the dotted line *w w*, Fig. 10, the parts, however, being in different position; Fig. 13, a perspective view of the parts shown in Fig. 10; Fig. 14, a view similar to Fig. 10, showing the parts in the position they occupy when the compressor-finger is forced over, and Fig. 15 an under side plan of the same.

In said drawings, the portions marked A represent the frame-work of the machine; B B′, the wheels on which the machine is mounted; C, the main shaft; D, the carrier-belt-driving shaft; E, the carrier-belts; F, a counter-shaft, through which the knotter-actuating shaft is driven from main shaft; G, the binder shaft; H, a stop or trip arm, which stops first one and then the other of the shafts D and G from revolving; I, a rock-shaft, through which said trip-arm is operated; J, the needle; K, a rock-shaft, through which said needle is operated, and which also operates a finger against which the grain packs before being bound; L, said finger, and M cut-off fingers which stop the grain from passing up under the binder-shaft while a bundle is being bound.

The frame A is of a suitable construction to support the mechanism, but has no peculiar features, and therefore needs no special description, as will be readily understood upon examination of the drawings.

The wheels B B′ have short axles *b b′*, which are mounted in suitable bearings on the frame A and support the machine. The main drive-wheel B has a gear-wheel, B^2, attached to its inner face, which, through a counter-shaft, B^3, and suitable gear-wheels, b^2 b^3 c^3, drives the main shaft C.

The main shaft C has mounted thereon the gear-wheel c^3, by which it is driven, and c^2, by which it drives the shaft N, and sprocket-wheel *c′*, by which it drives the shaft D. The gear-wheel c^3 is loosely mounted on this shaft, and revolves loosely thereon, except when engaged therewith by the sliding clutch C^3, said clutch being mounted on said shaft by means of a spline and operated by the lever C′ through the connecting-rod C^2, as is usual in such devices.

The shaft D is driven from the main shaft C by a chain-belt, D′, which connects the sprocket-wheels *c′* and *d′*. It bears the several sprocket-wheels *d*, by which it drives the carrier-belts E, and also the sprocket-wheel D^3, by which, through the chain-belt F′ and sprocket-wheel *f*, the counter-shaft F is driven. The sprocket-wheels *d′* and D^3 are secured together, and are loosely mounted on the shaft D, and so arranged that said shaft may be engaged with and driven thereby or remain motionless. This is accomplished by the use of the trip-arm H, the lower end of which is adapted to engage with a catch, D^4, having a lug, d^4, (see especially Figs. 8 and 9,) at times, and at times to be disengaged therefrom, said

catch being pivoted on a hub rigidly secured to said shaft. Upon the inner side of the wheel D^3 are pins d^3, preferably provided with anti-friction rollers, as shown, (see Fig. 9,) which are adapted to engage with said catch D^4, or, rather, with the lug d^4 thereon. As will be seen, (see Fig. 9,) this catch is only in engagement with the pins on the side of the sprocket-wheel when the trip-arm H is out of engagement therewith. When said trip arm is in engagement, (see dotted lines,) the said pins will pass around clear of the lug d^4 on said catch, and thus permit the shaft to remain motionless.

The carrier-belts E are the usual chain belts commonly employed for similar purposes, and run over wheels d and d^2 on the shafts D and D^2, the latter of which is an idle-shaft and the former a driving-shaft. These belts or chains have secured thereto at proper intervals jointed arms E′, which take the place of the multitudinous "packers" and "butters" commonly used in machines of this character to carry the grain into the proper position for binding. The gear-wheels e' of said arm engage with appropriate rack-bars, a a', secured upon the sides of the ways through which the standards pass, and are thus turned half around as they go under and come up onto the apron, thus bringing the front side to the front while advancing in one direction, and the rear side to the front while advancing in the other. As these arms and the mechanism connected immediately therewith are not made a part of this application, they will not be further described herein, but are expressly reserved for the subject-matter of a future application, being shown and sufficiently described herein to illustrate their use in connection with the other mechanism.

