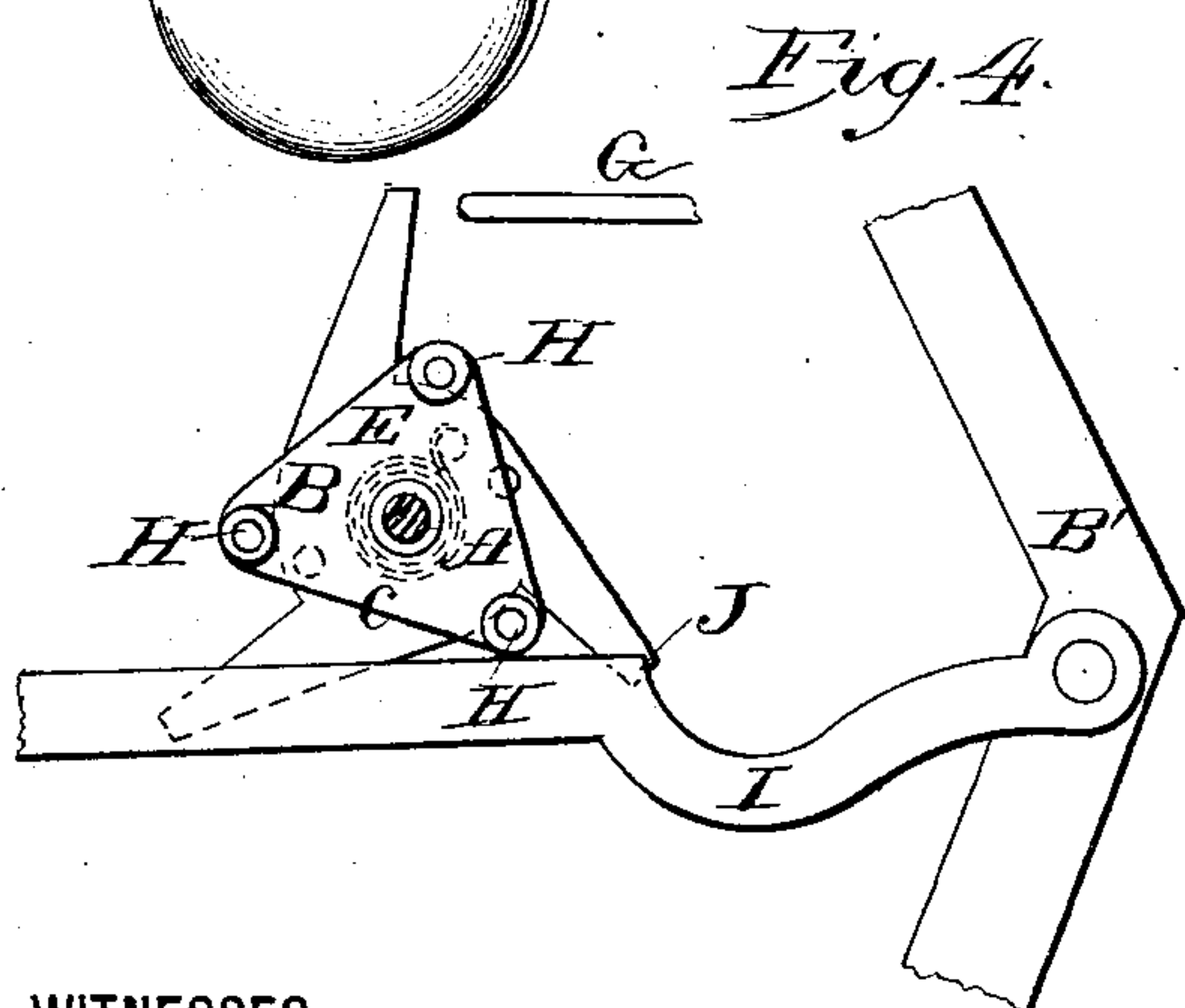
