(No Model.) 3 Sheets—Sheet 1.

S. B. WILKINS.

MECHANICAL MOVEMENT.

No. 362,564. Patented May 10, 1887.

Fig. 1.

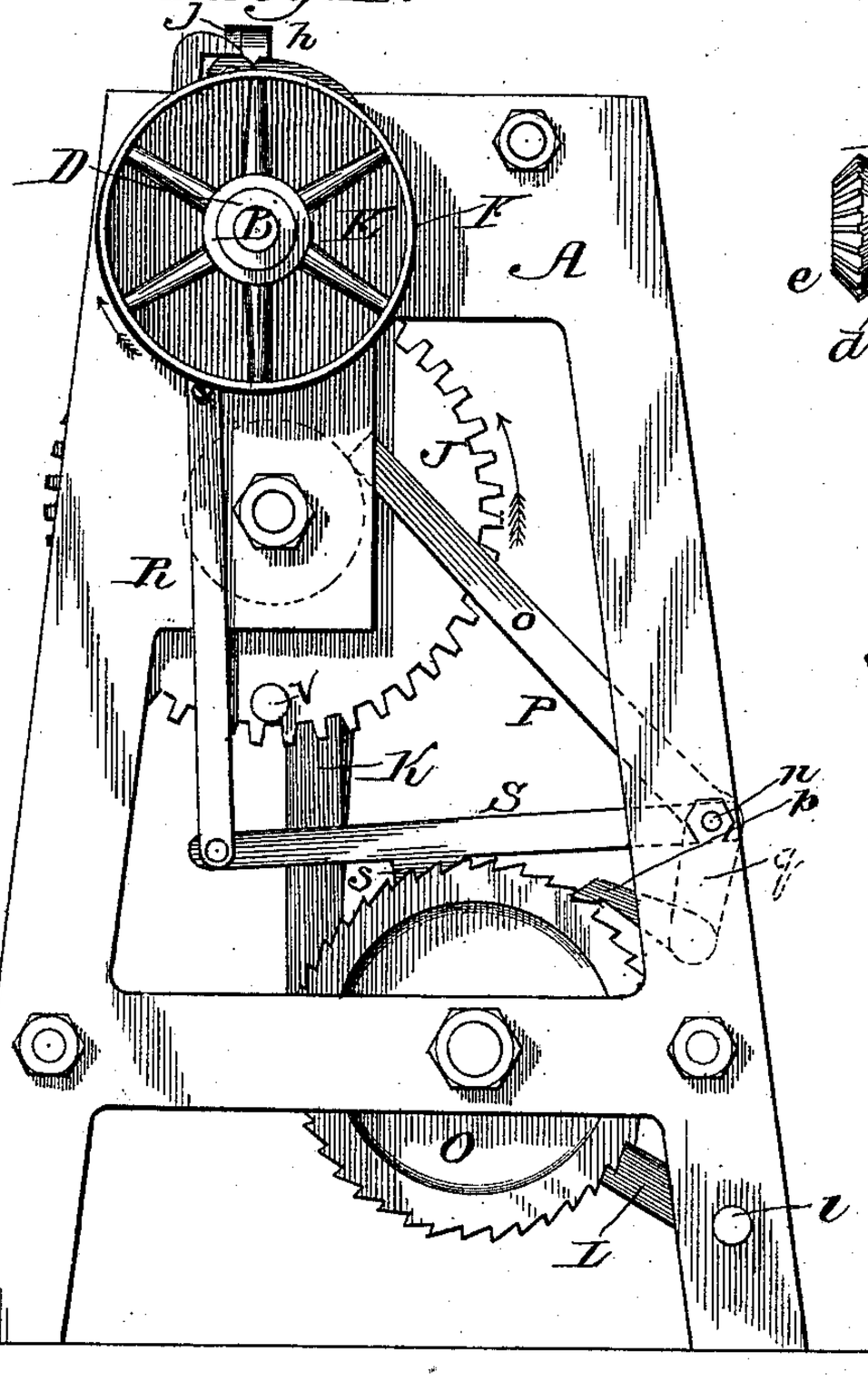


Fig. 2.

