

(No Model.)

3 Sheets—Sheet 1.

J. S. DAVIS.

MECHANISM FOR ACTUATING GRAIN BINDERS.

No. 311,420.

Patented Jan. 27, 1885.

Fig. 1.

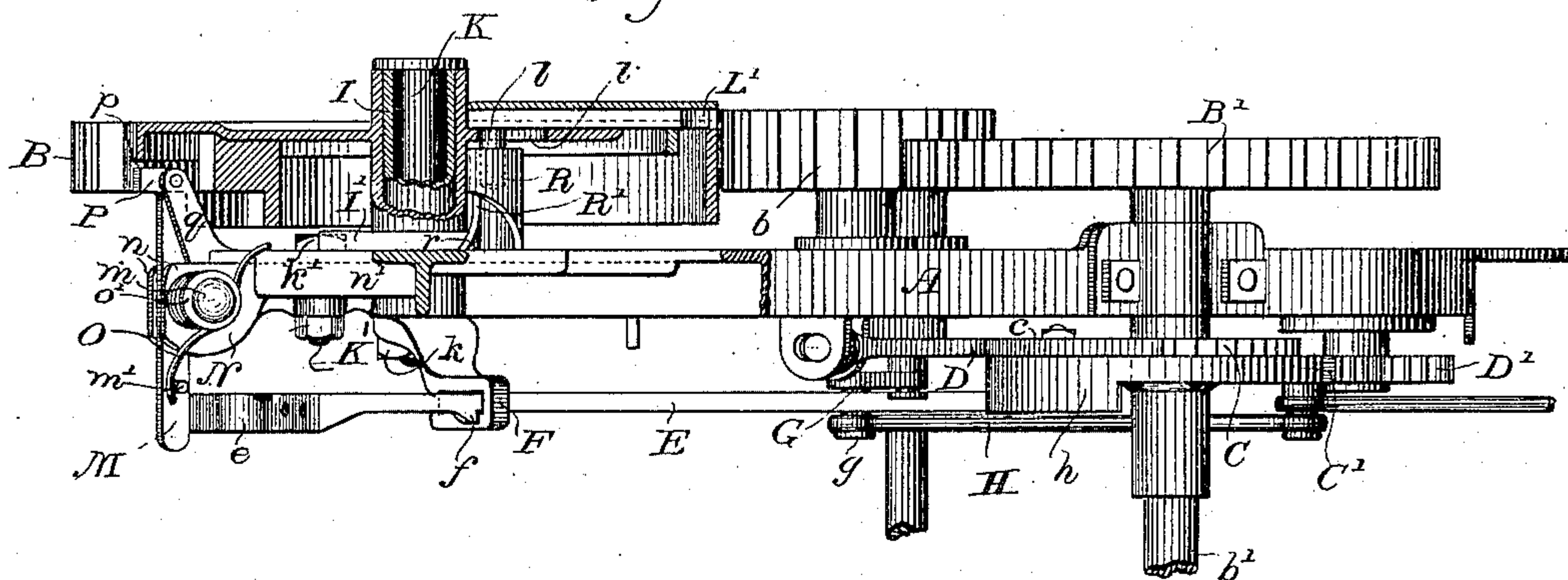
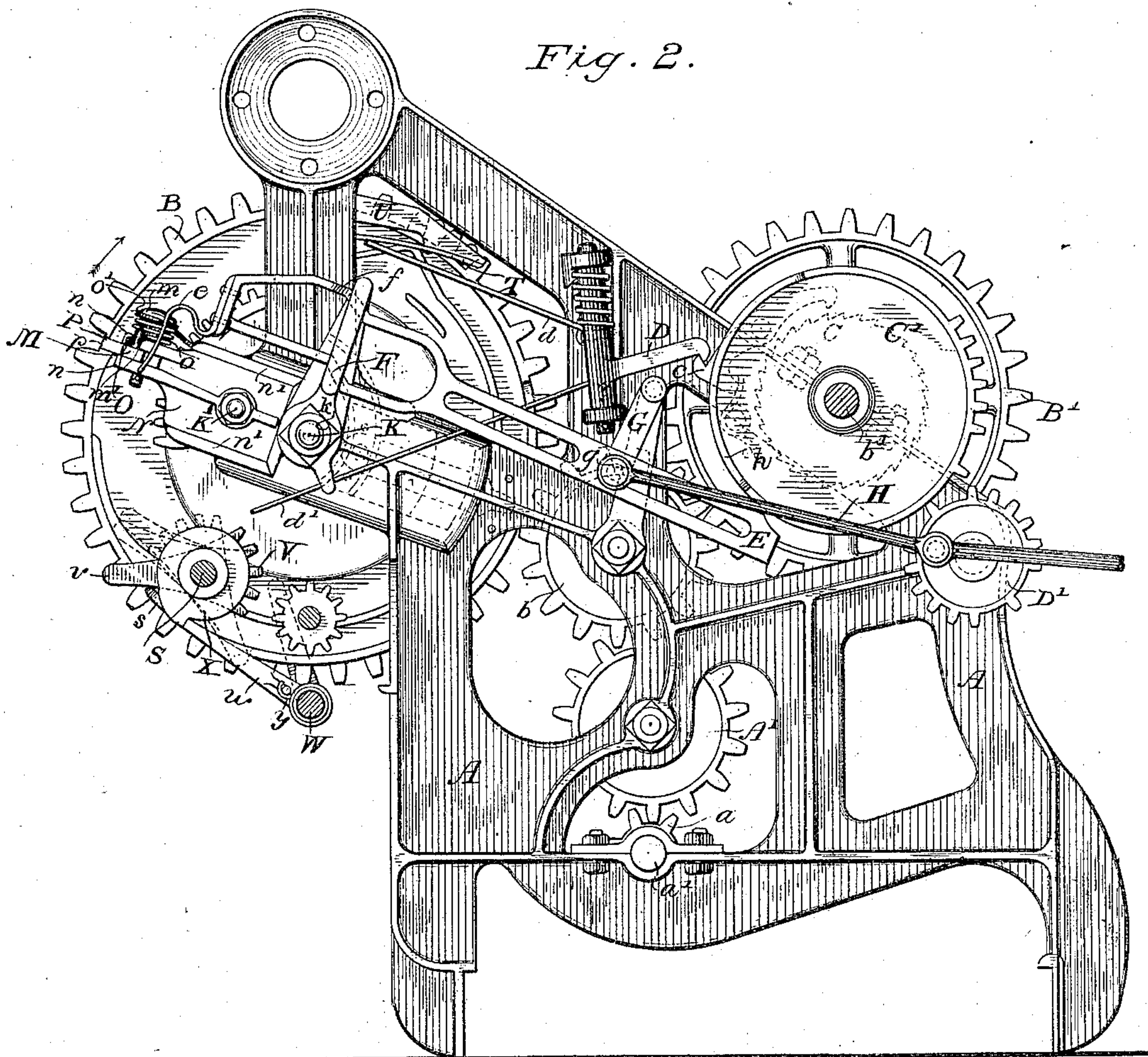


