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C. R. SQUIER.

Improvement in Mechanical Movement.

No. 126,421. Patented May 7, 1872.

Fig. 1.

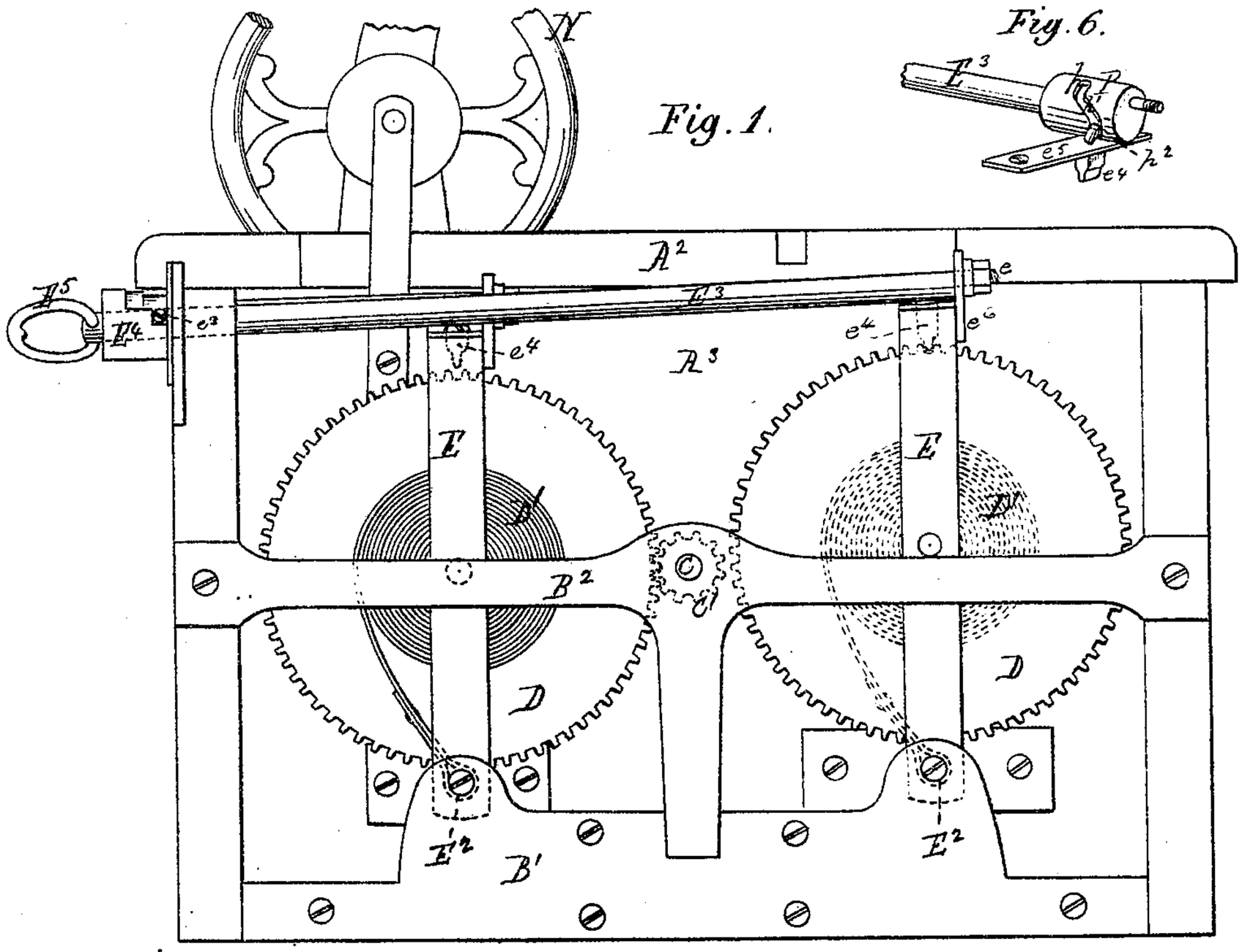
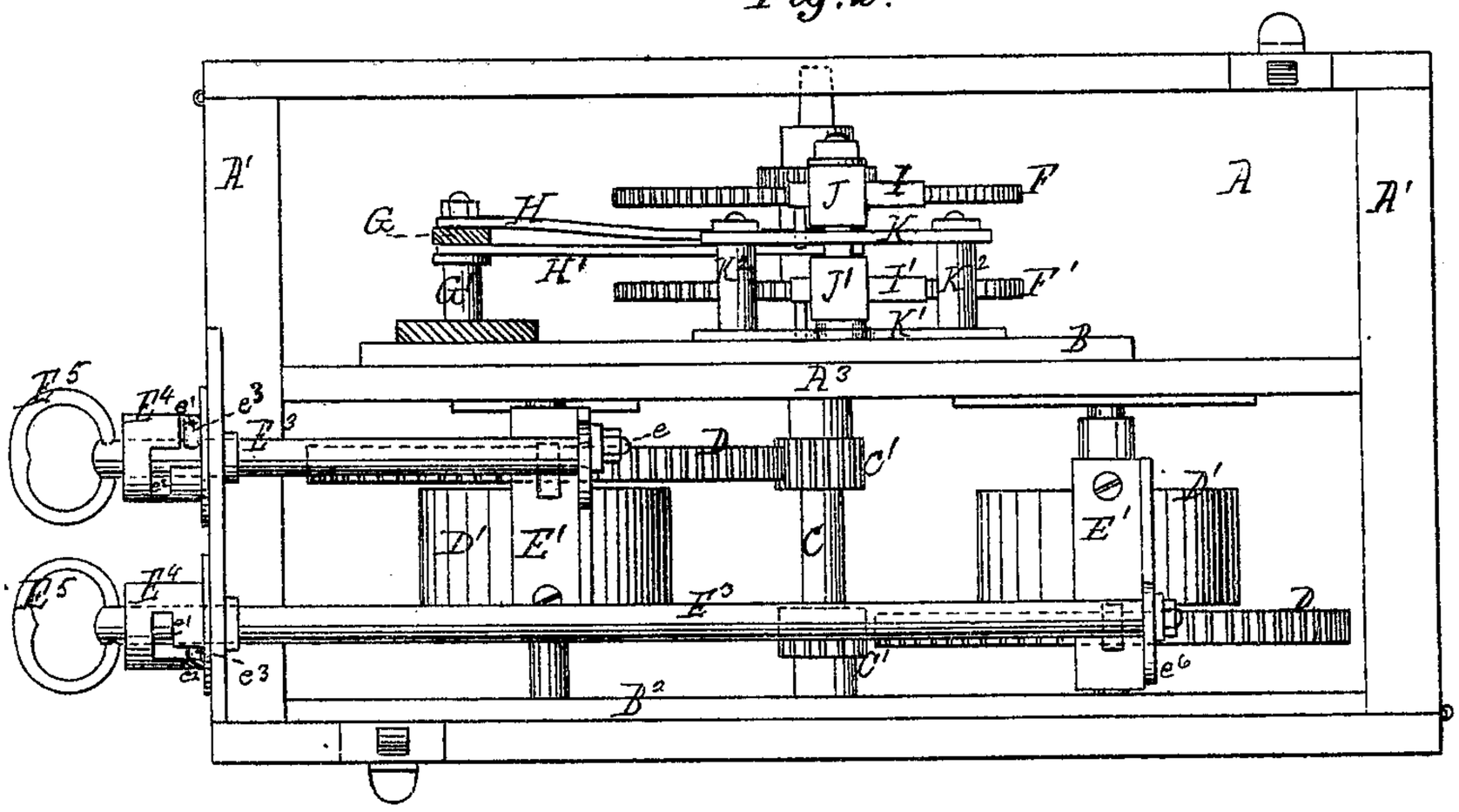


Fig. 6.

