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(No Model.)

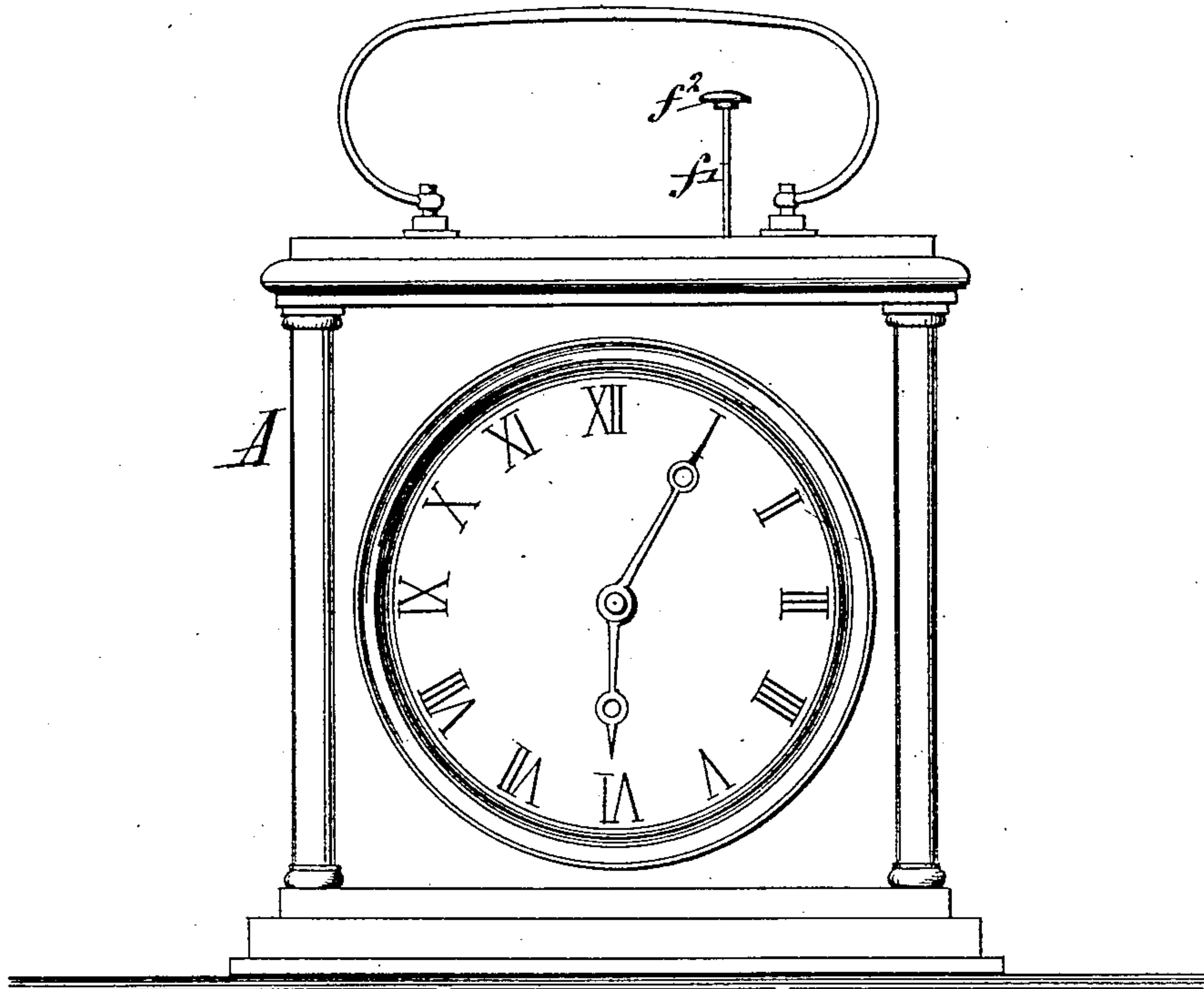
3 Sheets—Sheet 1.

C. PRAHL.  
REPEATING CLOCK.

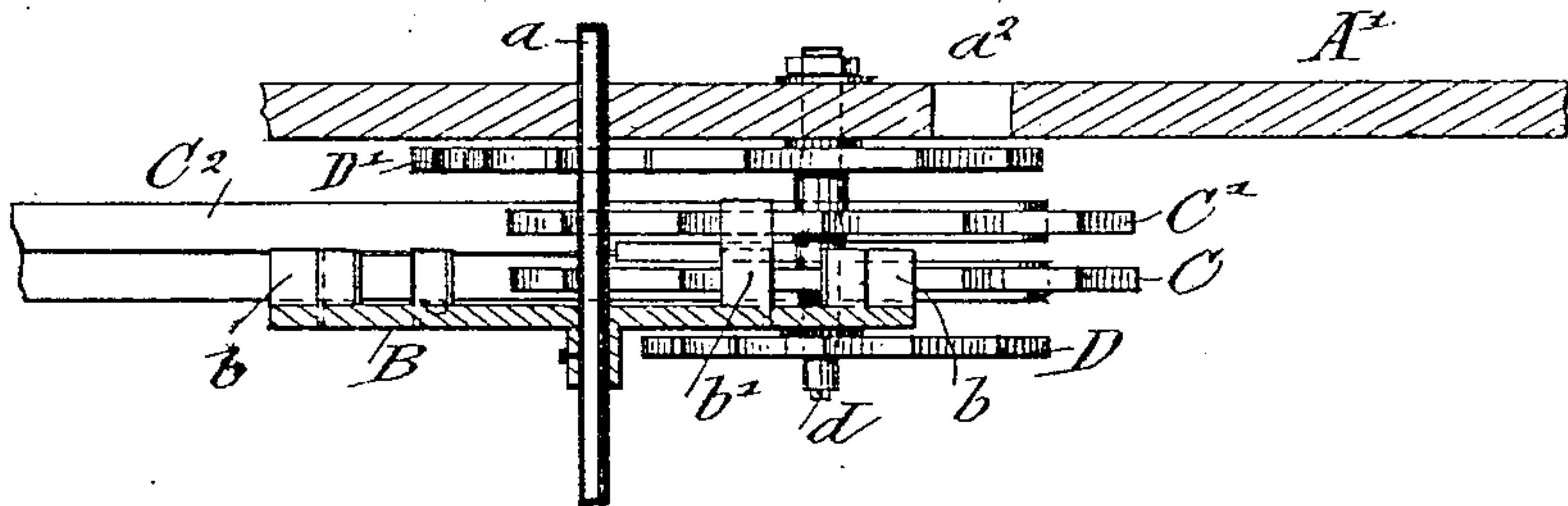
No. 560,926.

Patented May 26, 1896.