Fig. 2.



WITNESSES

Wm A. Skink.
Alfred B. Newman.

INVENTOR

John S. Davis.

By his Attorneys

Goldwin, Hopkins & Weston.

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Fig. 3.

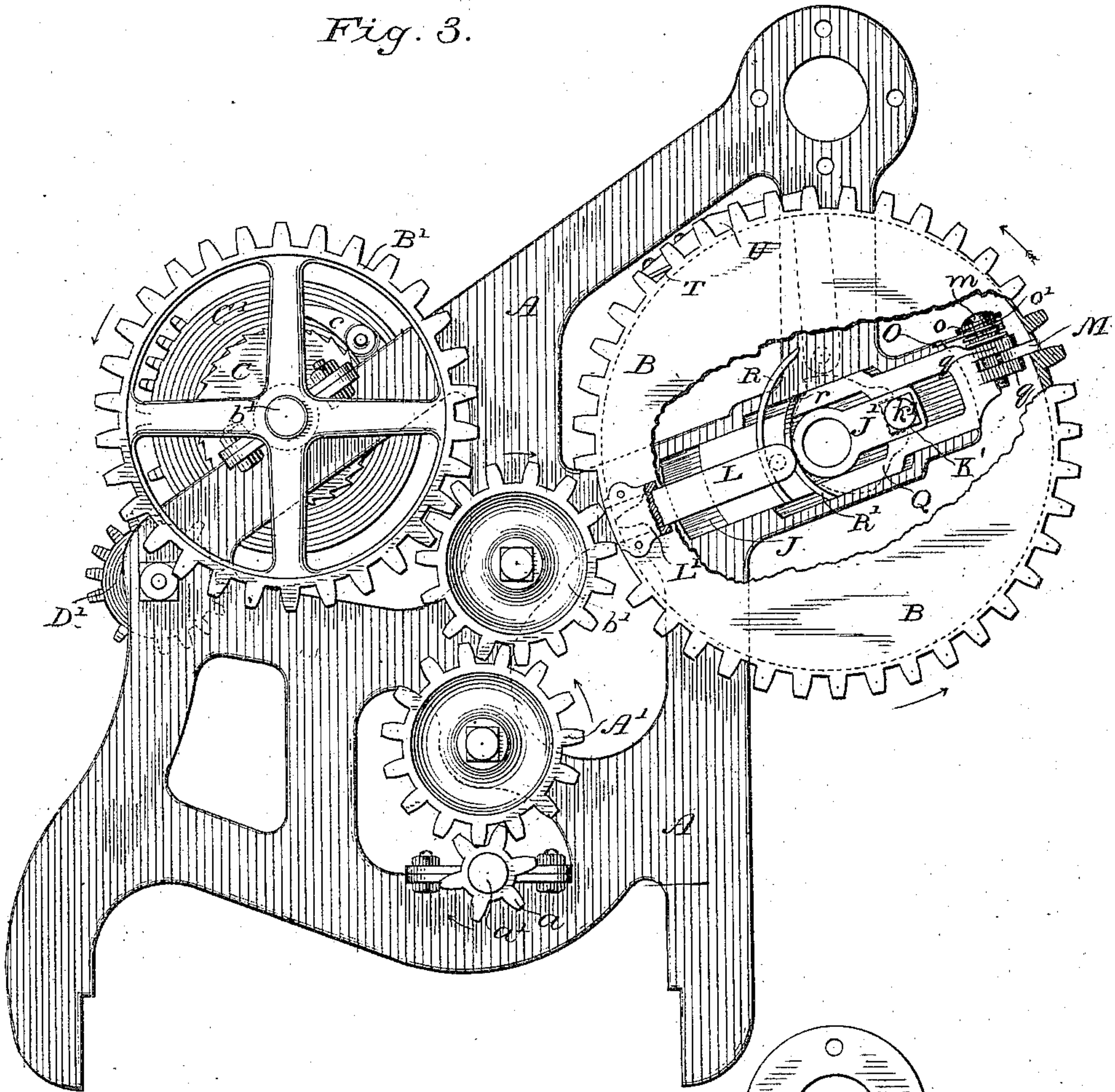
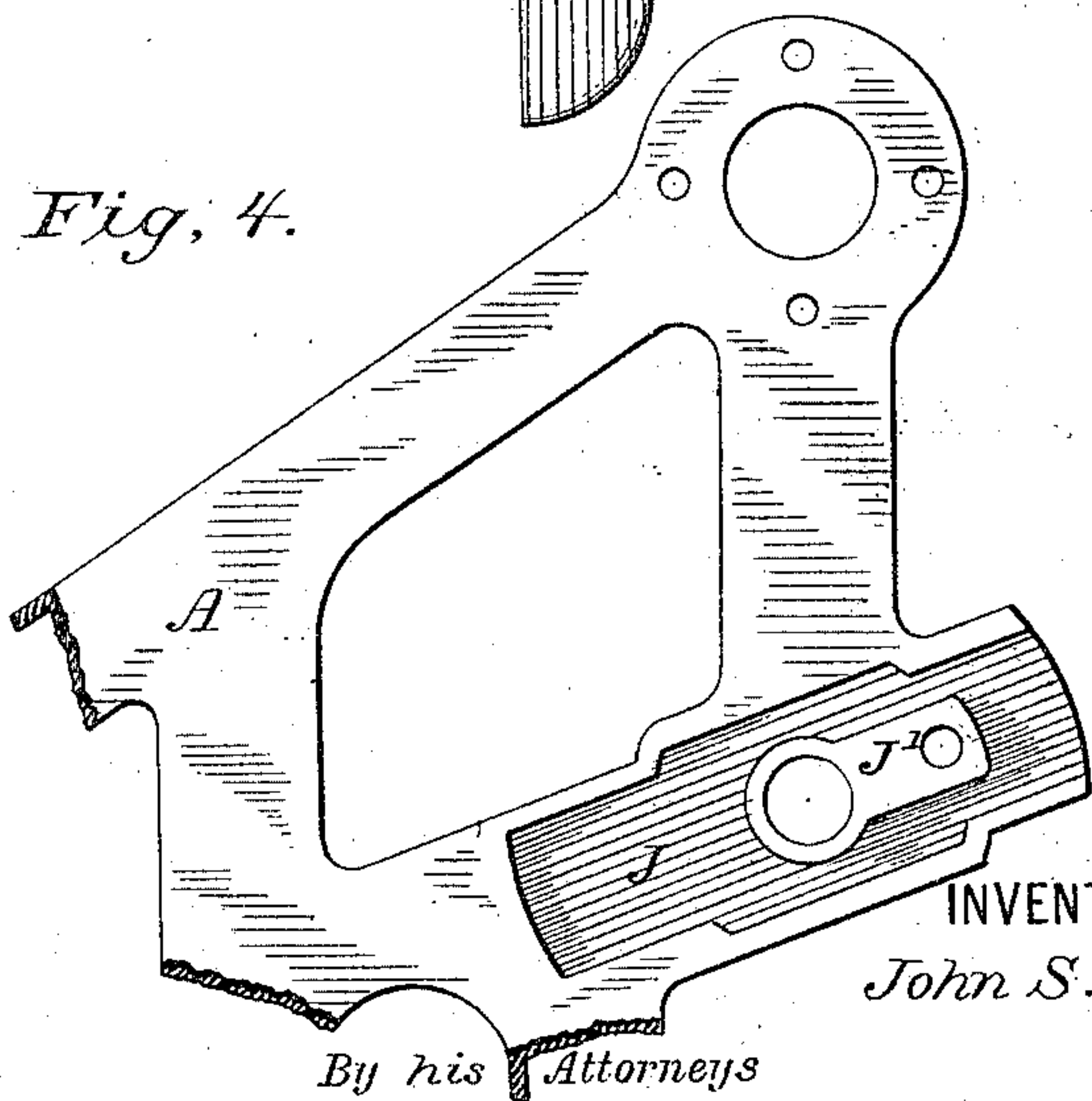