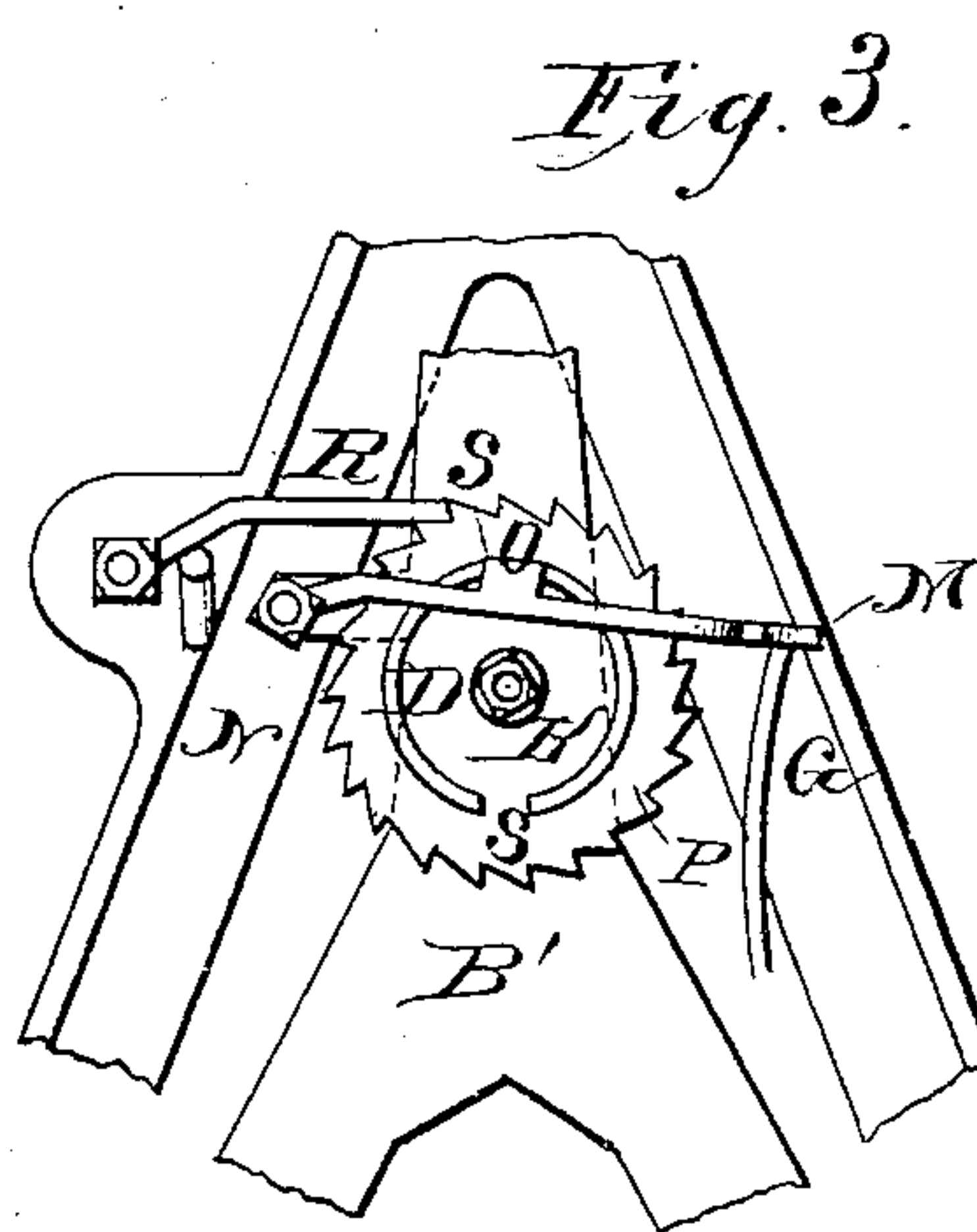