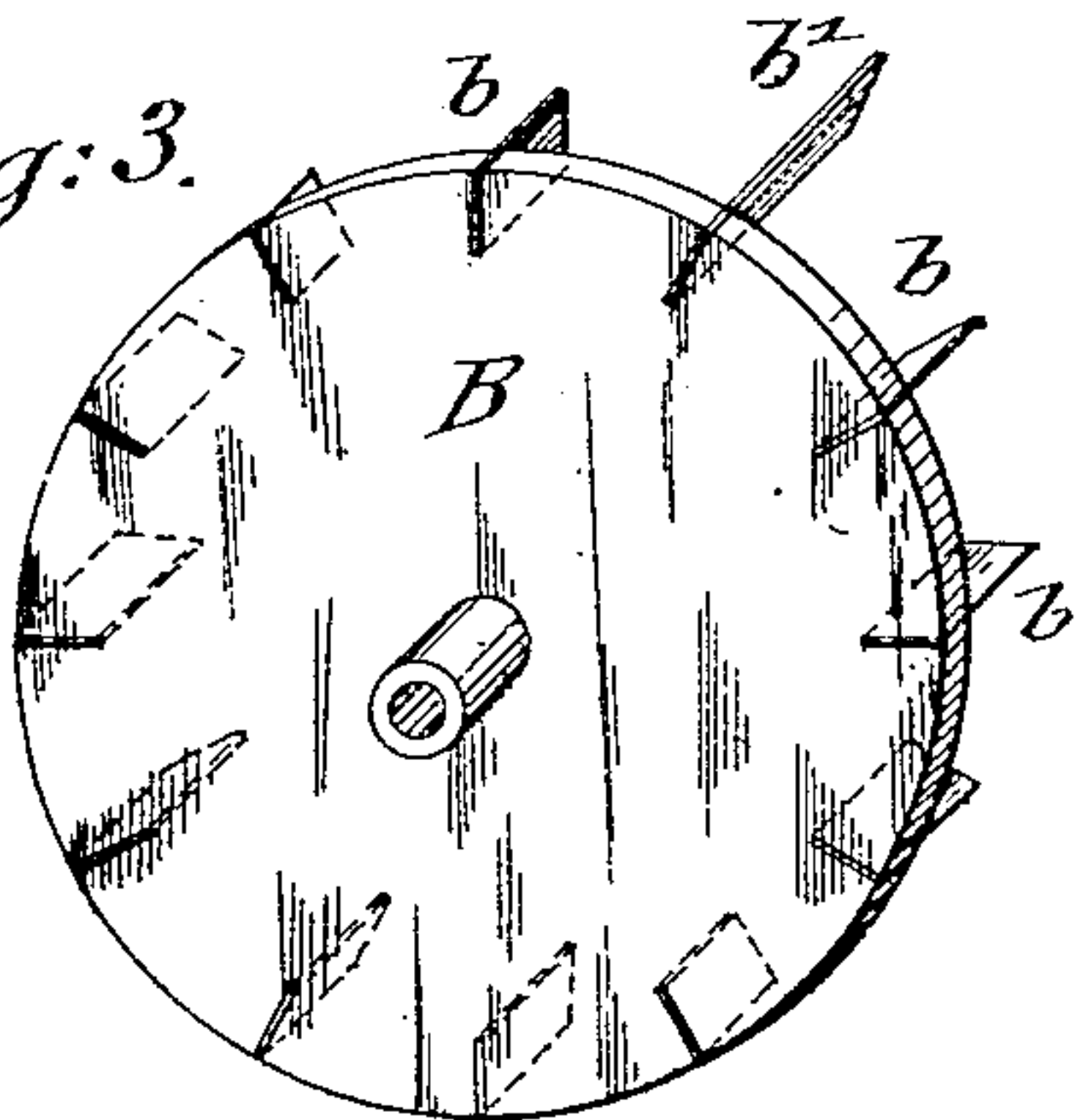
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES:  
*George W. Jauchel*  
*Ch. East*