Fig. 4.



WITNESSES

Wm A. Skinkle
Alfred C. Newman.

INVENTOR

John S. Davis,

By his Attorneys

Geldwin, Hopkins & Peyton.

(No Model.)

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J. S. DAVIS.

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Fig. 6.

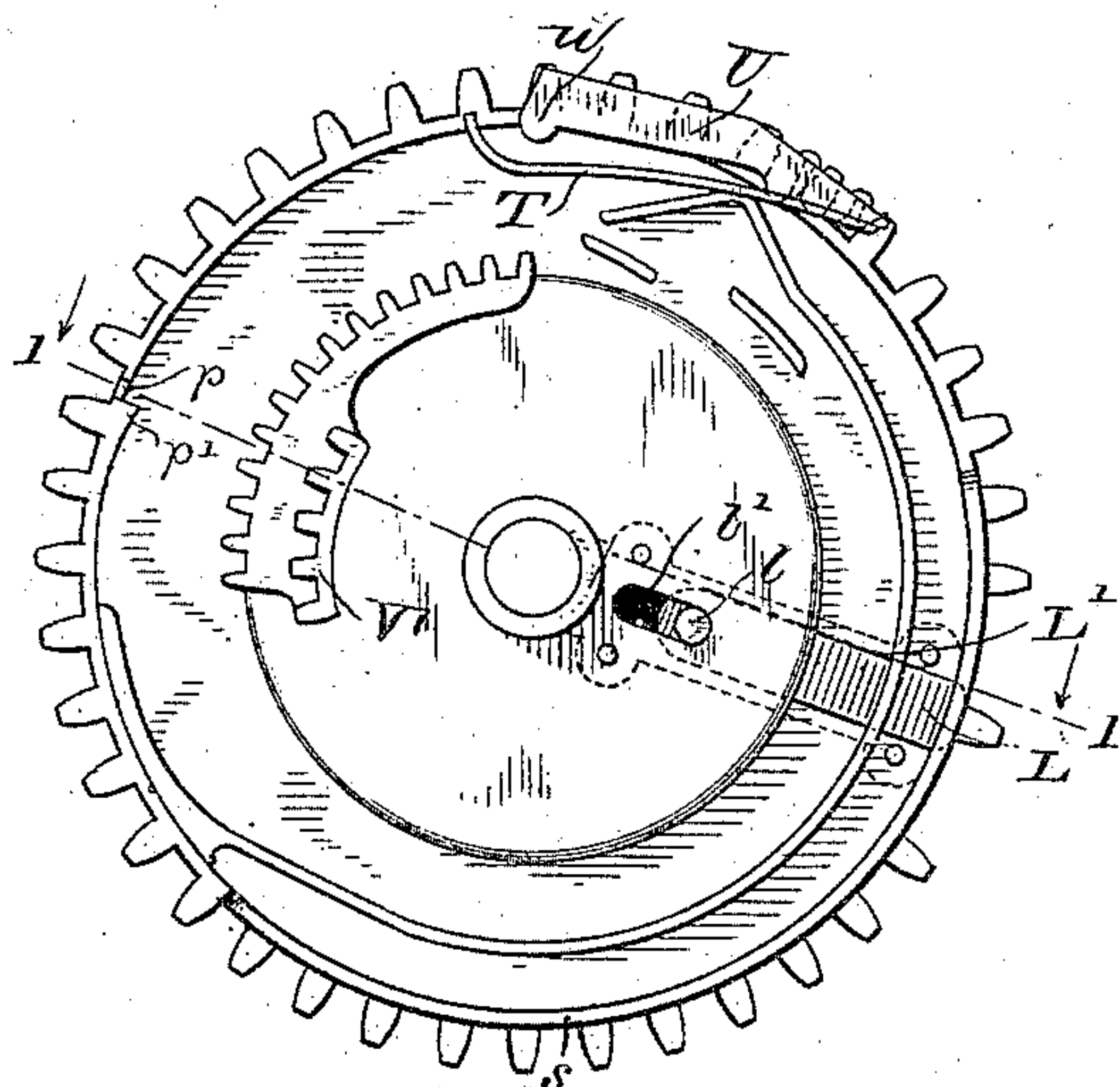


Fig. 5.

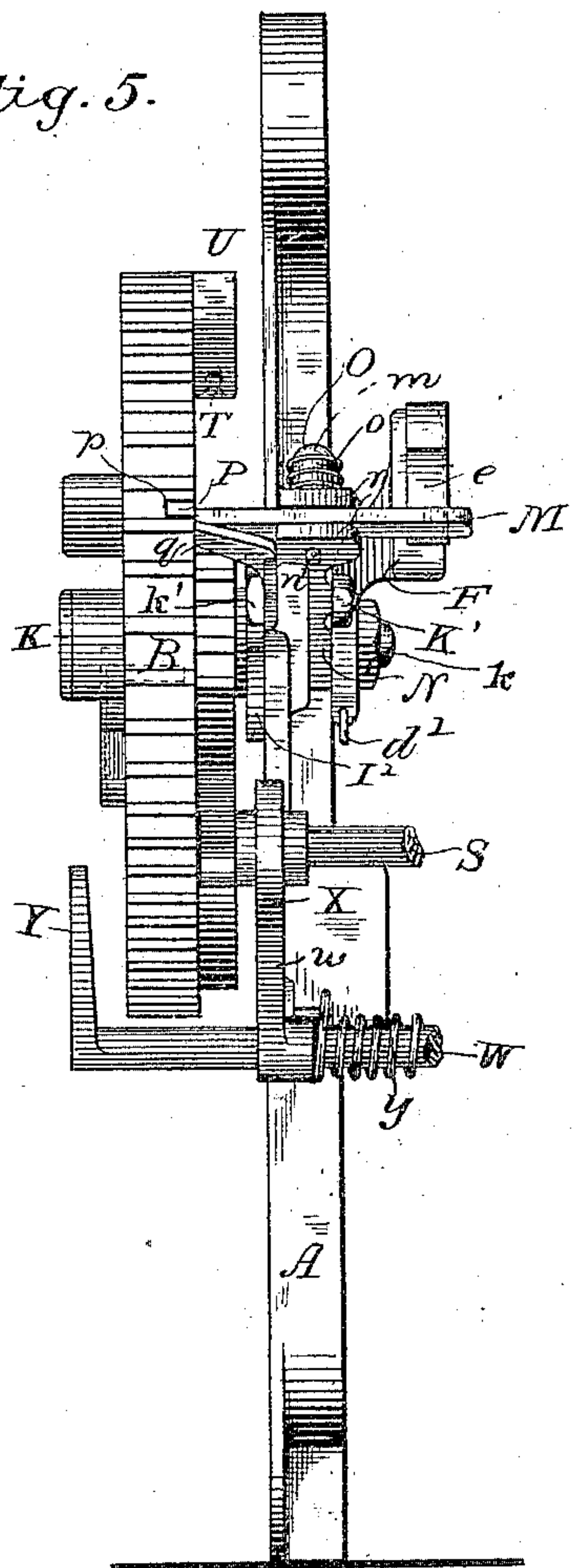


Fig. 9.

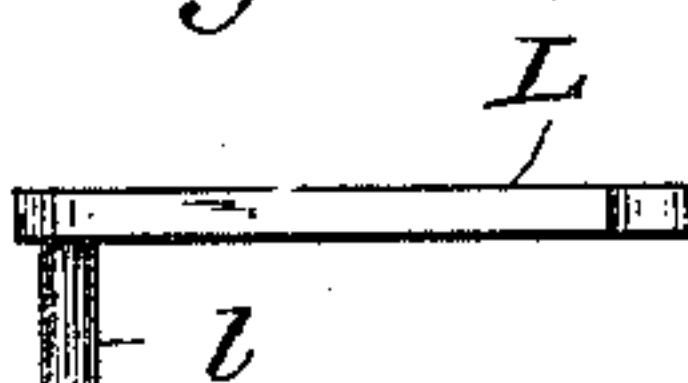


Fig. 7.