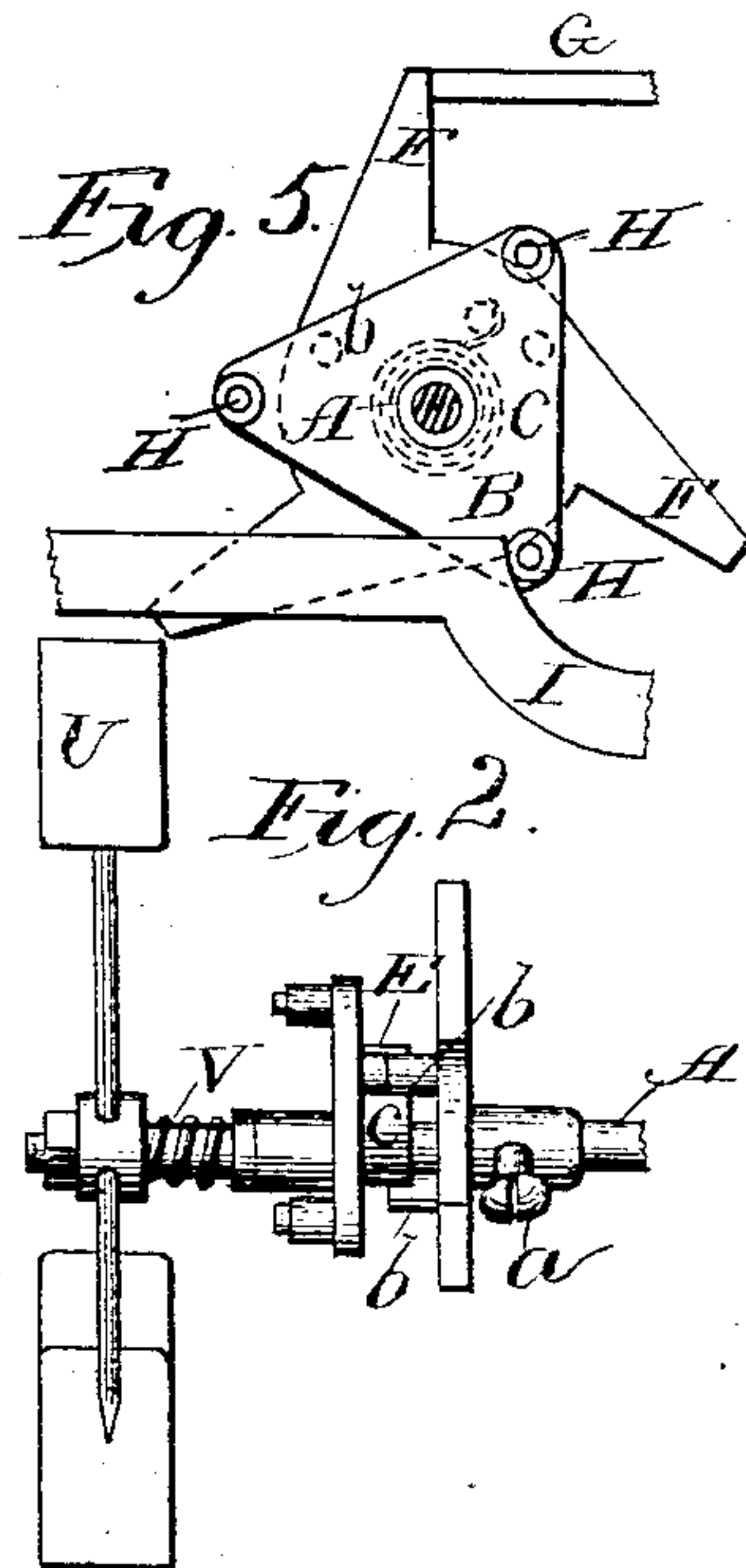