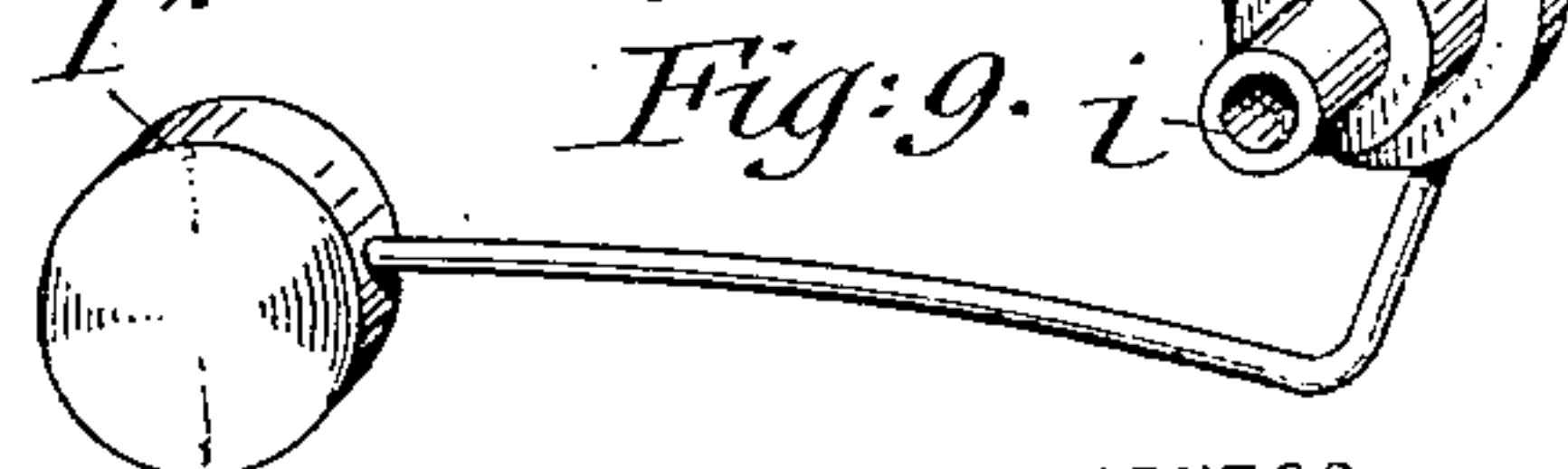
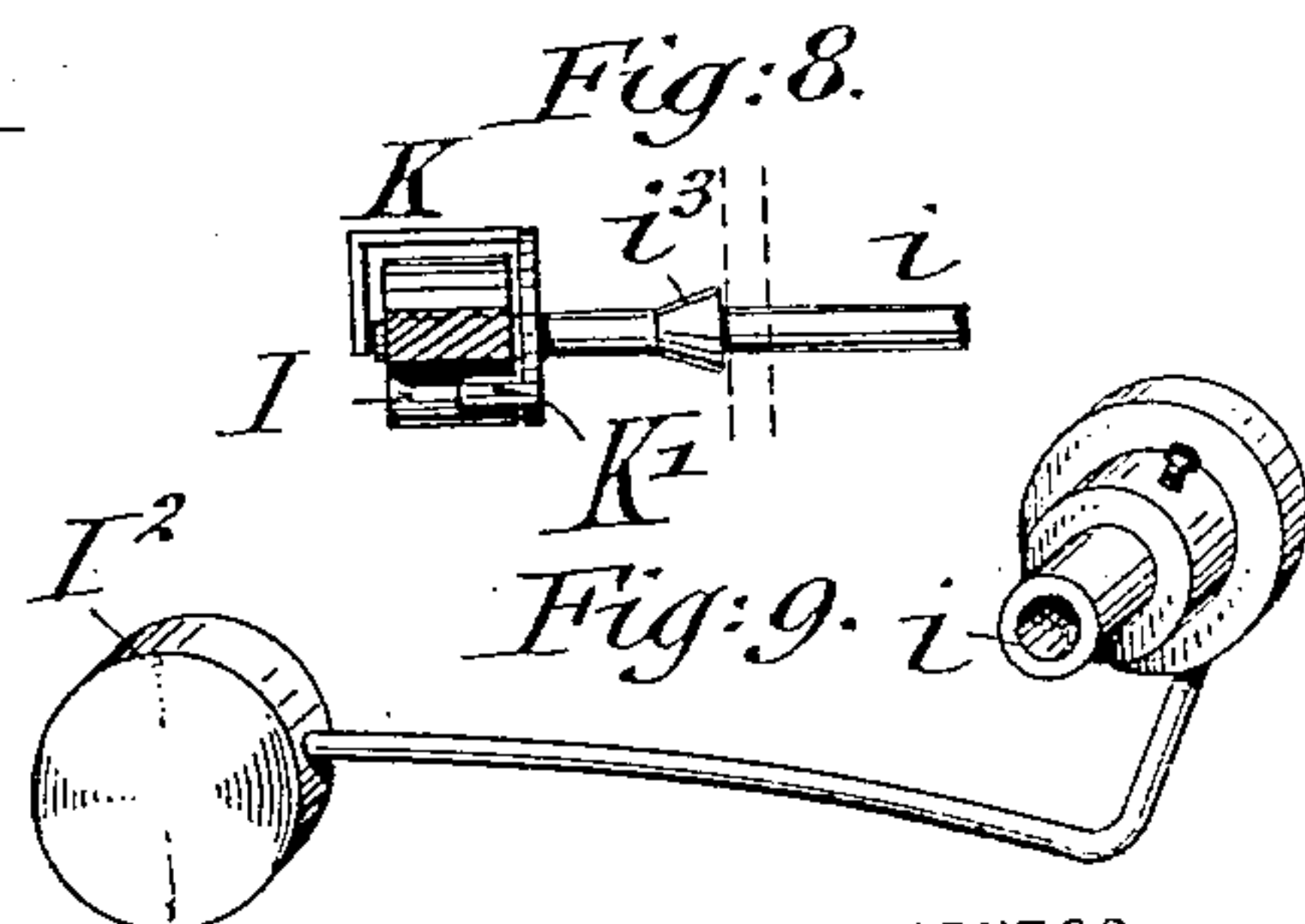
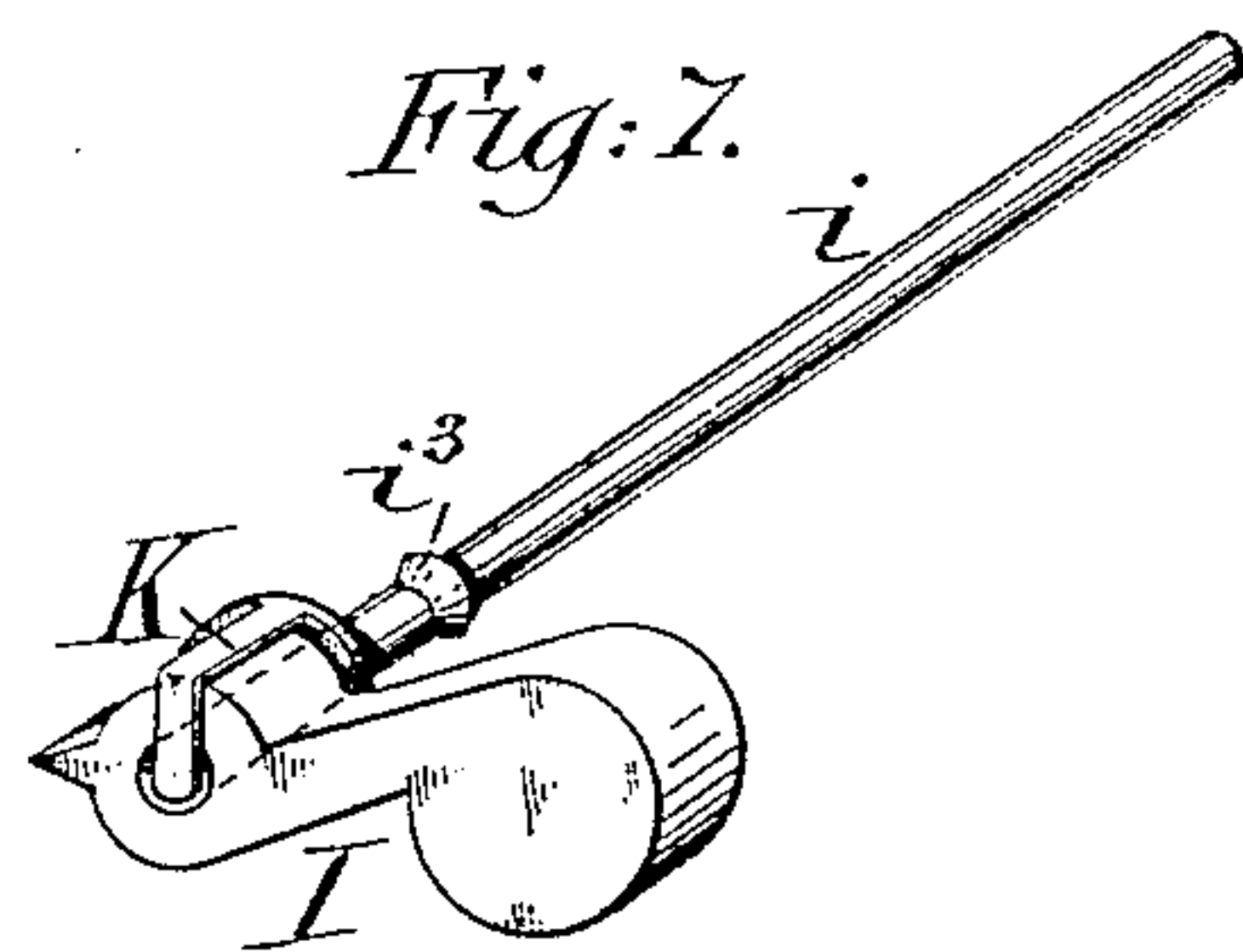
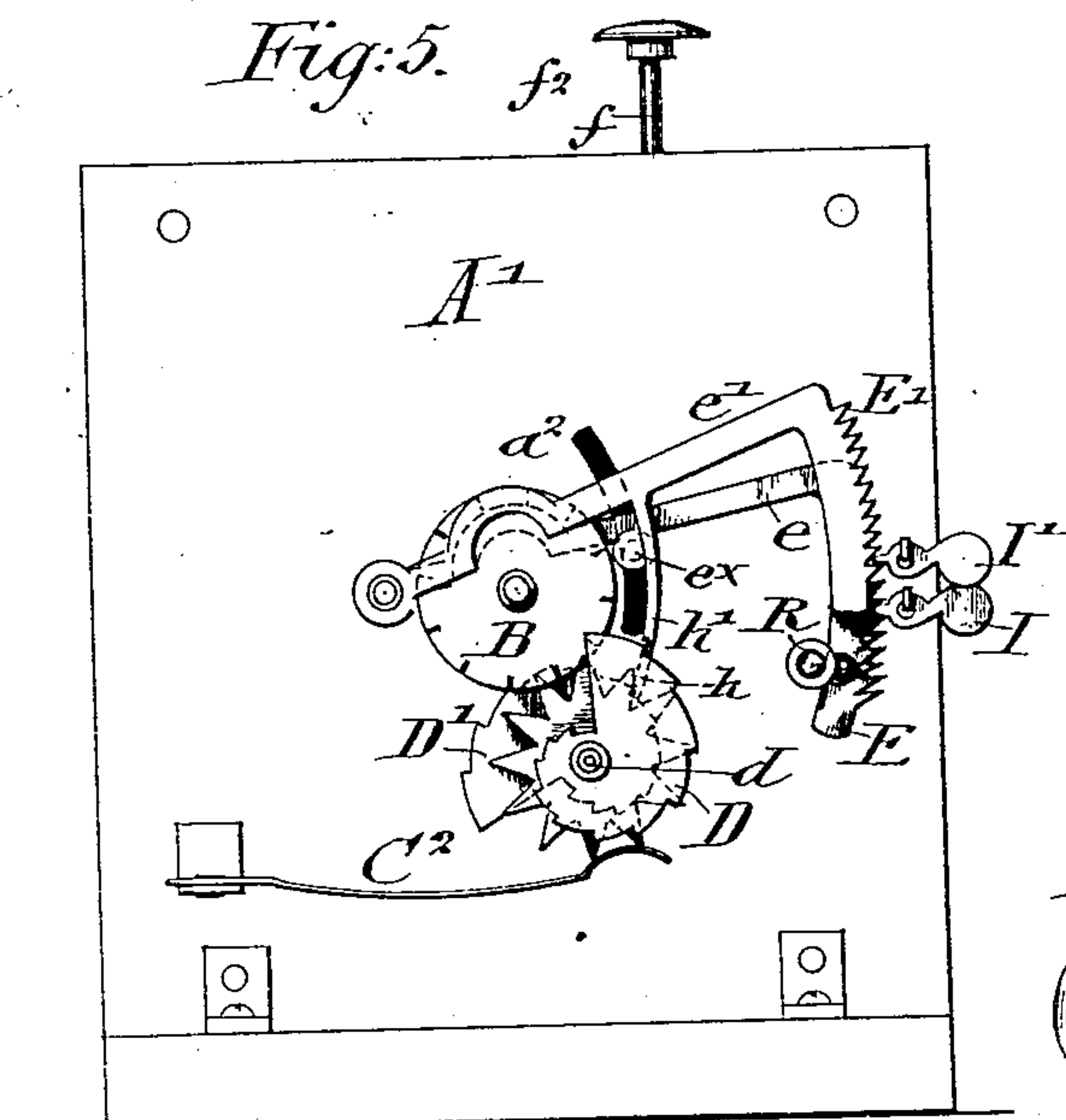