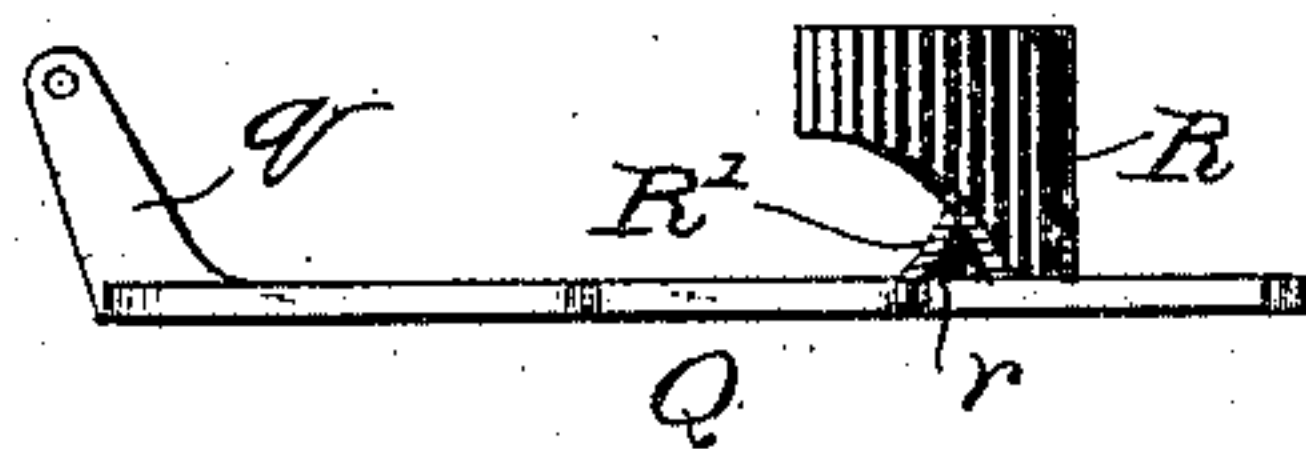


Fig. 10.

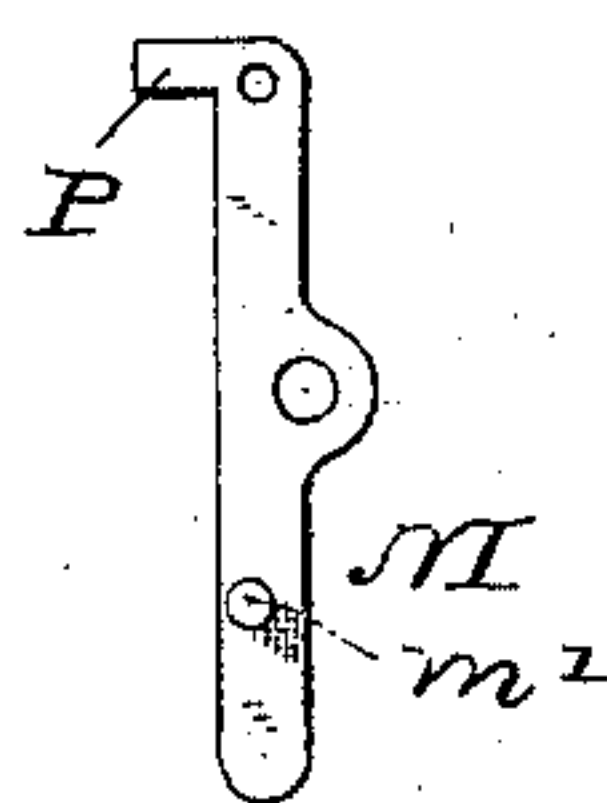


Fig. 8.

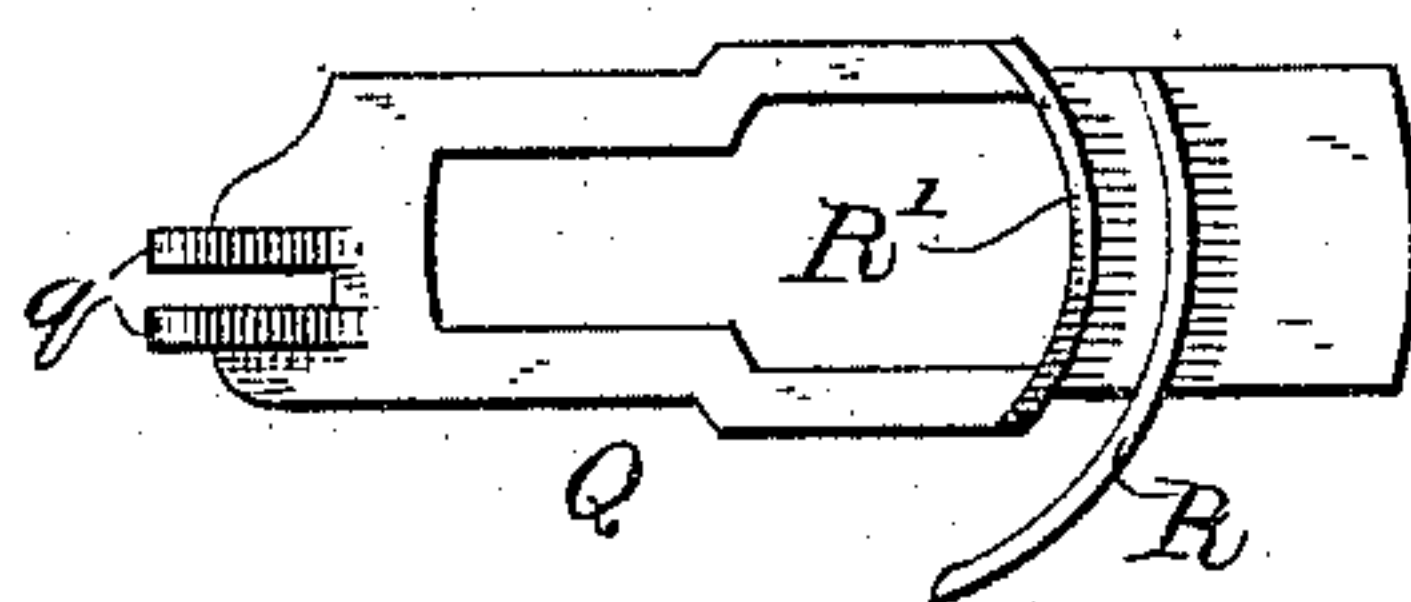


Fig. 11.