The counter-shaft F simply serves the purpose in connection with gearing of regulating the speed of the shaft G and causing it to revolve oppositely to the shaft D.

The shaft G is the usual binder-shaft, and carries the usual mechanism for holding and knotting the twine. As this mechanism is no part of my invention, it will not be described, except incidentally in describing the parts operating therewith. Upon this shaft G a gear-wheel, G′, is loosely mounted, and a device for stopping and starting said wheel is rigidly mounted on said shaft alongside the hub of the wheel. This device consists of the hub G^2 and an arm or catch, G^3, pivoted thereto, which is adapted to engage with the trip-arm H, as will be presently described. Upon the inner face of the wheel G′ are pins g', preferably provided with anti-friction rollers, as shown, (see Fig. 9,) which are adapted to engage with a lug, g^3, on the catch G^3 (see Figs. 1 and 9) when said catch is in the position shown by the dotted lines in Fig. 9, but to pass over said lug when said catch is in the position shown by the full lines in said figure. Thus, when said parts engage, the wheel G′ will revolve the shaft G and operate the knotter, but when not engaged the said wheel revolves loosely, and the shaft and knotter remain quiescent.

The catches D^4 and G^3 are held in position by stops and springs upon the hubs, to which they are attached, as shown, said springs being adapted to hold them against said stops, and thus keep the lugs thereon out where the pins on the wheels will come in contact therewith, except when forced into different position by the trip-arm H. A bar, G^4, is secured to a crank-arm, G^5, on this shaft, and thus operates the rock-shafts K and M′ as said shaft revolves, as will be hereinafter described. Riders G^6 extend from the knotter down to a cross-bar on the frame and hold the grain down, so that it will pack tightly to be formed into a bundle, and force down the bars I′, as hereinafter described.

The trip-arm H is secured to the frame by a pivot, h, and is adapted to engage with first one and then the other of the catches D^4 G^3, and thus hold said catches out of engagement with the projecting pins on the wheels, and thus permit one of the shafts D or G to remain motionless, while the other is caused to revolve. This trip-arm is operated by the bars I′, which are secured to the rock-shaft I in the following manner: As the grain is brought up by the carrier-arms or standards E′, it is packed in under the bars G^6 upon the bars I′, which project above the floor of the machine and against the finger L When the load of grain is compact and heavy enough to overcome the spring H′, it presses said bars I′ downwardly, and partly rotates the rock-shaft I through the means of the link i' and arm i, and thus through the arm i^2 and link i^3 draws the lower end of the trip-arm H toward the said rock shaft, thereby freeing the engagement between said trip-arm and the catch G^3, and causing the said catch to engage with the pins g', and thus revolve the shaft G and operate the knotter. As this is done, the lower end of the trip-arm swings in, and as the catch D^4 revolves it comes in contact with the lower end of the trip-arm H, which disengages said catch from contact with the pins d^3 on the inside of the wheel D^3, and thus stops the revolution of the shaft D and the operation of the carrier-chains. By this means while a bundle of grain is being bound the carrying of any more grain into position to be bound or under the needle is stopped. If there should be any tendency of the carrier-chains to continue, and thus defeat the last-named result, it is effectually checked by the arms M, which are promptly raised by the revolution of the shaft G, which, through the arm G^5, bar G^4, and chain m, operates the rock-shaft M′, on which the arms M are mounted, elevating said arms into upright position. The bar G^4 at the same time partly rotates the shaft K, thus operating the needle J, and also, through the bar L′, the compressor-finger L. As the wheel G′ revolves, and the shaft G returns to the position it occupies when at rest,

the spring H′ (the weight on the bars I′ being removed) operates to pull the bar H back where it will engage with the catch G^3 and release the catch D^4, thus causing the shaft D to be revolved by the pins on sprocket-wheel D^3 becoming engaged therewith, thereby starting the carrier-belts again into operation, and at the same time elevating the bars I′ to receive the grain which is to form another bundle. Should the bars I′ get caught by the straw, and thus fail to rise promptly, the arm *k* will engage with the spring-catch i^3 on the bar I^2, and through the arms and links i^2, *i*, and *i′* force said bars I′ at once into elevated position.