Fig. 2.



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A. B. Smith

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C. Robeson Squier
by his Attorney
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2 Sheets--Sheet 2.

C. R. SQUIER.

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Fig. 3.

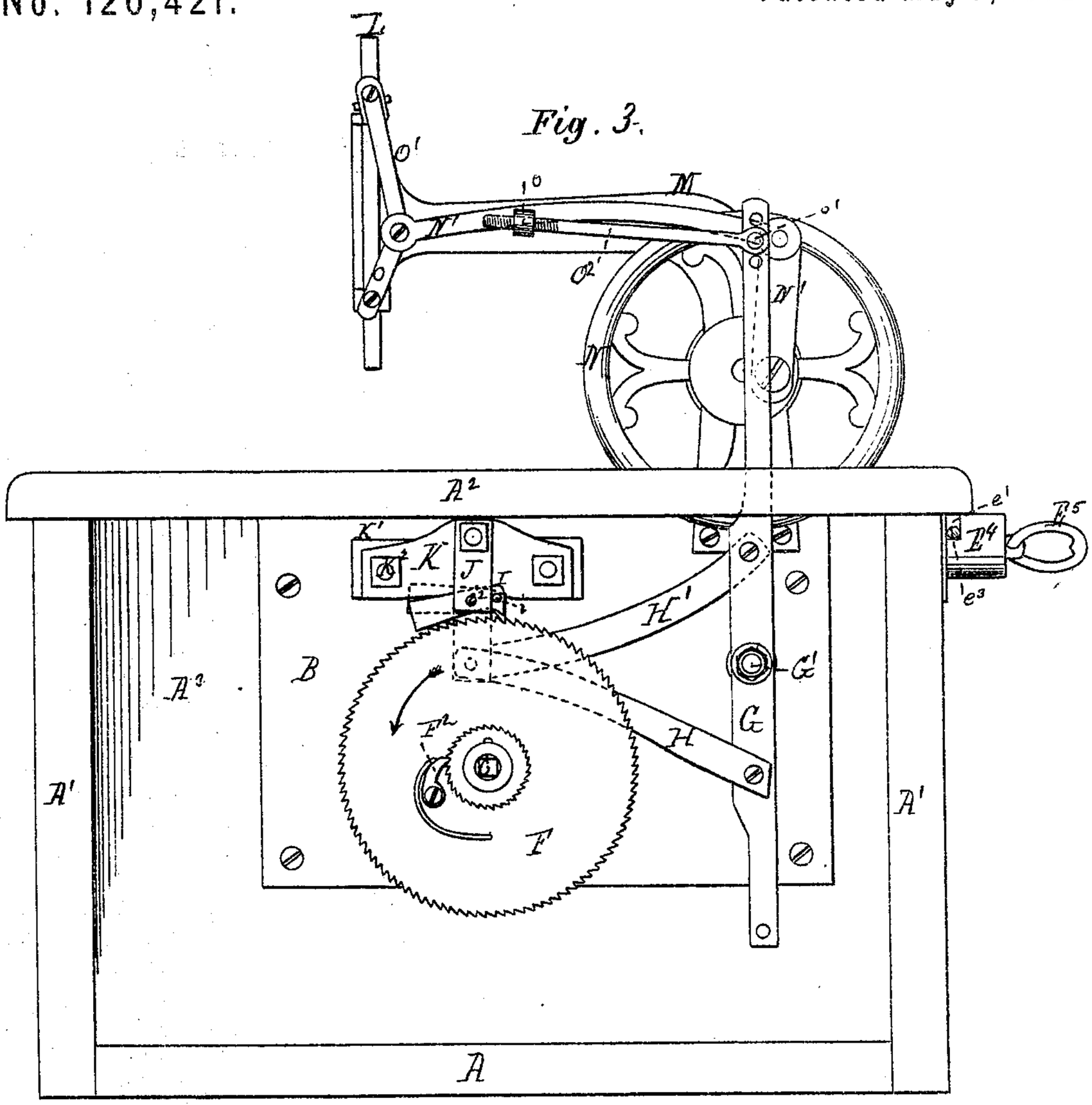


Fig. 4.