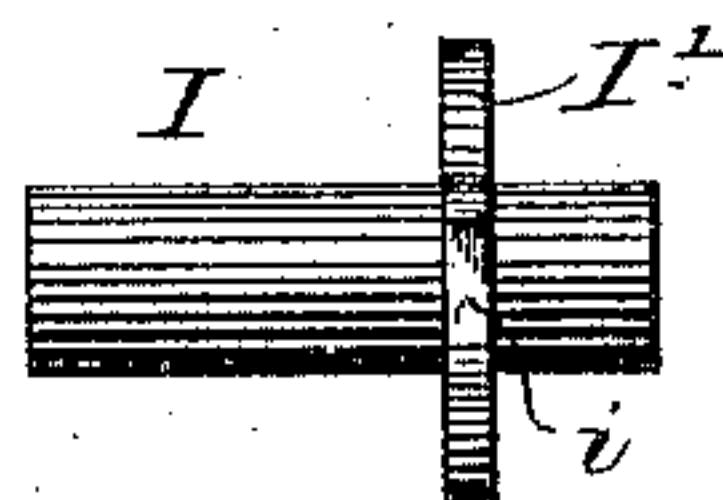
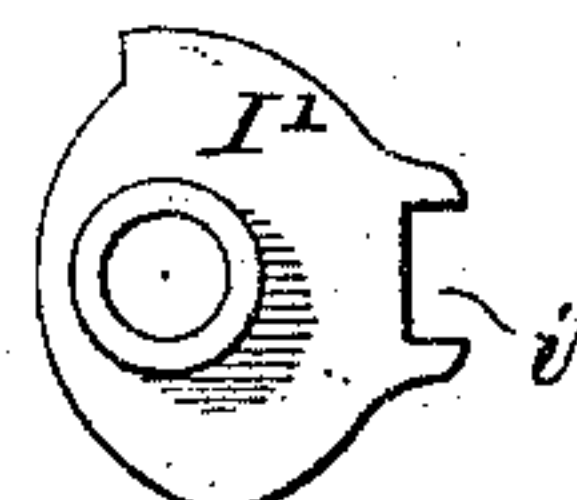


Fig. 12.



WITNESSES

Wm A. Skink.
Alfred C. Newman.

INVENTOR

John S. Davis.

By his Attorneys

J. S. Davis, Attorney.

UNITED STATES PATENT OFFICE.

JOHN S. DAVIS, OF TOLEDO, OHIO.

MECHANISM FOR ACTUATING GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 311,420, dated January 27, 1885.

Application filed November 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. DAVIS, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Mechanism for Actuating Grain-Binders, of which the following is a specification.

My invention relates to improvements in actuating mechanism of grain-binders of the class described in sundry Letters Patent of the United States granted me for my inventions, particularly Patents Nos. 274,441 and 275,330, respectively dated March 20, 1883, and April 3, 1883.

The subject-matter deemed novel will hereinafter be distinctly claimed, after being described in connection with the accompanying drawings and by reference to the above-named patents, only those parts of appropriate mechanism illustration of which is thought to be required to convey a proper understanding of my present improvements being now shown.

Figure 1 is a view showing portions of the mechanism in plan and other portions in section, as in part indicated by the line 1 1 of Fig. 6, parts being broken away and other parts omitted. Fig. 2 is a rear elevation with various shafts in section. Fig. 3 is a front elevation with parts broken away and other parts omitted. Fig. 4 is a front elevation of a portion of the frame. Fig. 5 is a side elevation with parts omitted and other parts broken away. Fig. 6 is an elevation of the main actuating-gear, showing its inner face or rear side and its attachments. Figs. 7 and 8 are views of a device by the actuations of which a sliding clutch tooth or bolt of the main gear is controlled. Fig. 9 is a view of the sliding clutch-bolt of the main gear. Fig. 10 is a view of a lever by which the main gear is locked against movement and the controller of its sliding clutch-bolt actuated. Figs. 11 and 12 are views of the stud-shaft upon which the main gear is mounted.

A gear-plate or upright frame, A, supports the binder-actuating mechanism, and this mechanism and the frame are in most respects the same as heretofore employed by me, and patented as above stated. As in this instance shown, the driving-gear *a* of the binder-gearing, instead of being located as before, is mounted by its shaft *a'* near the bottom of the

frame and beneath the idle-gear A', with which it meshes, and by way of which motion is imparted to the gear *b*, which actuates both the intermittently-operating main gear B and the continuously-operating gear B', which is fast on the shaft *b'* of a suitable packer, as before. The stud-shafts about which the gears A' and *b* rotate are properly secured to the frame, (these stud-shafts and the manner of securing them in place being preferably such as hereinafter described with reference to the main gear,) and the packer-shaft *b'* is suitably mounted near its front end in a bearing of the frame. Suitable tripping and starting mechanism actuated by the pressure exerted by the grain accumulated for binding serves by its connections with clutch mechanism of the main gear B to throw this gear into action for binding.

The tripping and starting mechanism, the clutch mechanism of the main gear, and the mechanism connecting said clutch mechanism with the tripping and starting mechanism are all as or substantially as described in the before-mentioned Patent No. 274,441, except in the particulars hereinafter specifically pointed out.