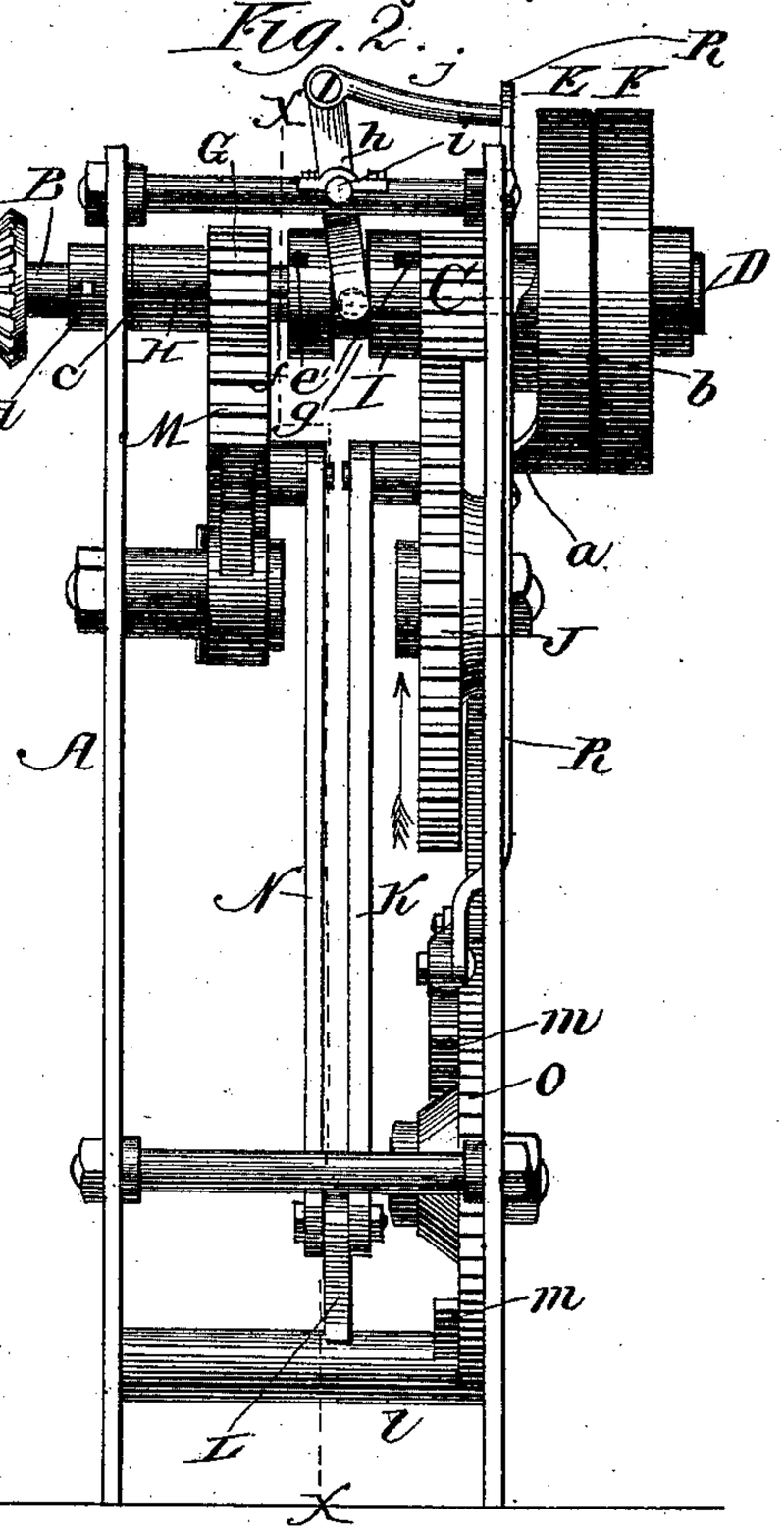


Fig. 3.

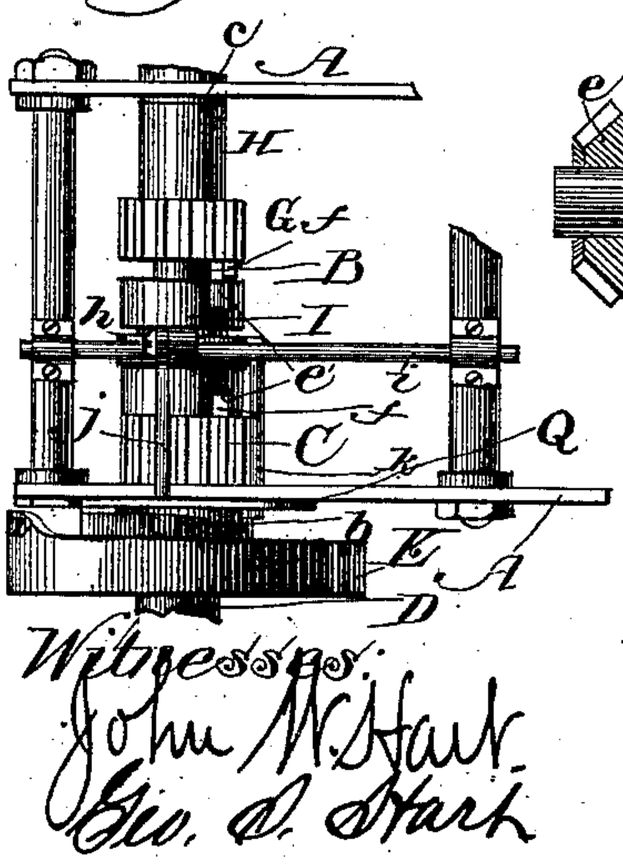
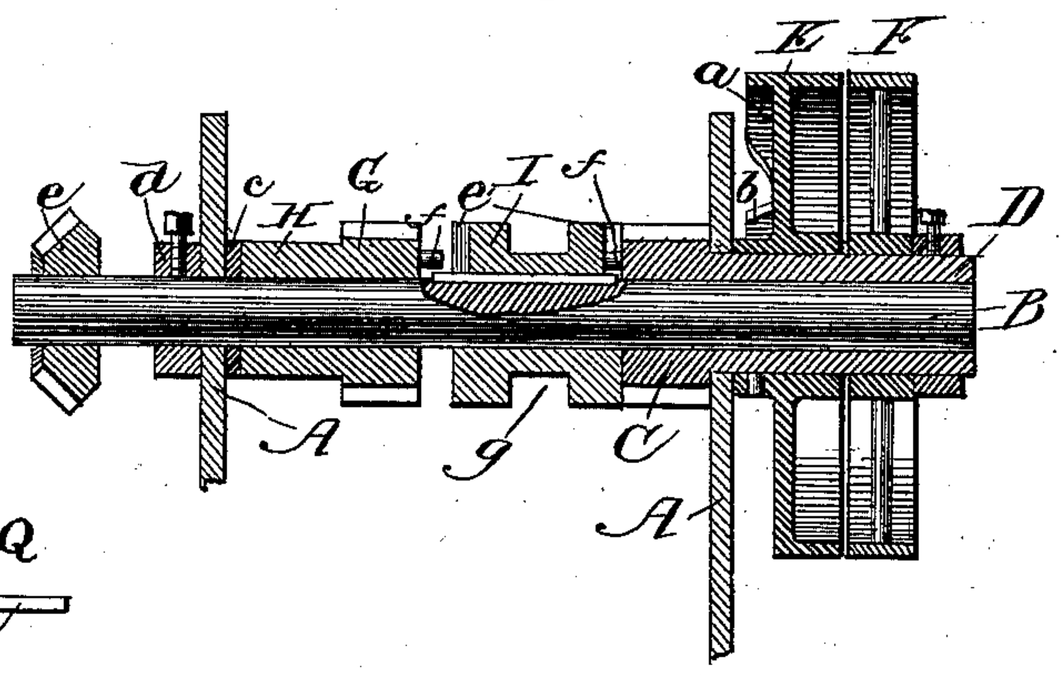