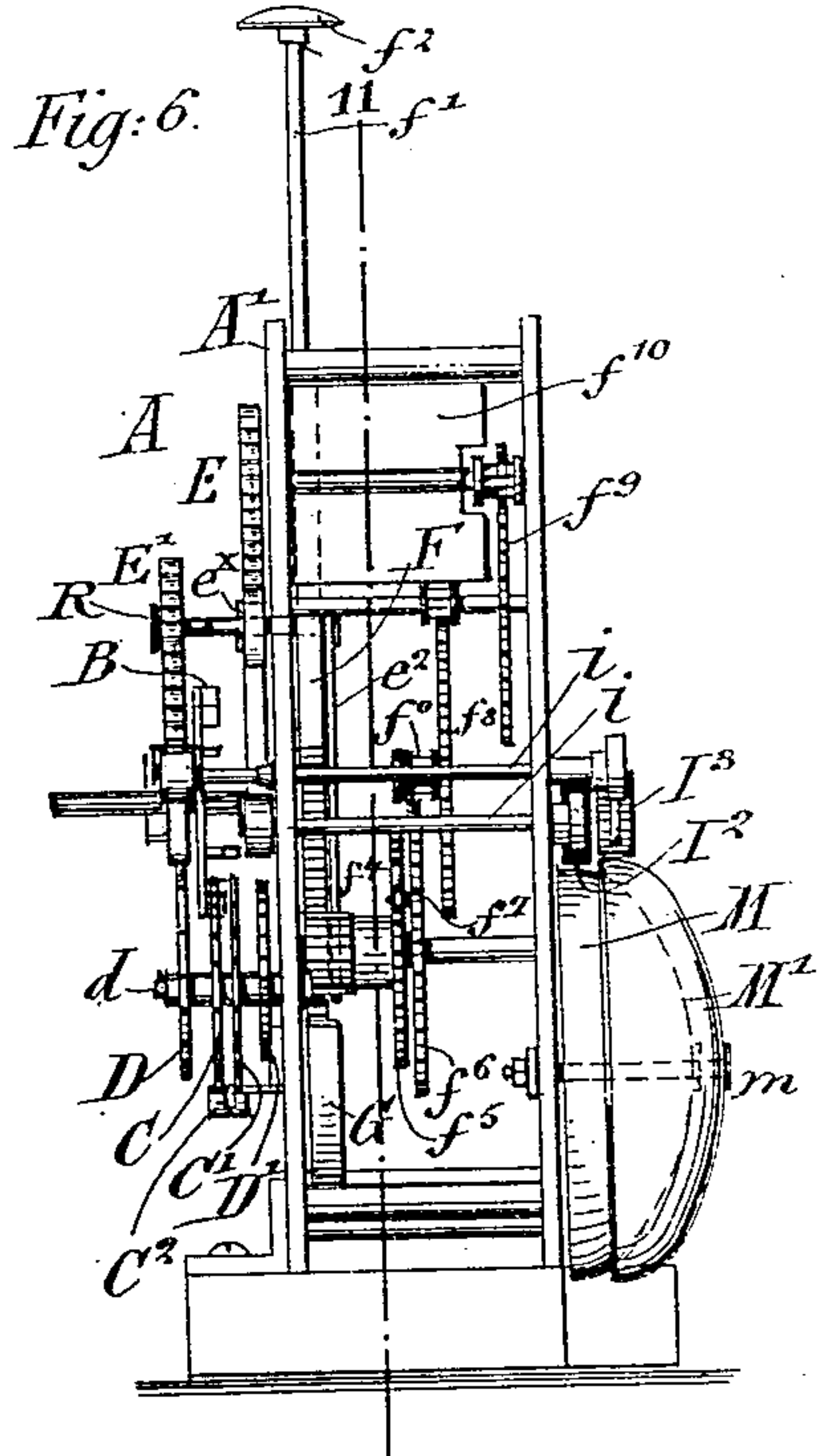
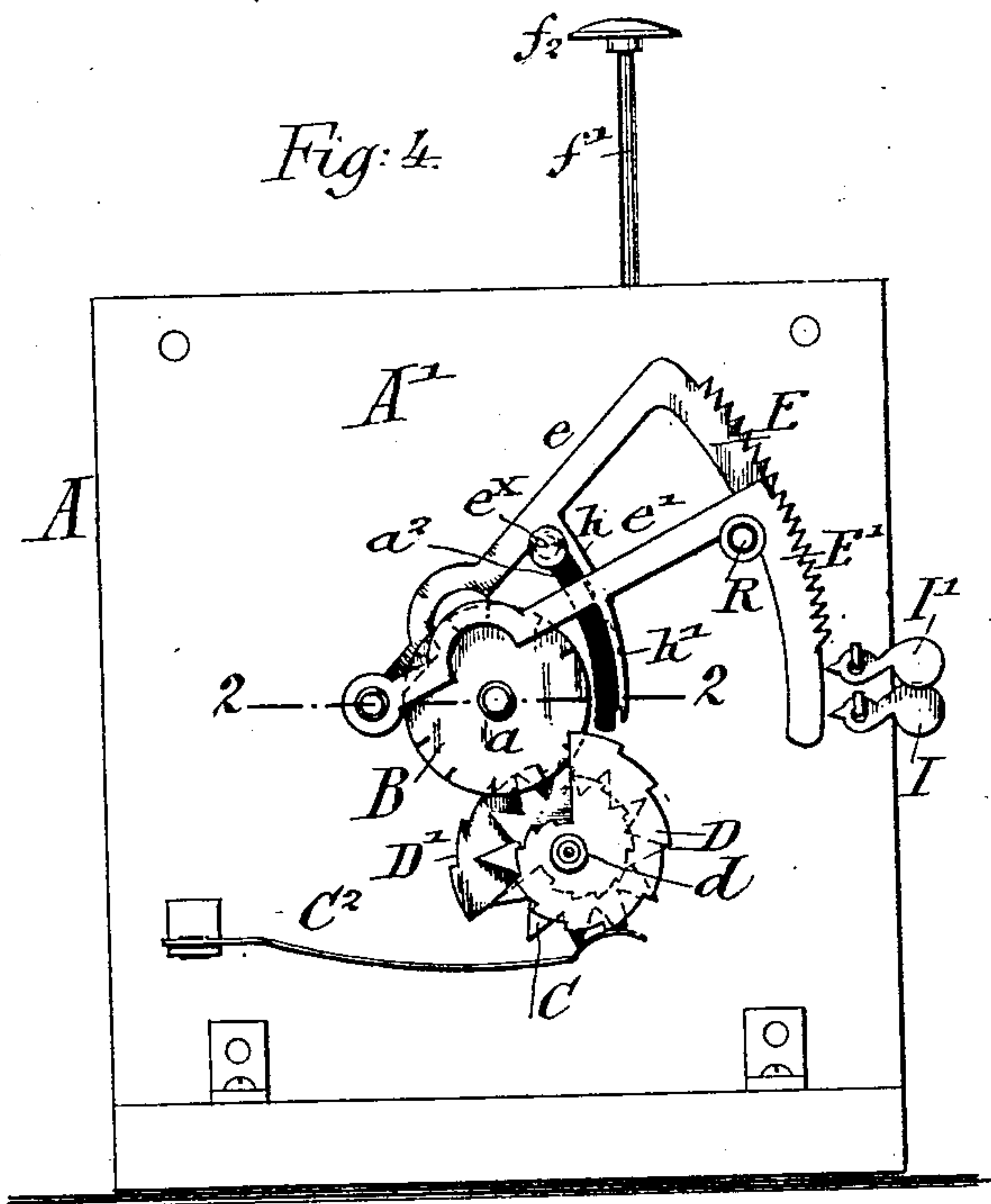
INVENTOR  
*Charles Prahl*  
BY *George W. Jauchel*  
ATTORNEYS.