The rock-shaft I is the means whereby the bars I′ are enabled to operate the trip-arm H, as has been described. Its arms and the links and bars which are connected thereto are so proportioned and arranged that the various operations produced thereby are performed in proper time and with exact regularity.

The bar I^2, the operation of which has been briefly described, may be described more in detail as follows: It has a spring-slide, i^6, mounted thereon, which is held in place by the nut i^4, secured to said rod between the arms of said slide, between which and the end with which the arm *k* comes in contact is interposed a spring, i^5. As said arm operates on said bar through said slide, it of course compresses said spring, and before the arm reaches the upright position shown (see especially Fig. 9) said spring exerts considerable force against it. Just before it reaches this position, however, a cam, d^5, on the shaft D comes in contact with and lifts said rod out of engagement with said arm, permitting said parts to assume their normal position ready for another operation, as shown.

The needle J is mounted on the shaft K, and as said shaft is rocked said needle is raised, carrying the cord with it, and engages with the knotter on the shaft G, tying the knot and securing the bundle, as is common in this class of machines. The needle itself, however, is of a peculiar construction, and is operated in a peculiar manner. The main stem of said needle is fixedly secured to the rock-shaft K and moves therewith. The point *j*, which carries the cord, is, however, jointed to the main portion, and is operated, (as indicated by the dotted lines in Fig. 7,) as said main portion rises, by the rod J′, which is pivoted to a projection, *j′*, on the frame-work of the machine, and to a projection, j^2, on the point *j*, which extends out on the opposite side of the pivot from the part that carries the cord in form similar to a bell-crank lever. This permits the needle to be in substantially right-angular form while making its stroke without occupying the space that form would require at other times when folded down.

The rock-shaft K serves to operate the needle, and also, through the arm *k*, the rod I^2, as before described. As will be seen, it is caused by the rod G^4 to make a complete movement at each revolution of the shaft G, as is necessary to correspond with the operation of tying a bundle of grain.

The finger L serves to keep the grain in position while being gathered into a bundle before the binder operates thereon, and its normal position is best shown in Figs. 7 and 10. As the needle J rises, however, it operates through the rod or bar L′ to first draw said finger toward the needle for a short distance, and then, as it returns, to release it, so that it may be forced back into the position shown by the dotted lines in Figs. 7 and 10, as will now be described.

Alongside the bar L′ is a stop, L^2, (or, rather, two—one on each side,) the point of which, when in normal position, rests against the face of the finger L at or below its pivot *l*, (see Fig. 7,) and thus prevents it from being forced over backward by the grain. The stops have a portion of their under faces inclined, (see Figs. 7, 10, and 13,) and as the finger returns backward after being drawn forward by the bar L′ the stops L^2 come in contact with and are forced up by a trip, L^3, (which is pivoted to the floor of the machine or a suitable bracket thereon,) and the fingers L thus permitted to be pushed over backwardly into the position shown by the dotted lines. The lower ends of these fingers are tapered, (see Figs. 12 and 13,) and as they come up under the floor as the top ends are pushed over pass behind the trip L^3, forcing said trip out of engagement with the stop L^2, and permitting the latter as the finger L regains its upright position (which it does by aid of the spring L^4) to drop down in front of and hold said finger, as shown. The pin *l′*, to which the spring L^4 is attached, serves also as a cross-bar to sustain the end of the bar L′, is rigidly attached thereto, and rests in slides i^4, secured to the under side of the platform or table of the machine, as shown. Springs l^2 and l^3 operate to hold the parts L^2 and L^3 respectively in their normal positions.