Fig. 4.



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(No Model.) 3 Sheets—Sheet 2.

S. B. WILKINS.

MECHANICAL MOVEMENT.

No. 362,564. Patented May 10, 1887.

Fig. 5.

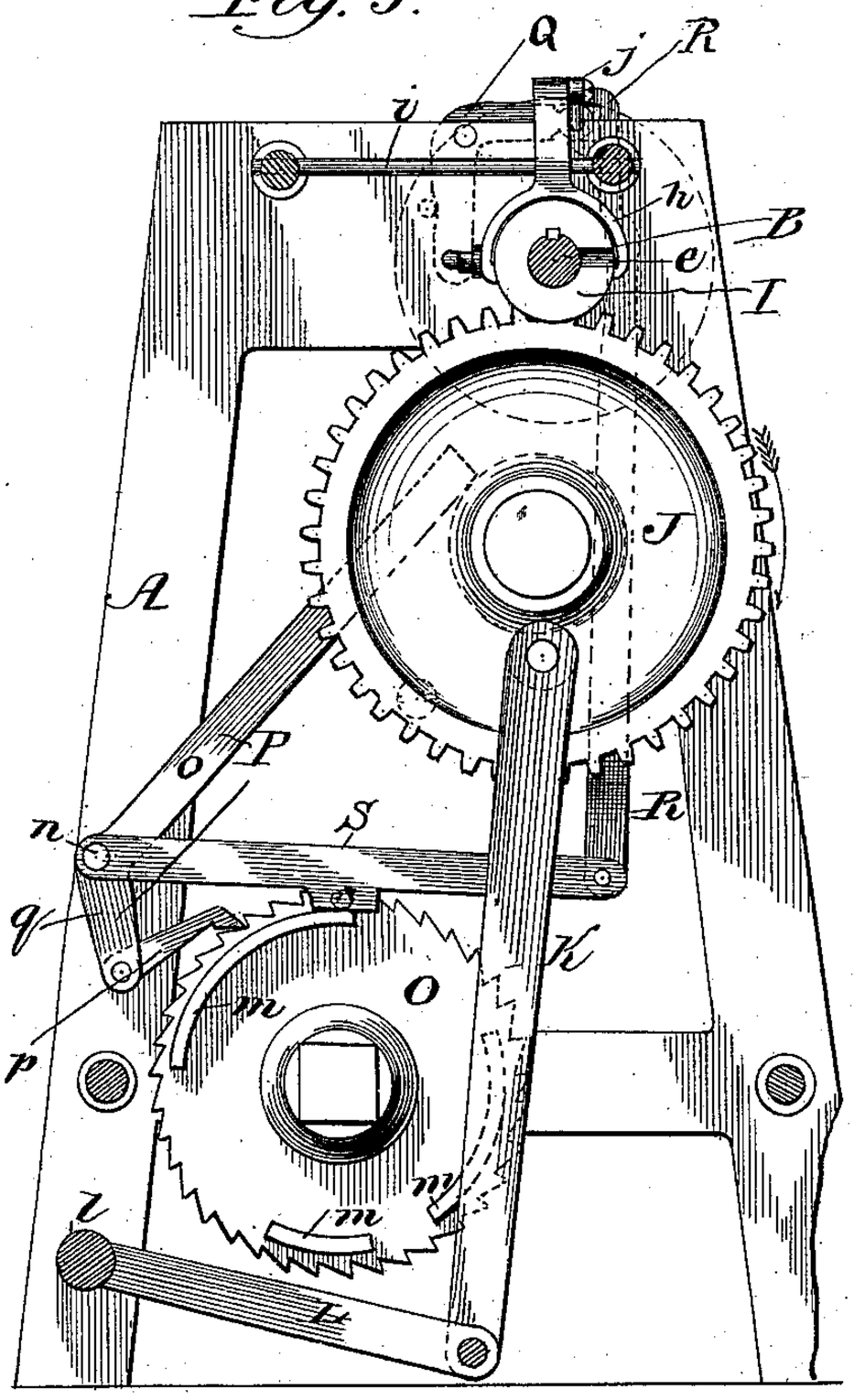


Fig. 6.