(No Model.)

C. PRAHL.  
REPEATING CLOCK.

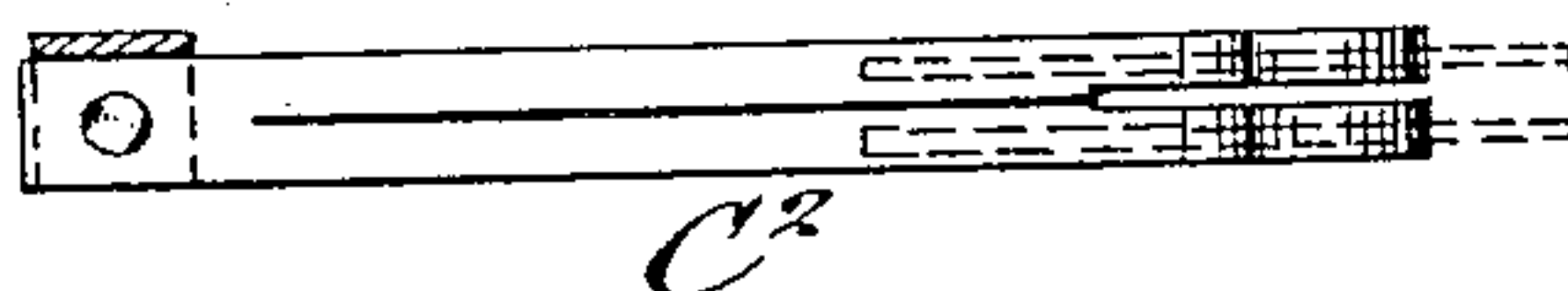
No. 560,926.

Patented May 26, 1896.