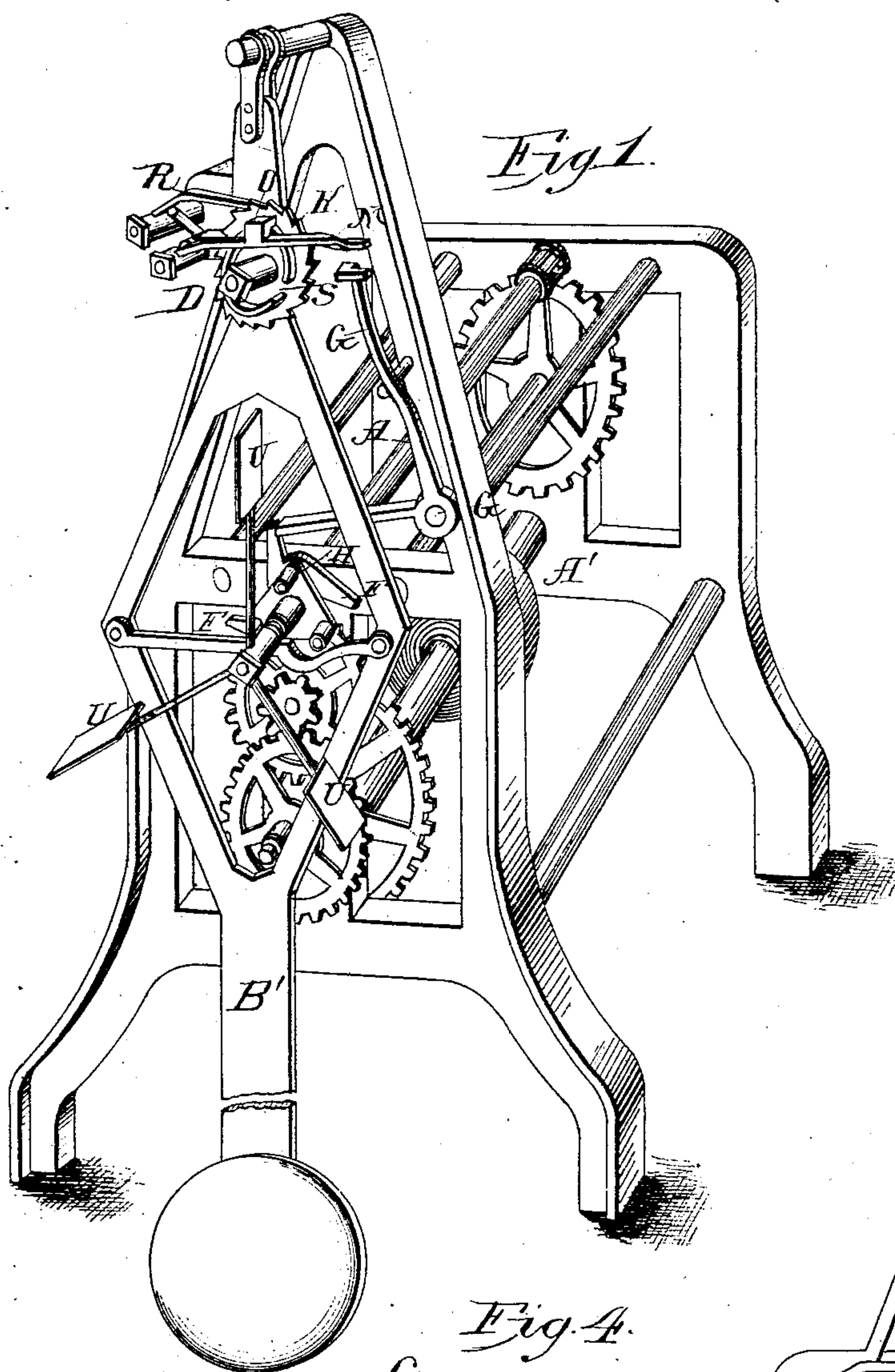