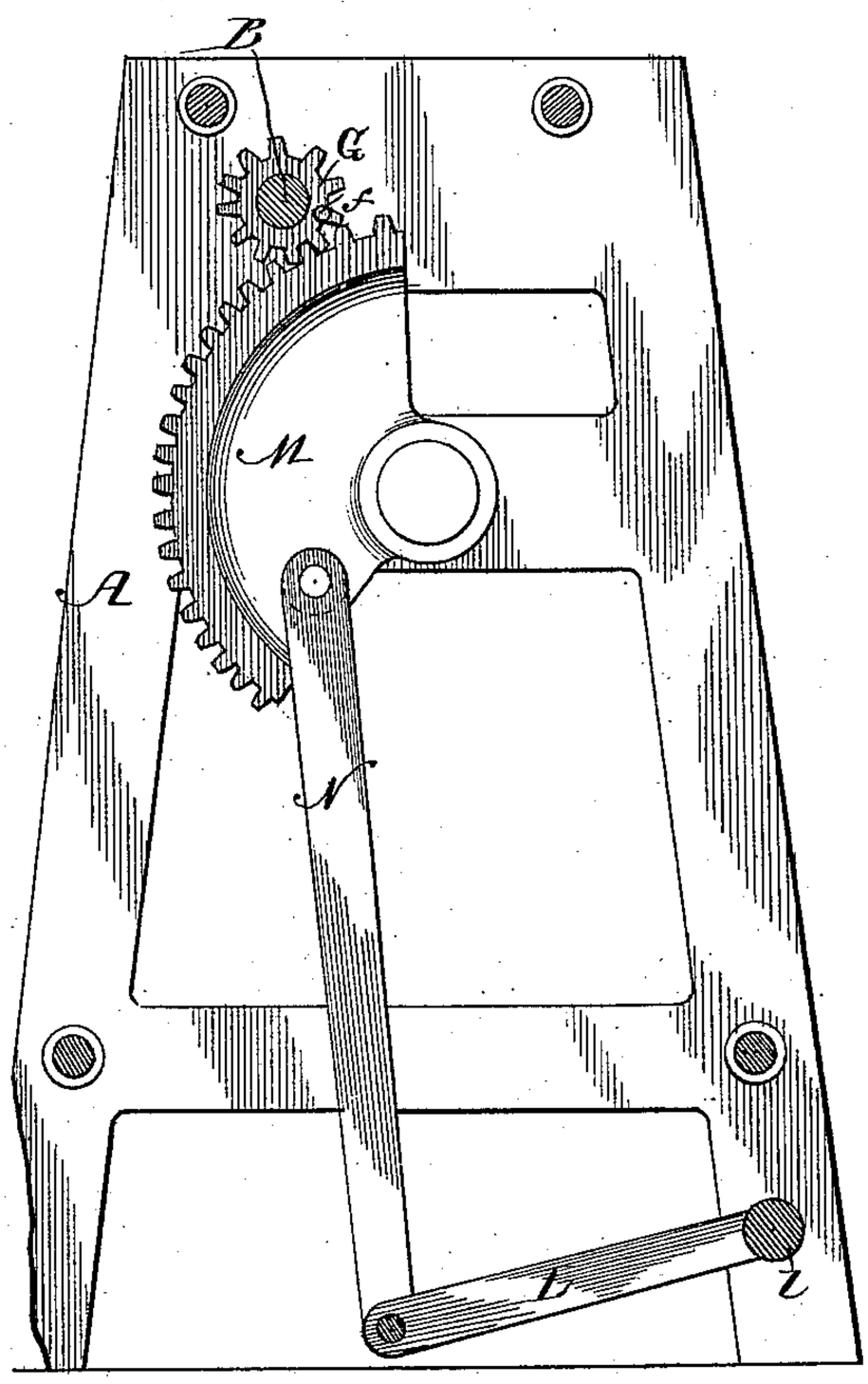


Fig. 7.

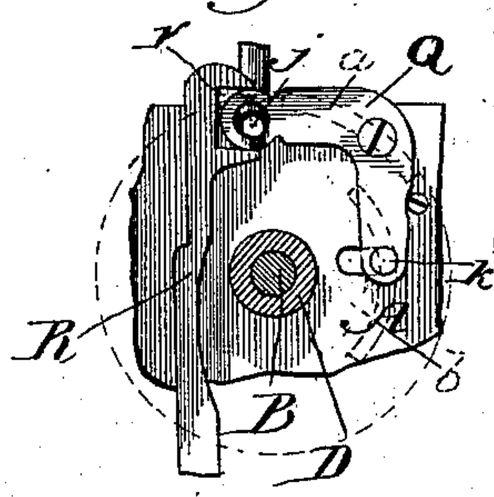


Fig. 8.

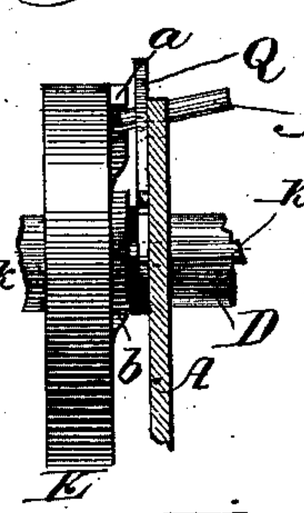


Fig. 9.