The various parts are so arranged and timed that while the finger L is disengaged and adapted to be forced down the arms on the knotter in coming around catch the tied bundle and throw it against and over said finger off the machine, forcing said finger down as it goes.

The arms M are mounted on a rock-shaft, M′, and are operated through the crank-arm *m′* and chain *m* by the bar G^4, as before described, and as will be readily understood by a reference to the drawings, especially Fig. 2.

The operation of the machine described, which embodies my invention, may be briefly recapitulated as follows: The grain upon being cut falls upon the apron, as usual, and is carried by the arms E′ on the carrier-chains E up under the binder-shaft G on top the bars I′, said carriers being driven by the shaft D, which is kept in motion by the clutch arrangement, which is held in position by the trip-arm H, as before described. When there is a sufficient quantity of grain on the bars I′ to overcome the spring H′, the trip-arm is there-

by shifted through the agency of the rock-shaft I and the various links, arms, and rods connected therewith. This stops the shaft D and sets the shaft G in motion, as explained, and the bundle is bound, the needle J being operated through the shaft K by the rod G^4, attached to said shaft G. The rod G^4 also operates the rock-shaft M′ and arms M thereon, and thus prevents the possibility of any grain passing up under the binder or needle until said needle is returned to position. The movement of the shaft K also unlatches the finger L, permitting it to fall backward and allow the bundle, which is by this time tied, to be thrown off the machine.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the trip-arm H, the spring H′, secured at one end to the frame and at the other to the lower part of said trip-arm, the rock-shaft I, the bars I′, and the arm i, link i', arm i^2, and link i^3, connecting the lower part of said trip-arm and the outer ends of said bars I′ to said rock-shaft I, whereby the weight of grain upon said bars is adapted to operate said trip-arm through said rock-shaft, substantially as set forth.

2. The combination of the rock-shaft I, the bars I′, the link i', the arms i i^2, the rod I^2, the spring-slide thereon, the arm k, and means for operating the same, substantially as set forth.

3. The combination of the shaft I, the arms and links thereon, the bar I′, the rod I^2, the spring-slide thereon, the arm k, and the cam d^5, substantially as described, and for the purposes specified.

4. The combination of the needle J, formed bifurcated at its outer end, the point j, pivoted and adapted to fold down between the forks of said bifurcated end, the rock-shaft K, on which said needle is mounted, the rod J′, pivoted to the projection j' on the frame of the machine at one end and at the other end connected to a projection on the point j, thereby as said needle is raised throwing said point out in position to operate, and as it is lowered drawing said point back and down between the forks of the needle out of the way.

5. The combination of the shaft K, a crank-arm thereon, (which may be an extension of the needle J,) the rod or bar L′, the compressor-finger L, the stop L^2, and the trip L^3, substantially as shown and described, and for the purposes specified.

6. The combination of the finger L, pivoted to the rod or bar L′, the stop L^2, also pivoted to the bar L′, the trip L^3, pivoted to the frame and adapted to raise the stop L^2 as the latter moves past it, and ways for guiding and sustaining the moving parts, substantially as set forth.

7. The combination of the finger L, secured to the bar L′ by pivot l, a stop on the front side of said finger, which abuts against it at or below the pivot, a spring, L^4, on the back side of said finger adapted to return it into upright position after being thrown down, and a cross-bar, l', which extends out and rests on the slides l^3, and said slides, substantially as set forth.

8. The combination of the bar L′, having a cross-pin, l', therein, slides l^3, in which said cross-pin l' rests and moves, a finger, L, secured to said bar L′ and adapted to move therewith, and means whereby said finger is commonly held in upright position, but is upon occasion permitted to be thrown backward, substantially as described, and for the purposes specified.

In witness whereof I have hereunto set my hand and seal at Indianapolis, Indiana, this 29th day of November, A. D. 1883.

CHAS. S. HENSLEY. [L. S.]

In presence of—
C. BRADFORD,
E. W. BRADFORD.