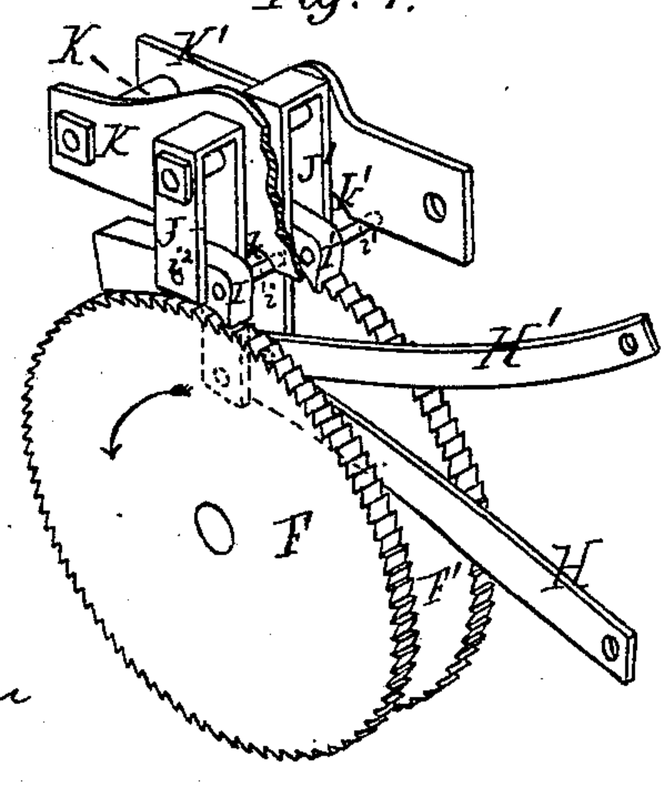
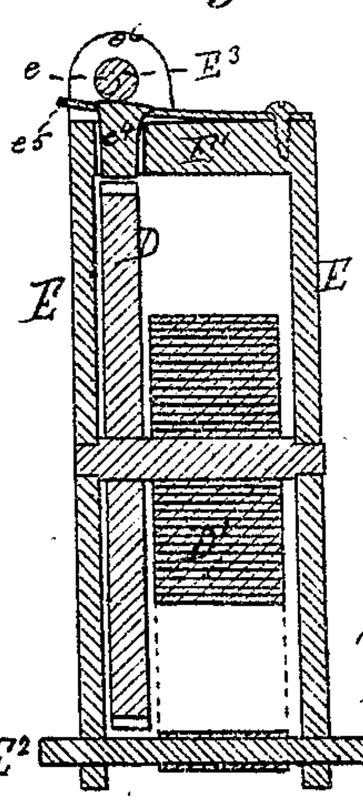


Fig. 5.



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126,421

UNITED STATES PATENT OFFICE.

C. ROBESON SQUIER, OF CLEVELAND, OHIO.

IMPROVEMENT IN MECHANICAL MOVEMENTS.

Specification forming part of Letters Patent No. 126,421, dated May 7, 1872; antedated May 1, 1872.

To all whom it may concern:

Be it known that I, C. ROBESON SQUIER, of Cleveland, county of Cuyahoga, State of Ohio, have invented a new and useful Improvement in Mechanical Movement, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a rear view of my invention. Fig. 2 is a top view with the devices for connecting the movement with a sewing-machine removed. Fig. 3 is a front view representing it as applied to a sewing-machine. Figs. 4, 5, and 6 are detached views of various parts of the mechanism.