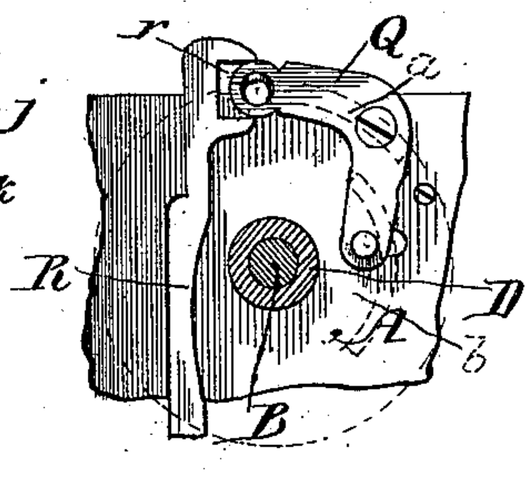


Fig. 10.

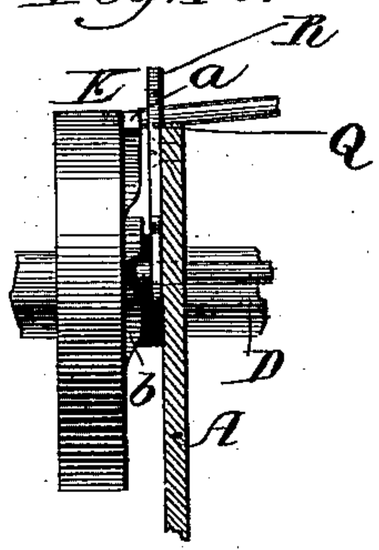
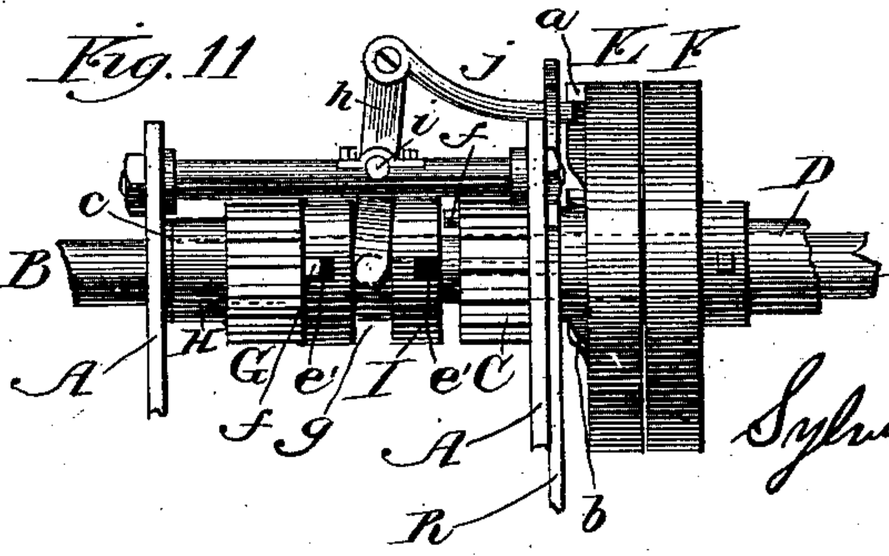


Fig. 11



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S. B. WILKINS.

MECHANICAL MOVEMENT.

No. 362,564. Patented May 10, 1887.

Fig. 12.

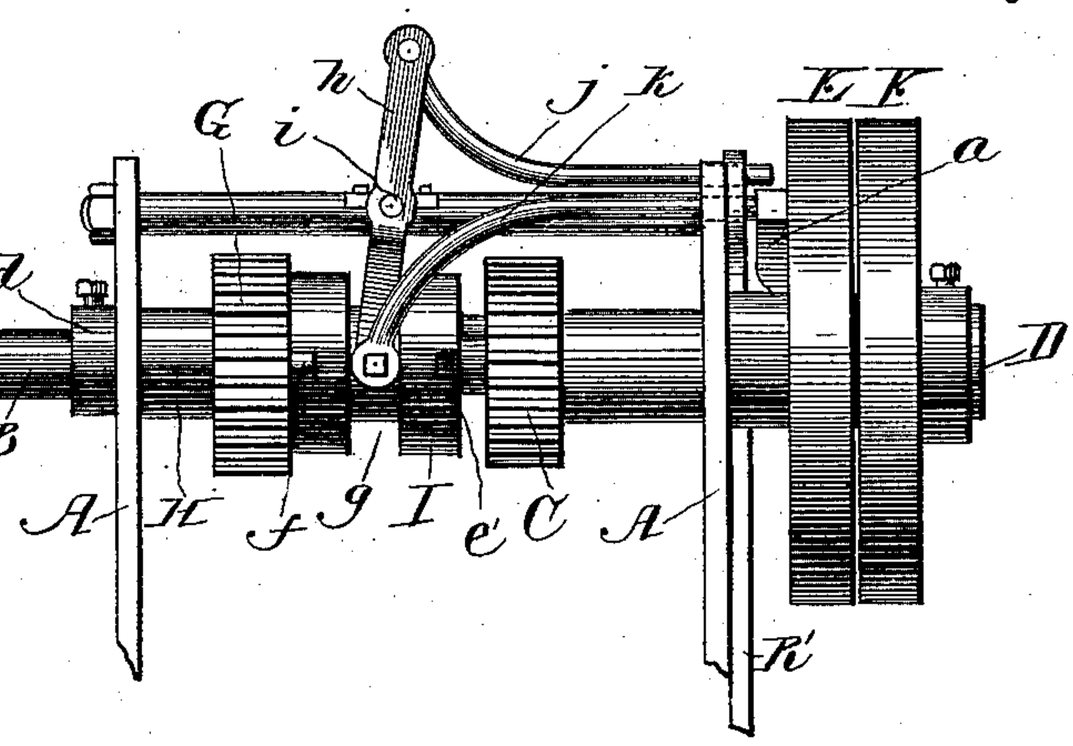


Fig. 13.