M. SCHWALBACH.
Clock Escapement.

No. 232,073.

Patented Sept. 7, 1880.



WITNESSES

E. G. Asmus
Charles F. Hunter

INVENTOR

Mathias Schwalbach
By *Jas. B. Erwin*
ATTORNEY

UNITED STATES PATENT OFFICE.

MATHIAS SCHWALBACH, OF MILWAUKEE, WISCONSIN.

CLOCK-ESCAPEMENT.

SPECIFICATION forming part of Letters Patent No. 232,073, dated September 7, 1880.

Application filed April 30, 1880. (Model.)

To all whom it may concern:

Be it known that I, MATHIAS SCHWALBACH, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Clocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in
15 clocks.

The class of clocks to which my improvements belong is shown in Patent No. 156,677, granted to me November 10, 1874.

Heretofore the motive power acted directly
20 upon the pendulum with greater or less force, according to the heft of the weight or the tension of the spring, and by the ordinary clock the motive force is expended with each vibration of the pendulum, while by my improve-
25 ments the motive power stands at rest while the pendulum vibrates many times, as in the present device it vibrates for thirty seconds with each new impetus received from the motive power. By the action of the pendulum
30 itself it once in thirty seconds releases the accelerating power which is communicated to it.

It is obvious that the number of gears required to continue the motion a given length of time may be reduced in proportion to the
35 number of vibrations produced by one impulse from the moving force.

The objects of the improvements are to transmit the force or impetus from the motive power to the pendulum uniformly without regard to
40 the heft of the weight or tension of the spring which moves the clock; also, to decrease the force required to produce a given number of vibrations of the pendulum and to increase the accuracy of the clock in keeping time.

My invention also relates to improvements in the device for connecting the pendulum to the motive power of the clock.

My invention is further explained by reference to the accompanying drawings, in which
50 Figure 1 represents a perspective elevation. Fig. 2 is a detailed side view of the escape-

ment and check wheel. Fig. 3 is a front view of a section of the pendulum, showing the device for releasing the accelerating power which drives the pendulum. Fig. 4 is an enlarged
55 front view of a section of the pendulum and pendulum-bar, showing the relative position of the escapement to the bar preparatory to communicating the accelerating power to the pendulum. Fig. 5 represents the escapement
60 in the act of communicating the accelerating power to the pendulum and the check-wheel at rest.

Like parts are represented by the same reference-letters throughout the several views.
65

I make no claim to the mechanism which connects shaft A with the mainspring A' or other motive power of the clock, or the supporting-frame, which are constructed in the ordinary manner.
70

The power exerted upon shaft A is greater or less according to the heft of the weight or the tension of the spring. In my invention described in said patent the triangular escape-
75 ment-wheel B was rigidly secured to said shaft and revolved with it, thus imparting greater or less force to the pendulum, according to the force which acts upon shaft A.

My improvement in this particular consists in attaching the escapement-wheel B loosely
80 upon shaft A and connecting it with said shaft by a coiled spring, C. The interior end of spring C is secured to the shaft, and the outer end is attached to escapement-wheel B by
85 pin E.

F is a three-armed check wheel or plate, which is rigidly secured to shaft A with set-screw a. The ends of the arms alternately strike against the horizontal arm of the elbow-shaped lever G and check the clock from run-
90 ning down. Wheel F is released by the action of the pendulum once every thirty seconds as the pendulum is swinging toward the right in position shown in Fig. 4, when wheel F performs one-third of a revolution and it is
95 again checked by the horizontal arm of lever G, which strikes against the next arm of wheel F. As wheel F thus turns forward it increases the tension of spring C, thus causing wheel B to revolve, whereby roller H is thrown down-
100 ward upon the upper side of the pendulum-bar I, as shown in said Fig. 4.