The first part of the invention consists in combining with the toggle-levers a balance-wheel, and the vibrating arm which actuates them, by means of two connecting-links, whereby the motion of the arm is communicated to the levers and the balance-wheel in a very simple and effective manner. The second part of the invention relates to combining, with a ratcheted escapement-wheel or wheels, a series of weighted or counterbalanced pawls, which are automatically disengaged from the wheel, except when they are forcibly held in contact with said wheel, as and for a purpose which will be set forth. The third part of the invention consists in combining, with the ratcheted escapement-wheel, a series of driving-wheels, connected therewith in such a manner that either or all of the series may be employed for driving or propelling the movement at the will of the operator for regulating the power and speed. The invention further consists in certain details of construction, as will be hereinafter fully explained.

In the drawing I have represented my invention as applied to a sewing-machine having an inclosing-case, of which A is the bottom; A^1 A^1, the ends; A^2, the top; A^3, a vertical partition, located centrally, (see Fig. 2,) with a part of the devices arranged upon each side of it; hence none of the devices seen in Fig. 1, except the balance-wheel, can be seen in Fig. 3, and vice versa. B, Figs. 2 and 3, is a face-plate, secured to one side of partition A^3, which, together with the bars or girts B^1 B^2, forms a frame-work, upon which most of the machinery is mounted; but it is evident that any other suitable support may be employed. C is the main shaft, provided at or near one end with spur-pinions C′ C′. D D are cogged driving-wheels, actuated by coiled springs D^1 D^2, (see Fig. 1,) and made to engage with pinions C′ at the will of the operator by a series of devices, which I will proceed to describe, each of the wheels D and the devices connected therewith being a duplicate of the other or others. Wheels D are mounted upon short shafts in vertical brackets E in the same vertical plane with pinions C′ C′. These brackets consist of two posts (one upon each side of the wheels) connected at the top by a cross-bar, E^1, and are mounted, at their lower ends, upon pivots E^2, Figs. 1 and 5, about which they vibrate. I usually clasp the outer end of spring D^1 about pivot E^2, the inner end being fastened to the shaft of wheel D, as will be readily understood by all who are familiar with the construction of coiled springs. E^3 is a sliding and rotating link, connected at its inner end with an ear or lug, e^6, formed upon or attached to the upper free end of bracket standard E, by means of a pin or wrist, *e*, projecting from and eccentric to said link, thus making this end of the link serve as a cam when rotated upon wrist *e* as a center. The projecting end of the wrist may be either riveted or secured by a nut, as shown. The outer end of link E^3 rests in a sleeve or tubular bearing, E^4, attached to one of the end pieces A^1. E^5 is a ring or thumb-piece on the outer end of the link. The link is made round at both ends in order that the outer end may rotate and slide readily in the sleeve E^4, and that the inner end may readily operate as a cam. e^1 e^2 is an angular peripherical cam-slot cut in the upper surface of the sleeve, substantially as shown in Fig. 2. e^3 is a pin projecting from the link E^3 near its outer end, and engaging with the slot e^1 e^2 to hold the link, and through it the wheel D, either in mesh or out of mesh with pinion C′, as will be fully explained. e^4 is a locking-dog. It is attached to the free end of a tongue-spring, e^5, on the upper end of the bracket standard, and vibrates in a slot cut for its reception in the cross-bar or tie E^1 immediately over wheel D and directly below the cam-end of link E^3. This dog is held by the spring in the position shown in Fig. 5, except when it is forced down-

ward by the cam and made to engage with the cogs of the wheel D, to prevent said wheel from turning on its axis. In Fig. 1 the dogs are shown in both positions in dotted lines, the wheel at the right being locked, and the one at the left being free to revolve. F F^1, Figs. 3 and 4, are ratcheted escapement-wheels, mounted loosely upon the opposite end of shaft C. They are rigidly connected with each other, preferably by a sleeve, and are also connected with the shaft by means of a spring-pawl, F^2. (See Fig. 3.) The end of shaft C is squared to receive a crank, for the purpose of winding up the springs, which can be done when wheels D are in gear with pinion C′, by turning the gearing backward, the spring-pawl F^2 permitting this movement without affecting the escapement-wheels F F^1. G, Fig. 3, is a lever or walking-beam, pivoted upon a stud projecting from the face-plate at G′, Figs. 2 and 3. This walking-beam has a vibrating movement imparted to it from the escapement-wheels F through links H H′ and pawls I I′.