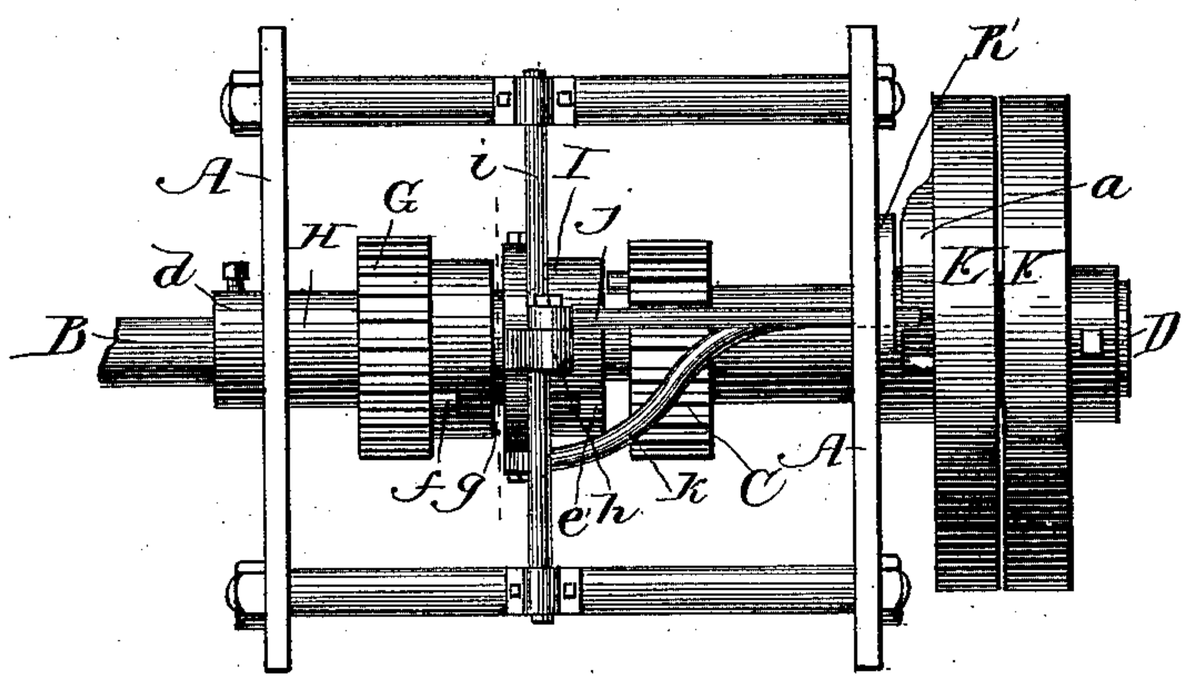
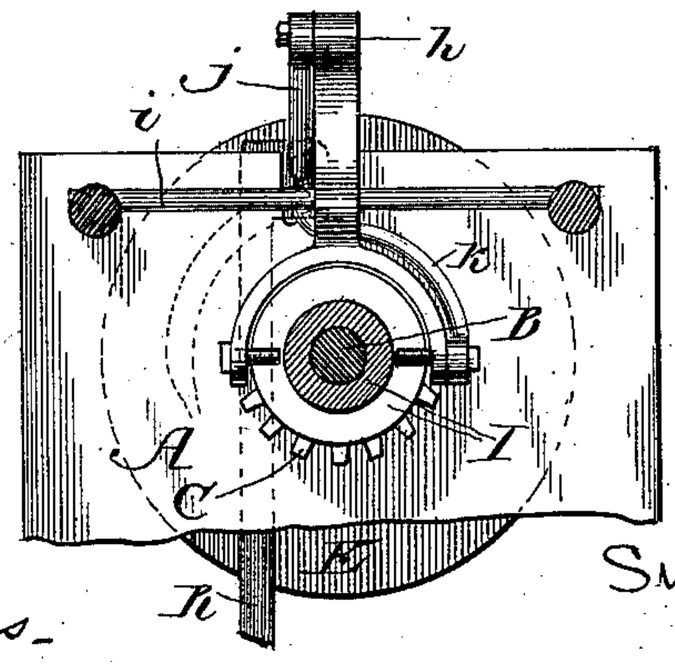


Fig. 14.



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Albert H. Adams.

Inventor.
Sylvester B. Wilkins
By West & Bond
His Attys.

UNITED STATES PATENT OFFICE.

SYLVESTER B. WILKINS, OF ROCKFORD, ILLINOIS.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 362,564, dated May 10, 1887.