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*George W. J. J. J.*  
*A. J. J.*

*Fig. 10.*



INVENTOR

*Charles Prahl.*

BY

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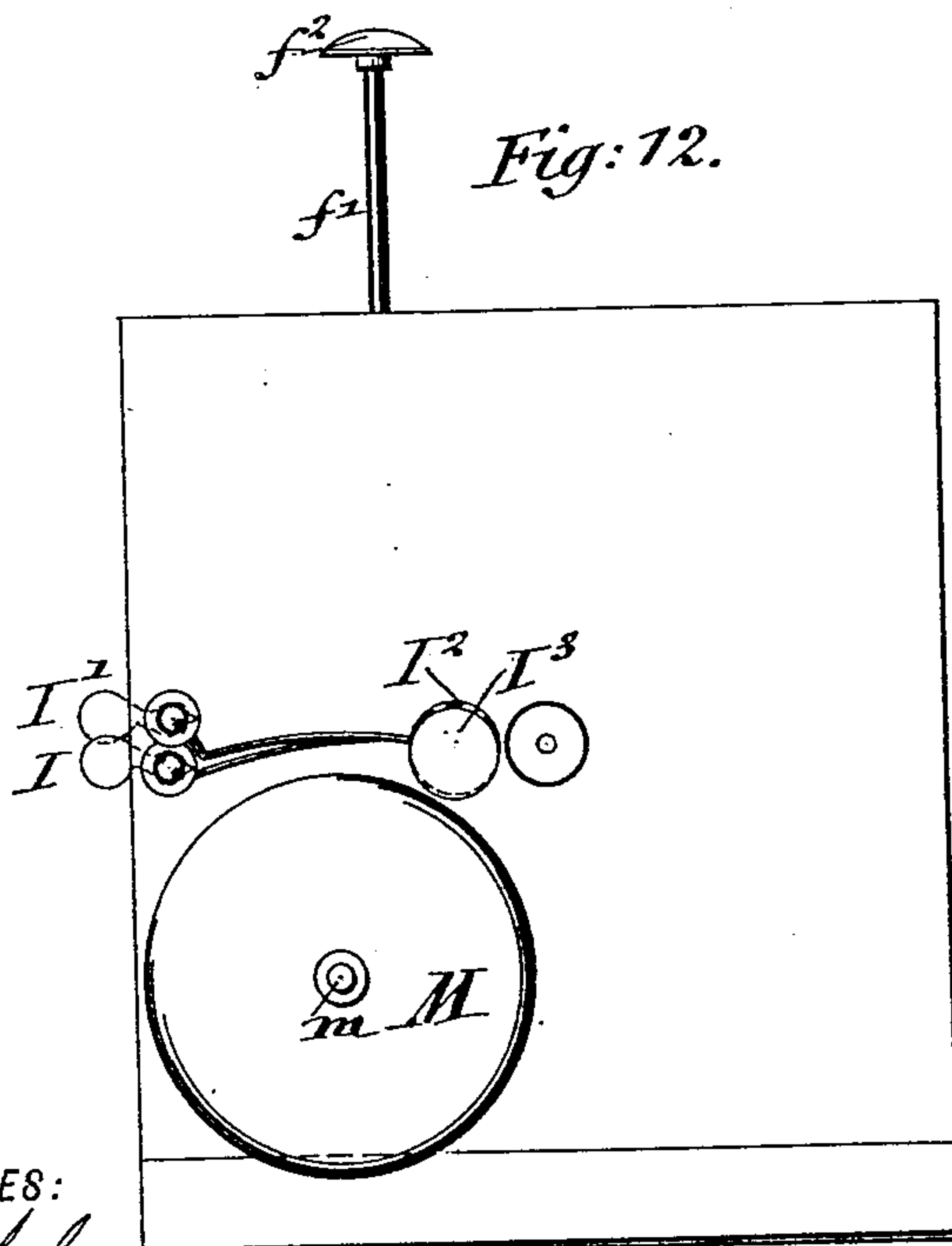
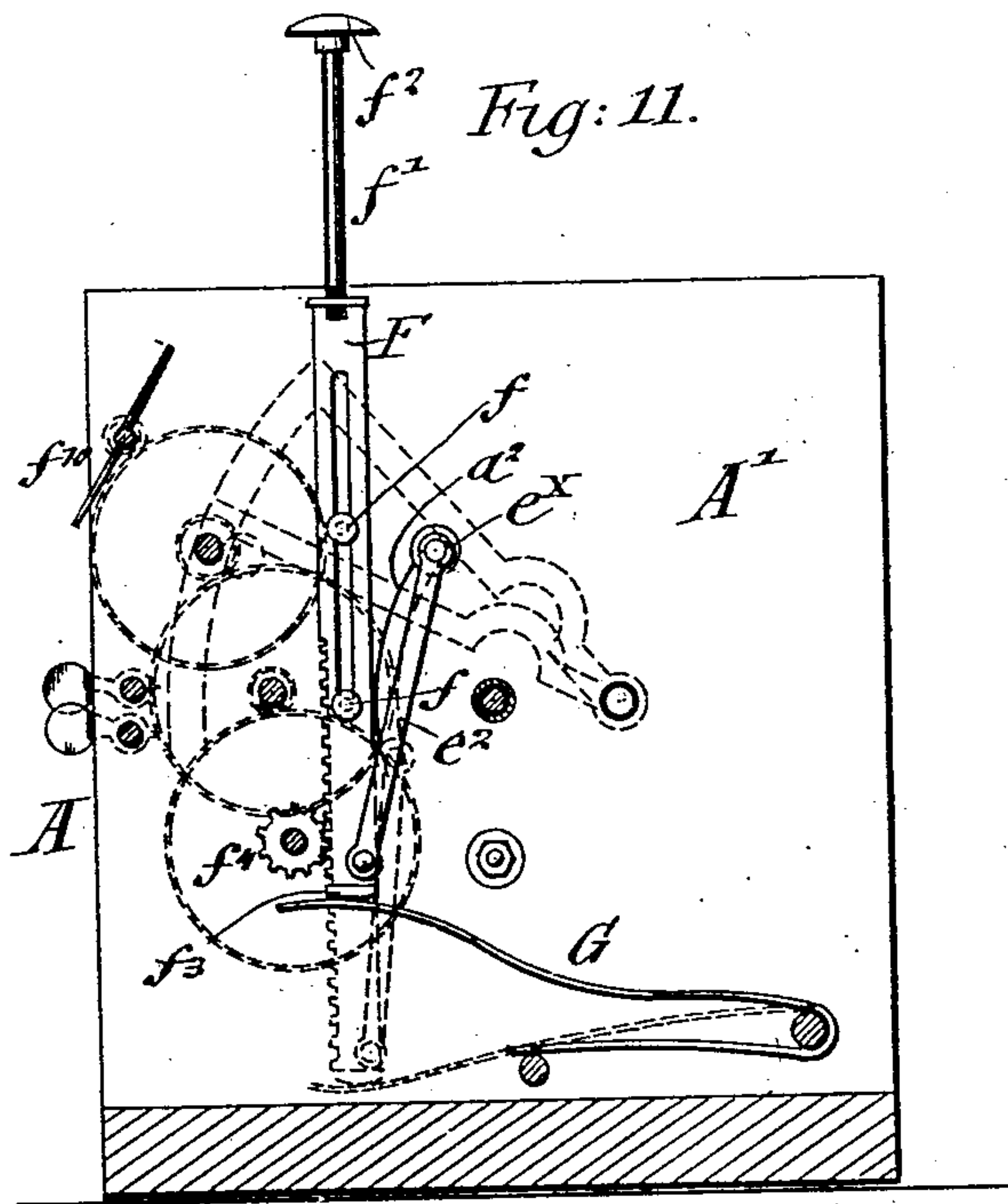
(No Model.)