The construction and operation of the pawls is as follows: They are hung on pivots i^2 in pendent loops J J′, which are, in turn, pivoted to face-plate B, or preferably to a pawl-frame, K K^1 K^2, secured to said plate.

In an ordinary pawl the end which is provided with a bit or claw, and which engages with the ratcheted wheel, is the heaviest, or is held in contact with the wheel by a spring; but in this movement the construction is reversed—that is, the claw-end is the lightest—and the pawl is withdrawn from the wheel, as at I, Figs. 3 and 4, except under certain circumstances, which will be fully explained hereafter. The long arm of loop J is connected with lever G by link H, loop J′ being connected with said beam at the opposite side of its fulcrum by link H′. In the pawl-frame shown the horizontal bars K K′ are notched or recessed at *k k′*, Figs. 3 and 4, and the pawls have pins *i* i^1 projecting laterally from the front ends, said pins extending through notches *k k′*, and in such relation thereto that as each pawl approaches the forward limit of its throw the pin must strike the edge of the bar and force the claw of the pawl down upon the wheel before the pin can escape from the notch, as is clearly shown at i^1 *k′*, Fig. 4.

The devices for transmitting motion from the lever G to the fly-wheel and needle-bar of a sewing-machine, when my movement is applied to one, are represented in Fig. 3, in which L is the bar, reciprocating in suitable bearings in the goose-neck M of the machine. N is the balance-wheel, and N′ a bent bar or link connecting the crank-wrist of the wheel with the toggle-lever O O^1, the lever O being pivoted to the goose-neck M and the upper one to the needle-bar. O^2 is a link connecting the upper end of lever G with bent bar N′. One end of this link is provided with a screw-thread, which engages with a thread cut in a stud, *o*, on link N′, and the other end is adjustably attached to the slotted end of lever G by a screw, *o′*, or its equivalent. A straight link may be used in place of the bent link N′, although I prefer the form shown, as it is entirely out of the way of any work which may be interposed between the needle and the balance-wheel. In the drawing the machine is represented with the springs wound up ready for action, with one of the driving-wheels, D, in mesh with its corresponding pinion C′, (see Figs. 1 and 2.) The escapement-wheels will be driven in the direction indicated by the arrow in Figs. 3 and 4. By an inspection of Fig. 4 it will be seen that the pawl I′ engages with wheel F^2; hence, as that wheel moves forward, this pawl and link H′ carry with them the upper end of lever G, the pawl I being simultaneously carried backward by link H, the claw of pawl I being held above the teeth of wheel F during the greater part of its backward stroke, the rear end of said pawl being the heaviest. As the pin *i* on pawl I approaches the rear end of notch *k* it comes in contact with the inclined face or cam-track of said notch, and the pawl is forced down into contact with the wheel. The backward movement of pawl I does not cease at the instant that it is brought into contact with wheel F, the arrangement and adjustment of parts being such that the momentum of the machine shall cause pawl I to move wheel F backward a very little, and thus release pawl I′, which is at once disengaged from wheel F^1 by the weight of its rear end when the full force of the spring is exerted upon pawl I, carrying it, together with link H and the lower end of lever G, forward, thus imparting to said lever a vibratory motion. Pawl I is now free to be moved backward by link H′, when pin *i′*, traversing the cam-track at *k′*, brings pawl I′ into action. Thus each pawl is alternately operated, as will be readily understood without further description. Under ordinary circumstances the power of one spring will be sufficient to run the movement until it is nearly unwound. When, however, it becomes necessary to increase the power, the driving-wheel, which is actuated by this partially-spent spring, may be thrown out of gear and a new one substituted. This is accomplished by means of the link E^3 and the devices connected therewith, as follows: It will be seen in Fig. 1 that the left-hand driving-wheel is in gear with its corresponding pinion C′. In order to withdraw this wheel I turn the link which is attached to its standard to the right by means of the ring E^5. This movement withdraws pin e^3 from the end e^1 of the slot in which it is resting, (see Figs. 2 and 3.) This rotation of the link forces the locking-dog between the cogs of the wheel, so that, when the wheel is withdrawn from the pinion by pulling the link out through its sleeve, the wheel is securely locked, and whatever tension there may be in the spring is reserved for future use. After the link is drawn backward to the limit of its throw it is turned still further to the right into the end e^2 of the slot, and is thus securely held from being acci-