Application filed August 16 1886. Serial No. 211,046. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER B. WILKINS, residing at Rockford, in the county of Winnebago and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Mechanical Movements, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a front view. Fig. 3 is a top view, some parts, which are in view, being omitted. Fig. 4 is an enlarged detail, being a longitudinal section through the clutch and two pinions and other parts of the main shaft. Fig. 5 is a vertical section at line *x x* of Fig. 2, looking to the right. Fig. 6 is a vertical section on the same line *x x* of Fig. 2, looking to the left, except that the arm or lever L is shown in this figure. Fig. 7 is a detail, being a side view of the levers which operate the clutch. Fig. 8 is a detail, being a rear elevation of the driving-pulley with its cams and parts of two levers which operate the clutch. Figs. 9 and 10 are details corresponding with Figs. 7 and 8, except that the parts are in different positions. Fig. 11 is a detail, being a side elevation of the main shaft, the two pinions thereon, the clutch, and some other parts, the clutch being in a different position from that shown in Fig. 2; Figs. 12, 13, and 14, details, being a side elevation, a top view, and a cross-section, respectively, showing a single cam for shifting the clutch.

The leading object of my invention is to produce intermittently a rotary and an oscillating movement from a main driving-wheel which constantly rotates in one direction, which I accomplish by means of a shaft, a clutch secured to said shaft, two pinions loose on such shaft, one of which carries the driving-pulley, and by means of devices for shifting the clutch, using some other devices in connection with those mentioned, all as illustrated in the drawings, and as hereinafter described. Those things which I claim as my invention will be pointed out in the claims.

In the drawings, A represents a frame in which the operating parts are supported, which frame may be constructed in any suitable manner.

B is the main shaft.

C is a pinion loose on the shaft B. This pinion is provided with a sleeve, D, which passes through the frame or through a bearing in the frame.

E is the main driving-pulley, which is secured to the sleeve D. This pulley E is provided upon its inside with two cams, *a b*, which are not concentric with each other.

F is a loose pulley on the sleeve D.

G is another pinion, which is loose on the shaft B. This pinion G is also provided with a sleeve, H.

c is a washer.

d is a collar held upon the shaft B.

e is a beveled wheel on the end of the shaft B. The sleeve D is the bearing for one end of the shaft B. The opposite end of the shaft has its bearing in the frame A. The sleeve D rotates in its bearing.

I is a clutch, which is secured to the shaft B by means of a feather, as usual. Each end of this clutch is provided with a recess, *e'*, and the pinions C G are provided with pins *f*, to enter such recesses. The clutch I and pinions C G are so arranged that the clutch does not become disengaged from one pinion until after it engages with the other, both pinions moving at the same rate of speed.

g is a groove in the clutch I.

h is a fork in the groove *g*, which fork is secured to a shaft, *i*, which is supported in bearings on the frame.

j is an arm or lever pivoted to the upper end of the fork.

k is another arm or lever pivoted to one of the arms of the fork. The cam *a* is arranged to engage with the free end of the lever *j*, and the cam *b* to engage with the free end of *k*.

J is a gear-wheel with which the pinion C engages.

K is a pitman-rod, the upper end of which is pivoted upon a pin on the wheel J. Its lower end is pivoted to an arm, L, the outer end of which is secured to a rock-shaft, *l*, pivoted in the frame.

M is a quadrant or part of a gear-wheel with which the pinion G engages. M is pivoted upon the frame.

N is a pitman-rod, one end of which is connected with M and the other end with the arm L.

O is a ratchet-wheel pivoted upon the frame.

It is provided on its inside with a flange, *m*, portions of which flange are cut away.

P is a lever pivoted at *n* to the frame. The long arm *o* of this lever passes up by the side of the wheel J, and is so arranged that the pin *v* upon such wheel comes in contact with such long arm.

p is a pawl pivoted to the short arm *q* of the lever P, which pawl is arranged to engage with the ratchet-wheel O.

Q is a bell-crank lever pivoted to the frame. The free end of the lever *j* enters a hole in one end of this lever Q, and the free end of the lever *k* enters a hole in the other end of Q, the lever *k* passing through a slot in the frame.

R is a sliding bar, the upper end of which is provided with a notch, *r*, into which one end of the lever Q passes. The lower end of R is pivoted to one end of an arm, S, the other end of which arm S is pivoted to the frame.

s is a projection from the arm S, arranged to ride over the flange *m* and to drop into the spaces formed by cutting away portions of such flange. The rear end of the projection *s* is inclined, so that it can readily ride up onto the parts *m*.

The operation is as follows: Suppose the parts to be in the position shown in Figs. 2, 3, the driving-pulley being, as stated, fast on the sleeve of the pinion C, and the clutch being, as shown, in engagement with such pinion C, and the projection *s* resting upon a portion of the flange *m*. If the machine be in motion, the rotation of the drive-wheel and the pinion C will cause the wheel J to move in the direction indicated by the arrow in Fig. 1, and the movement of the pitman K will cause the inner end of the bar L to move up and down in the arc of a circle, and motion will also be given to the pitman N, and through it to the quadrant M, the latter moving first in one direction and then back in the other direction, the pinion G then being out of action, although the shaft B revolves with the clutch, a movement in both directions being given to the quadrant with each revolution of the wheel J. The quadrant has this oscillating movement, because the pin upon which the upper end of the pitman N is pivoted never passes beyond the pivotal point of the quadrant, but is always on one side thereof. With each revolution of the wheel J the ratchet-wheel O will be moved one notch through the action of the pin *v*, the lever P, and pawl *p*. So long as the projection *s* on the arm S rides on the flange *m*, the bar R and the bell-crank lever Q will be held in the position shown in Figs. 9 and 10, and the cam *b* on the inside of E cannot then engage with the end of *k*. When, by the movement of the wheel O, the arm S drops, carrying the projection *s* into the space between two parts of the flange *m*, the bar R also falls a little, causing the position of the bell-crank lever Q to change, which brings the outer end of the arm or lever *k* into position to be engaged by the cam *b*, as shown in Figs. 7 and 8, and by such engagement the clutch will be thrown over into engagement with the pinion G, and so long as the clutch remains in this position the pinion G and the shaft B will be moved first in one direction and then back in the opposite direction, such pinion and shaft partaking of the oscillating movement of the quadrant. Such movement of this pinion and shaft will continue so long as the projection *s* on S remains in a space between two parts of the flange *m*; but when the projection *s* rides up onto the flange *m* then the cam *a* will engage with the outer end of the arm *j* and cause the clutch to again come into engagement with the pinion C, when the operation described will be repeated.