3 Sheets—Sheet 3.

C. PRAHL.  
REPEATING CLOCK.

No. 560,926.

Patented May 26, 1896.



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BY *Samuel Reger*  
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# UNITED STATES PATENT OFFICE.

CHARLES PRAHL, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF THREE-FOURTHS TO SIGMUND STERN AND LEVY, DREYFUS & CO., OF SAME PLACE.

## REPEATING CLOCK.

SPECIFICATION forming part of Letters Patent No. 560,926, dated May 26, 1896.

Application filed September 6, 1895. Serial No. 561,685. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES PRAHL, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Repeating Clocks, of which the following is a specification.

This invention has reference to certain improvements in repeating clocks in which by a simple repeating mechanism applied to ordinary clocks the minutes and hours are indicated whenever desired, the repeating mechanism being so arranged that it may be applied to the clock after the parts of the same are entirely assembled; and the invention consists of a clock with a repeating attachment which is operated by the power of a spring that acts on a vertically-guided pusher-rod which is connected with one of the toothed segments, through the medium of which the minutes and hours are indicated. The shank of each segment is provided with a fixed stop-arm that is arrested by a step-shaped cam or snail which is placed on the same arbor with a spring-actuated spur-wheel that is operated by a crown-wheel on the minute-arbor of the clock, said crown-wheel being provided with eleven short teeth and one longer tooth, so as to properly rotate the minute and hour snail. As the toothed segments are returned by the actuating-spring the teeth of the same are engaged with weighted trip-pawls which are applied to shafts, the other ends of which are provided with hammers, which strike, respectively, the minute and hour bells, so as to indicate the minutes and hours.

In the accompanying drawings, Figure 1 represents a front elevation of my improved repeating clock. Fig. 2 is an enlarged detail horizontal section of a portion of the same on line 2 2, Fig. 4, showing the connection of the minute-arbor, by the crown-wheel, with the actuating spur-wheels of the step-shaped snail. Fig. 3 is a perspective view of the crown-wheels for actuating the snails. Figs. 4 and 5 are front elevations showing the toothed bell-actuating segments, their step-shaped cams, and the crown-wheel for actuating the lever, respectively, in normal position and after the pusher-rod is actuated. Fig. 6 is an end elevation of Fig. 4. Figs. 7,

8, and 9 are details of the pawls and hammers for striking the minute and hour bells. Fig. 10 is a detail view of the split spring for detaining the spur-wheels of the step-shaped cams. Fig. 11 is a vertical transverse section on line 11 11, Fig. 6, showing the pusher, the actuating-spring of the repeating mechanism, and the moderating-gear of the same; and Fig. 12 is a rear elevation of a clock, showing the hammers for striking the bells.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a clock-movement of any approved construction. To the minute-arbor *a* of the same is applied a crown-wheel B, which is formed of a disk provided with twelve teeth arranged equidistantly from each other, eleven teeth *b* being of shorter length than the twelfth tooth *b'*, which latter is double the length of the shorter teeth.

The crown-wheel B rotates with the minute-arbor, all the teeth of the same engaging the teeth of a spur-wheel C arranged adjacent thereto, while the longer tooth alone engages the teeth of the second spur-wheel C', which is arranged back of the spur-wheel C. The spur-wheel C is keyed to the hub of a step-shaped cam or snail D, while the spur-wheel C' is keyed to the hub of a step-shaped cam or snail D', which cams are applied to an arbor *d*, that is attached to the upright front plate of the clock-movement A. A split spring C<sup>2</sup> acts on the teeth of both spur-wheels C C', so as to arrest the spur-wheels without preventing the rotation of the same when engaged by the teeth of the crown-wheel B.

To the front plate A' of the clock-movement A are pivoted the radial shanks *e e'* of two toothed segments E E', which shanks are provided with semicircular bends, so as to clear the minute-arbor. The shank *e* of the toothed segment E rests normally upon a pin *e<sup>x</sup>*, which passes through an arc-shaped slot *a<sup>2</sup>* in the front plate A, and is carried by a pivot-link *e<sup>2</sup>*, that is arranged adjacent to the inner face of the front plate A', which pivot-link is pivoted at its lower end to a vertical pusher-rod F, which is guided by a longitudinal slot along headed pins *f* applied to the inner face



of the front plate A'. The pusher-rod F is provided at its upper end with a round shank  $f^1$ , having a knob  $f^2$ , by which the pusher-rod is depressed whenever the repeating mechanism is to be actuated. The lower end of the pusher-rod F is provided with a heel  $f^3$ , that engages the free end of a flat spring G, which is attached to the lower part of the front plate A', as shown in Fig. 11. This spring serves for the purpose of actuating the repeating mechanism after it has been depressed by the pusher-rod.

The lower part of the pusher-rod F is made in the shape of a rack, the teeth of which engage with a pinion  $f^4$ , that is placed loosely on a stationary arbor and fixed on the hub of a ratchet-wheel  $f^5$ , which is placed loosely on the sleeve or arbor of a gear-wheel  $f^6$ , said ratchet-wheel  $f^5$  being engaged by a pawl  $f^7$  on the gear-wheel  $f^6$ . The pawl  $f^7$  passes over the teeth of the ratchet-wheel  $f^5$  when the pinion  $f^4$  is turned by the downward motion of the pusher-rod, but it engages the teeth of the ratchet-wheel so as to carry the gear-wheel  $f^6$  along, when the pusher-rod F is moved in upward direction by the spring G. The gear-wheel  $f^6$  engages the pinion of a second gear-wheel  $f^8$ , which engages again the pinion of a third gear-wheel  $f^9$ , that engages the pinion of a fly  $f^{10}$ , which pinions, gear-wheels, and fly form together the so-called "moderating-gear," by which the return motion of the pusher-rod and of the segments operated by the same is retarded. This moderating mechanism is not operated when the pusher-rod is depressed, as the pinion  $f^4$  and its ratchet-wheel  $f^5$  is then turned on the shaft without influencing the remaining gear-wheels of the moderating-gear. By the upward motion of the pusher-rod F, however, the moderating-gear is operated, as the ratchet-wheel  $f^5$  on the pinion  $f^4$  is then engaged by the pawl on the gear-wheel  $f^6$ , so that the moderating-gear is set into action and by the quickly-rotating fly the return motion of the pusher-rod is retarded.