dentally thrown into gear. The opposite wheel may be thrown into gear by reversing the movement of its link, and when it has nearly expended its force the first one may be thrown into gear and the power of both be used. In practice I prefer to place the axes of the two wheels in different planes, one above the axis of the pinion C C′, as I have found that this arrangement facilitates throwing them in and out of gear when in motion. Although but two sets of springs and driving-wheels are shown, yet I usually employ four, or even more, in order to increase the power and length of time that the movement will run with once winding. Under some circumstances I may prefer to employ weights instead of springs as the motive power. Instead of using two escapement-wheels I sometimes arrange both pawls to be operated by a single one, placing the pawls diametrically opposite to each other, one above the wheel and the other below it; but I prefer the arrangement shown.

In Fig. 6 I have represented a modification of the link E^3. In this construction the inner end of the link is mounted in a bearing on the frame-work instead of on the vibrating standard E, in such manner that it can be rotated, but has no end movement. It is provided with a cam, P, arranged in the same relation to dog e^4 as that of link E^3 in the drawing. Cam P is provided with a peripherical cam-slot, $p\,p^1\,p^2$, substantially as shown. The upper end of the dog e^4 projects through the spring e^5 and enters this slot, being long enough to be always engaged with the cam.

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

1. The combination of the toggle-levers O O^1, the link N′, the balance-wheel N, the vibrating arm or lever G, and the O^2 link, substantially as described.

2. In combination, with the ratcheted wheel F F′, whether single or double, two pawls, each of which are acted upon alternately by the teeth of the wheel, each pawl being released from the teeth with which it is engaged by the forward movement of the wheel, imparted by the opposite pawl.

3. In combination, with the ratcheted escapement-wheel F F^1, whether single or double, the weighted pawls I I′, cams or inclined ways *k k′*, vibrating arm or lever G, and connecting-links H H′, substantially as described.

4. In combination, with the ratcheted escapement-wheel F F^1, the driving-gear wheels D D, two or more, constructed and arranged in such manner that either of said driving-wheels may be employed singly for actuating the ratcheted wheel, or that all of them may be employed simultaneously at the will of the operator.

5. In combination, with the gear-wheels D D, connected with the ratcheted escapement-wheel F F^1 in such manner that said gear-wheels can be disconnected at the will of the operator, locking devices, by means of which the gear-wheels can be locked in position while disconnected from the escapement-wheel, substantially as described.

6. In combination, with the gear-wheels D D, the spring-dog e^4 and the cam-shaft E^3 for locking the wheel, substantially as described.

7. The combination of gear-wheel D D, vibrating bracket-standard E, sliding shaft E^3, and grooved locking-sleeve E^4, substantially as described.

In testimony whereof I have hereunto set my hand this 27th day of September, A. D. 1871.

C. ROBESON SQUIER.

Witnesses:
ALEXR. MAHON,
H. H. DOUBLEDAY.