It will be seen that the clutch is transferred from one pinion to the other while both are in motion in the same direction and while both are moving at the same rate of speed, thereby preventing all shock from the transfer, and, because the clutch does not leave one pinion until after it is engaged with the other, the movement of the machine will be constant and without interruption.

The time during which the shaft B will rotate in the same direction, and the time in which it will rotate backward and forward, and the times when the changes will take place are all determined by the length of the parts of the flange *m* and the length of the spaces between them.

The motion of the shaft B, whether it be constantly in one direction or first in one direction and then back in the opposite direction, can be communicated to any suitable desired mechanism through the beveled wheel *e* on the shaft B.

I have not deemed it necessary to show connections between the mechanism which I have described and the mechanism which it is designed to operate. This mechanism may be used for various purposes, and will be found very useful in connection with that class of knitting-machines which knit first around and around and then backward and forward.

Instead of the quadrant and pitman N, a rack-bar might be used, arranged to engage with the pinion G, the lower end of such bar being pivoted to L, suitable guides for the rack-bar being provided.

I do not limit myself to the precise means shown and described for operating the clutch. For some purposes the clutch might be operated by hand, the automatic devices for operating the clutch being in such cases omitted.

The sliding clutch can be shifted by the use of a single cam on the wheel E, in connection with the rods *j k*, and for this purpose a rod, R′, is made to take the place of the rod R and bell-lever Q; and with this construction the ends of the rods *j k* are passed loosely through the end of the bar R′, and one cam, *a*, is used on the wheel E, which cam is in such relation to the ends of the rods *j k* and the movement of the bar R′ that when the bar is raised, as shown in Fig. 12, the end of the bar *k* will be engaged by the cam *a* in the rotation of the

wheel E, and force the bar in the direction to engage the clutch I with the pinion G, and in this position the end of the bar *j* is projected and lies outside of the circle of rotation of the cam *a*, and when the bar R′ is dropped the end of the rod *j* is brought in line with the cam *a*, and such rod is moved in the direction to throw the clutch I into engagement with the pinion C, and in this position the end of the rod *k* is projected and lies within the circle described by the cam *a*.

The bar R′ is automatically moved, as required, to bring the ends of the rods *j k* in line with the cam *a* to be operated upon, and the arrangement for employing one cam on the wheel E to shift the clutch is shown in Figs. 12, 13, and 14.

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

1. A shaft, B, in combination with two loose pinions thereon and a sliding clutch which rotates with the shaft and is located between and adapted to engage alternately with said two pinions while both are in motion in the same direction and same rate of speed, and devices for automatically shifting the clutch, said clutch and pinions being so arranged that the clutch does not become disengaged from one pinion before it engages the other, whereby the movements of the machine are constant and without shock or interruption, substantially as and for the purposes specified.

2. A shaft, B, in combination with two loose pinions thereon and a sliding clutch which rotates with the shaft and is located between and adapted to engage alternately with said two pinions while both are in motion, devices for automatically shifting the clutch, a main gear-wheel, J, and a ratchet-wheel, O, provided with a flange having some part or parts cut away, and pawl-connections between the driving-wheel and ratchet-wheel for moving the latter, substantially as and for the purposes specified.

3. A shaft, B, in combination with two loose pinions, C G, a sliding clutch which rotates with the shaft and is located between and adapted to engage alternately with said two pinions while both are in motion, a main gear-wheel, J, engaging with the pinion C, and quadrant engaging with the pinion G, the pitman K, the bar L, and pitman N, substantially as and for the purposes specified.

4. The combination of the shaft B, loose pinions C G, clutch I, fork *h*, levers *j k* Q, driving-pulley E, provided with cams *a b*, main gear-wheel J, engaging with the pinion C, and quadrant engaging with the pinion G and operated by the pitman K, the bar L, and pitman N, substantially as and for the purpose specified.

5. A shaft, B, in combination with two loose pinions, C G, a sliding clutch which rotates with the shaft and is located between and adapted to engage alternately with said two pinions while both are in motion, a main gear-wheel, J, a quadrant engaging with the pinion G and operated by a pitman, K, bar L, and pitman N, fork *h*, levers *j k* Q, driving-pulley E, provided with two cams, *a b*, bar R, bar S, ratchet-wheel O, provided with a flange, *m*, partly cut away, lever P, and pawl *p*, substantially as and for the purposes specified.

SYLVESTER B. WILKINS.

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GEO. S. HART.