When the pendulum vibrates again toward the left, as shown in Fig. 5, the next following arm strikes against lever G and again checks the motion of the motive power of the clock. At the same time the roller H engages against shoulder J of the pendulum-bar and imparts a new impetus to the pendulum. Thus the motive power of the clock is expended in simply winding up the coiled spring C at intervals a little less than one-third of a revolution at a time, without coming in direct connection with the pendulum, and as the spring C is rewound to exactly the same tension previous to each impetus it imparts, the force applied to the pendulum must at all times be equal without regard to the tension of the spring or heft of the weight which drives the clock. Spring C is prevented from unwinding by the pins *b b*, which project from the front surface of wheel F and engage with pin E.

In my said patented invention the ratchet-wheel K was provided with three arms, which were alternately thrown in contact with elbow-lever G as the wheel revolved, thus releasing the accelerating power which is communicated to the pendulum.

This form of device proved objectionable, as the motion of the arms was not sufficiently positive, they being brought into position for contact with the lever gradually, whereas the motion ought to be instantaneous.

My improvement consists in providing the pendulum with bar M, which is attached to the pendulum by bolt N, upon which it is loosely fitted, so that the free end may move upward and downward. Bar M is provided with lug O, which projects at right angles thereto, and rests upon the upper surface of the circular flange P, and thus supports the free end of the bar. The flange P is formed in one piece with the ratchet-wheel K, and serves the double purpose of a support for bar M and tens on or friction bearing for block O, which block checks the ratchet-wheel K and prevents it from being revolved backward by the action of pawl R as it is drawn backward over the ratchet-teeth. Flange P is divided into two equal parts by slots S S, which slots are made for the reception of lug O, which drops in first one and then the other as they revolve beneath it, whereby bar M drops into the position shown in Fig. 3 twice with each revolution of the ratchet-wheel. When bar M drops its free end strikes against the vertical arm of the elbow-lever G, when the motion of the pendulum carries it forward, thus throwing back the vertical arm and raising the horizontal arm out of contact with the arm of the check-wheel F, allowing the accelerating power to be transmitted to the pendulum.

With each vibration of the pendulum toward the left the teeth of the ratchet-wheel K are one after another brought against pawl R, which revolves the wheel one tooth with each vibration. When the slot S passes beneath the lug O the bar M drops instantaneously in position to strike against lever G. The left-hand side of lug O and slots S are respectively beveled, so that as the ratchet-wheel is revolved forward the lug is thrown out of the slot and again rests upon the upper surface of the flange until the ratchet-wheel performs a half-revolution, when it drops, as before, into the next slot. As the lug is thus thrown out of the slot the bar M is raised above and out of contact with lever G.

W is a fan, which is loosely attached to the escapement-shaft, and is caused to revolve with it by the friction of the tension-spring V. The object of the fan is to retard the motion of the escapement and check wheels and lessen the force or concussion of the parts which come in contact as the check-wheel is released from lever G.

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

1. The improvements in clocks herein described, consisting in the ratchet-wheel K, provided with the flange P, having slots S S, in combination with pendulum B', pawl R, and bar M, provided with lug O, all substantially as and for the purpose specified.

2. The improvements in clocks herein described for transmitting the accelerating power uniformly to the pendulum, consisting in a loosely-fitting escapement as arranged to turn both with and upon its shaft, in combination with spring C and pendulum-bar I, substantially as and for the purpose specified.

3. The improvements in clocks herein described, consisting in the combination of loosely-fitting escapement B, anti-friction pulley H, shaft A, coiled spring C, check-wheel F, provided with pins *b b*, and pendulum-bar I, all substantially as and for the purpose specified.

4. The improvements in clocks herein described, consisting in the combination of bar I, escapement-wheel B, provided with pulleys H H H, spring C, shaft A, elbow-lever G, bar M, having lug O, ratchet-wheel K, having circular flange P, and pendulum B', all substantially as described, and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

MATHIAS SCHWALBACH.

Witnesses:

JAS. B. ERWIN,
W. SINNOTT.