The ratchet C, fastened to the packer-shaft *b'*, the intermittently-actuated mutilated gear C', loosely mounted upon said shaft and provided with the spring-actuated vertically-rocking pawl *c* for engagement with the ratchet, the two-motion spring-actuated dog D, and the links *d d'*, by the pull of which the dog is operated to cause it to temporarily release the pawl *c* and allow it to engage the ratchet C, and thus clutch it with the packer-shaft, are all fully described in Patent No. 274,441, and need not be in detail described here. Neither have I deemed it necessary to again show and describe those features of the tripping and starting mechanism by which the links *d d'* are actuated, as shown and described in said patent. As before, the mutilated gear makes one revolution at each actuation, and imparts at each movement a half-revolution to the mutilated pinion D', by the mechanism connected with which the clutch mechanism of the main gear is actuated to throw binding mechanism (not shown) into action. The thrust-bar E of the connecting mechanism for actuating the main-gear clutch mechanism is the same as before, except that when moved outward it is adapt-

ed to act with a yielding pressure upon the clutch mechanism, for a purpose farther on to be explained, and has a lug or stop-shoulder, *f*, which acts against the guide-bracket *F* to limit the movement of the thrust-bar inward, or toward the pinion *D'*. A bent spring, *e*, at the upper or outer end of the thrust-bar insures its action with a yielding pressure upon the clutch mechanism. The swinging arm or crank *G* has a pin, *g*, passing through a slot in the thrust-bar, and the rod *H* connects this crank-pin *g* with a wrist-pin on the pinion *D'*; but instead of a mere lug upon the mutilated gear *C'*, as before, for operating upon the thrust-bar, I now provide a long edge rib or lateral flange, *h*, at the periphery of this gear, thus insuring that the thrust-bar, when lifted at its inner end into position to be acted upon by this rib and pushed outward into its operative position, shall be held in such position long enough to cause proper action of the clutch mechanism, as will farther on be made apparent. The intermittingly-actuated main gear is mounted upon a tubular stud-shaft, *I*, provided with a flange or collar, *I'*, of irregular shape, near its inner end. This flange is rigid with the shaft, being best made in one piece with it, and extends sufficiently far from the shaft, at diametrically-opposite sides thereof, to cross a recess, *J*, in the frame, and thus be made to bear against the frame at the sides of this recess, as well as against the seat or projection *J'* in the recess. (See Figs. 4, 11, and 12; also Fig. 3, where the flange is dotted in place.) A headed bolt, *K*, and its nut *k*, and the head *k'* of a bolt, *K'*, entering a notch, *i*, in the stud-flange, serve to secure the flanged stud-shaft to the frame in such manner as not to bind the hub of the main gear, the head of the bolt *K'* preventing the turning of the stud-shaft, as will readily be understood. The sliding tooth or clutch-bolt *L* of the main gear for engaging this gear with its actuating-pinion is housed in a guideway-casing, *L'*, and has a pin, *l*, at its heel end passing through a radial slot, *l'*, in the gear, which limits its movement. Instead of operating this clutch-bolt and yieldingly holding it in its inoperative position, as before, it is now positively controlled both in projecting and retracting it, and is securely locked against premature actuation when in its inoperative position, and positively arrested at the completion of a revolution, by means such as yet to be described.

A lever, *M*, by which the main gear is locked in its inoperative position, and which constitutes part of the clutch mechanism of this gear operated by the actuation of the thrust-bar *E*, is shown as secured in position by a pivot, *m*, between two ears, *n*, of a bracket, *N*, attached to the frame by a seat formed between ribs *n'* thereof and the bolt *K'* and its nut. The upper one of the ears *n* is provided with a fixed tubular boss or hollow stud, *o*, surrounded by a coiled spring, *O*, which is held against displacement by a washer, *o'*, and the pivot-pin *m*, which passes through the boss and through

the ears to support the locking-lever. One end of the spring bears against a shoulder on the bracket *N*, and the other against a pin, *m'*, secured to the locking-lever near its inner or heel end. This spring acts with a tendency to hold a side lug, *P*, at the outer end of the locking-lever engaged with a notch, *p*, in the rim of the main gear, or else to cause the lug to enter said notch when at the completion of a revolution of the gear the notch is presented to the lever-lug. The rim of the main gear is thickened at one side of the notch *p*, so as to form an inwardly-projecting shoulder, *p'*, and at and near the opposite side of the notch the gear-rim is made thinner than elsewhere, the rim being gradually decreased in thickness toward the notch, as plainly shown in the drawings. The result of this construction is that the lever-lug, when held against the gear-rim by the spring *O* as the gear is revolved in the direction indicated by the arrow, is caused to assume a position such as to be engaged with certainty with the notch in the rim at the proper time, the stop-shoulder *p'* coming in contact with the lever-lug and positively stopping the gear, and as the lever-lug enters the notch *p* the gear becomes positively locked against movement in either direction at the completion of a revolution at each time the gear is actuated in the manner next to be explained. The locking-lever is tripped by the contact with its heel or inner end of the spring *e* of the thrust-bar, and at the time the lug of the locking and tripping lever is disengaged from the notch in the gear-rim a sliding controller, *Q*, of the clutch-bolt *L* is actuated by this lever to project the toothed end of the bolt and cause engagement of the main gear with its actuating-pinion. The controller *Q* reciprocates in a guideway formed by the frame-recess *J*, the flange *I'* of the stud-shaft *I*, and the bearing projection or seat *J'*, against which the flange abuts, and in an opening in which the inner end of the stud-shaft is fitted. The controller is slotted to surround the seat *J'*, as plainly shown, and has perforated ears *q q* at its inner or heel end, with which the locking and tripping lever is pivotally connected at its outer end by means of a pin passing through the perforations in the ears and through the perforated lever end, which loosely fits between the ears. (See Figs. 1, 7, 8, and 10.) The controller is provided near its outer end with two curved ribs or flanges, *R R'*, the distance between which slightly exceeds the diameter of the pin *l* of the clutch-bolt, so that this pin may work without binding in the controlling-guideway formed between the ribs. The inner and shorter one, *R'*, of these ribs is inclined or cut away gradually at *r* from its base to its outer surface at its upper or front end, for a purpose soon to be explained.