Near the inner end of the toothed segment E is applied an antifriction-roller R, which serves as a carrier for returning the toothed segment E' whenever said carrier engages the shank  $e'$  of the toothed segment E'. As the shank of the toothed segment E rests upon the transverse pin  $e^x$  it and the toothed segment E' are moved in downward direction by gravity, when the pusher-rod F is depressed and returned simultaneously with the same, by the action of the spring G, into its normal position. The segments move together downward until a fixed arm  $h'$  on the shank of the toothed segment E' is arrested by one of the eccentric steps of the step-shaped cam D, and until the fixed arm  $h$  on the shank of the toothed segment E is arrested by one of the eccentric steps of the step-shaped cam D'. During the return motion of the pusher-rod the roller R of the toothed segment E engages at the proper moment the shank of the

toothed segment E' and returns thereby the toothed segment E' to its normal position, as shown in Fig. 4. When the segments E E' are moved in downward direction by the pusher-rod F, the teeth on the circumference of the same are engaged by weighted trip-pawls I I', which are applied to the ends of separate arbors  $i$ , however, and carry at their opposite ends the minute and hour hammers I<sup>2</sup> I<sup>3</sup>, that strike, respectively, hour and minute bells M M', said hubs being applied by suitable set-screws to the arbors  $i$  after the same have been passed through holes in the supporting-plates of the clock-movement, the arbors being provided with shoulders  $i^3$ , which arrest the pawls when they are placed in position on said arbors and the hubs of the hammers retaining the hammer-arbors in proper position. As the trip-pawls I I' are engaged by the teeth of the segments E E' the hammers are raised and dropped so as to strike the minute and hour bells M M', which are applied to a suitable post  $m$  at the rear of the movement A, said bells being preferably arranged on the same post, one back of the other, as shown in Fig. 6. The trip-pawls I I' are retained on the end of the arbor  $i$  by a keeper K, as shown in Figs. 7 and 8, the lower part or stop K' of said keeper being engaged by the shank of the pawl when the point of the same is actuated in upward direction by the toothed segment, so that the arbor is turned, and thereby the hammer lifted, the latter being dropped again as soon as the tooth of the segment has passed the point of the trip-pawls I I'. During the downward motion of the segments E E' the teeth of the same act on the points of the trip-pawls so as to lift the weighted end of the same, in which case, however, the lower part of the keeper and the arbor of the hammer are not actuated.

The operation of my improved repeating clock is as follows: Whenever the time of day is desired to be ascertained, the pusher-rod is quickly depressed by pressing with the finger on the knob of the same, while by the downward motion of the pusher-rod the spring G, the link  $e^2$ , and the pusher-rod are moved into the position shown in dotted lines in Fig. 11. As the pin  $e^x$  is drawn down both segments fall by gravity, and this is continued until each is arrested by its step-shaped cams D D', against which the fixed arms on the shanks of the segments abut, as shown in Fig. 5. By the return movement of the pusher-rod, which is produced by the actuating-spring G, the hour-segment is simultaneously moved in upward direction, so that the teeth of the same, located below the tooth engaged by the trip-pawl I, actuate successively the trip-pawl and hammer of the hour-bell M. By this time the carrier-pin R on the hour-segment E arrives at the shank of the minute-segment E' and carries that along, so that the teeth of said minute-segment actuate the trip-pawl and hammer of the minute-bell and produce thereby the striking of the same.



The repeating attachment is so arranged that each stroke of the minute-bell indicates five minutes, and which has the advantage that the step-shaped cams D D' and the minute and hour segments, respectively, can be made of equal size and shape, whereby the manufacture of the repeating attachment is considerably simplified and cheapened.

During the return motion of the segments the hour-bell strikes first, and after the hour-strokes are sounded the minute-bell is sounded, and thereby the minutes indicated, which number of strokes, however, must be multiplied by five, so as to indicate the correct number of minutes. The repeating attachment can be applied to the clock-movement after the parts of the same are entirely assembled, the crown-wheel on the minute-arbor forming connection with the clock-movement, while all the remaining parts of the repeating mechanism are independent of the movement-power. The parts of the repeating mechanism can all be made cheaply and by machinery the same as the gear-wheels and other parts of the clock-movement, so that the repeating attachment can be applied to any clock, even the cheapest kind, with little extra expense, and thereby a repeating clock placed within the reach of almost everybody.

The advantages of the repeating clock are mainly apparent at night, as thereby the time during the night can be readily ascertained without requiring a light.

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

1. The combination, with a clock-movement, of a crown-wheel on the minute-arbor, said crown-wheel having eleven short teeth and one longer tooth, step-shaped cams actuated by said crown-wheel, pivotally-mounted toothed hour and minute segments, means for oscillating said pivoted hour and minute segments until arrested by the step-shaped cams, mechanism actuated by the toothed segments for striking respectively an hour and minute bell, substantially as set forth.

2. The combination, with a clock-movement, of a crown-wheel on the minute-arbor, said crown-wheel having eleven short teeth

and one longer tooth, step-shaped cams actuated by said crown-wheel, pivotally-mounted toothed hour and minute segments, means for oscillating said pivoted hour and minute segments until arrested by the step-shaped cams, mechanism actuated by the toothed segments for striking respectively an hour and minute bell, and a moderating-gear for regulating the return movement of the motor mechanism, substantially as set forth.

3. In a repeating clock, the combination of a motor mechanism, consisting of a vertically-guided pusher-rod, a spring depressed by said pusher-rod, oscillating hour and minute segments provided with means for engaging one with the other, a pivot-link connected with the pusher-rod and carrying a pin which engages the minute-segment, and a moderating-gear actuated by the pusher-rod so as to retard the return motion of the same and of the toothed segments, substantially as set forth.

4. In a repeating clock, the combination, with a clock-movement, of a crown-wheel on the minute-arbor, said crown-wheel having eleven short teeth and one longer tooth, spur-wheels engaged respectively by the short teeth and the long tooth, step-shaped cams or snails applied to the spur-wheel, oscillating toothed segments provided with fixed arms that are arrested by the steps of the cams, and the moderating-gear for retarding the return movement of the mechanism, substantially as set forth.

5. In a repeating clock, the combination, with the oscillating toothed hour and minute segments, of weighted trip-pawls adapted to engage the teeth of said segments, arbors provided with keepers to which the pawls are applied, hammers applied to the opposite end of the arbors, and hour and minute bells actuated by said hammers, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES PRAHL.

Witnesses:

PAUL GOEPEL,

GEORGE W. JAEKEL.