From the above description it will be understood that when the thrust-bar is moved outward the spring at its end bears against the lever *M*, tripping it to first free the main gear, and instantaneously thereafter (practi-

cally considered simultaneously therewith) to cause the tooth of the clutch-bolt to engage the pinion *b*. This engagement of the clutch-bolt with the pinion which actuates the main gear results from the bolt being projected by the thrust upon its pin *l* of the rib *R'* of the sliding controller as the controller is moved by the vibration of the locking and tripping lever. Should the end of the tooth of the clutch-bolt come in contact with the end of a tooth of the actuating-pinion, the thrust-bar spring yields momentarily until the tooth of the clutch-bolt is enabled to enter the space between two of the pinion-teeth, thus avoiding straining or breakage of parts. The thrust-bar having been retracted, as in the before-referred-to patent, after engagement of the teeth of the binder-gear with the teeth of its actuating-pinion, the locking and tripping lever being left free to be actuated by its spring, and the pin of the clutch-bolt having passed from between the ribs of the controller, the operation of the parts will be as follows: The pin of the clutch-bolt is held against improper outward movement by the slot *l'*, in which the pin works. By the time the clutch-bolt has reached the position indicated by dotted lines in Fig. 3 the rib *R* will act upon its pin to withdraw the bolt, if it has not dropped by gravity, to the limit of its inward movement, and if it has so dropped the pin will pass by the cut-away end of the rib *R'* to the space between the ribs, and in either event the bolt will be brought to rest in its inoperative position and be positively locked in such position. At the time the clutch-bolt comes to rest at the completion of a revolution of the main gear this gear is positively locked against movement in either direction by the engagement with it of the locking and tripping lever, as before explained.

It will be seen that by my present improvements I avoid the uncertainty of action and the waste of power required to overcome the force exerted by the spring of a brake acting merely by spring-pressure to stop and hold the main gear as before employed.

In order that a compressor (not shown) carried by a rock-shaft, *S*, as in the patents above named, particularly Patent No. 274,441, shall be caused to bear with a slightly-yielding pressure on the bundle at the time the knot is being tied in the band about it, and thus provide for variations in the sizes of the bundles, a spring, *T*, is fixed at its heel end by rivets to the before-employed cam-ended rib or flange *U* of the main gear, and is prevented from yielding to too great an extent by an inwardly-projecting shoulder, *u*, on the cam-ended rib. In all other respects the compressor rock-shaft is actuated and controlled, precisely as in Patent No. 274,441, by means of the segment-gear *V*, its lever *v*, the long edge rib, *s*, on the main gear, the segment-gear *V'*, also on the main gear, the dogging-arm *w* of the rock-shaft *W*, the shouldered disk *X* on the rock-shaft *S*, a spring, *y*, acting on the rock-shaft *W*,

and a rib (not now shown) on the main gear acting on a crank-arm, *Y*, of the rock-shaft *W*.

Full description here of the operation of the compressor rock-shaft and its connections is not deemed necessary.

I claim as of my own invention—

1. The combination of the main gear, its clutch mechanism, the thrust-bar provided with the stop-shoulder, and the guide-bracket against which the shoulder acts to limit the inward movement of the thrust-bar, substantially as hereinbefore set forth.
2. The combination, substantially as hereinbefore set forth, of the thrust-bar, the clutch mechanism of the main gear, and the gear provided with the long edge rib acting upon the thrust-bar, for the purpose described.
3. The combination, substantially as hereinbefore set forth, of the thrust-bar, the gear provided with the long edge rib acting on the thrust-bar, and the locking and tripping lever of the clutch mechanism of the main gear acted upon with a yielding pressure by the thrust-bar, for the purpose described.
4. The combination of the main gear, its tubular stud-shaft provided with the notched flange, the frame having the guideway-recess and the seat against which the flange of the stud-shaft bears, and the securing bolts and nuts, substantially as and for the purpose hereinbefore set forth.
5. The combination, substantially as hereinbefore set forth, of the main gear, the spring-actuated lever by which the gear is positively locked when in its inoperative position, and the thrust-bar for tripping said lever, for the purpose described.
6. The combination of the intermittingly-actuated main gear having the notch in its rim and the shoulder at the side thereof, and the spring-actuated locking and tripping lever, substantially as and for the purpose hereinbefore set forth.
7. The combination, substantially as hereinbefore set forth, of the main gear, its clutch-bolt, the controller by which the clutch-bolt is positively held when at rest and positively projected and retracted, and the locking and tripping lever which positively holds the main gear when in its inoperative position and actuates the controller of the clutch-bolt, for the purpose described.
8. The combination of the main gear, the clutch-bolt provided with the pin passing through a slot in the main gear, and the sliding controller provided with the curved ribs for acting on the pin of the clutch-bolt, substantially as and for the purpose hereinbefore set forth.
9. The sliding controller for the clutch-bolt, provided with the curved rib *R* and the shorter curved rib, *R'*, inclined at its end, substantially as and for the purpose hereinbefore set forth.
10. The combination of the compressor rock-shaft, the main gear, and its attachments by which the rock-shaft is yieldingly actuated,

substantially as and for the purpose herein-
before set forth.

11. The combination, with the main gear,
of the cam-ended rib provided with the spring,
5 substantially as and for the purpose herein-
before set forth.

In testimony whereof I have hereunto sub-

scribed my name this 13th day of November,
A. D. 1883.

JOHN S. DAVIS.

Witnesses:

J. H. SOUTHARD,
CARRIE T. SOUTHARD.