

(Model.)

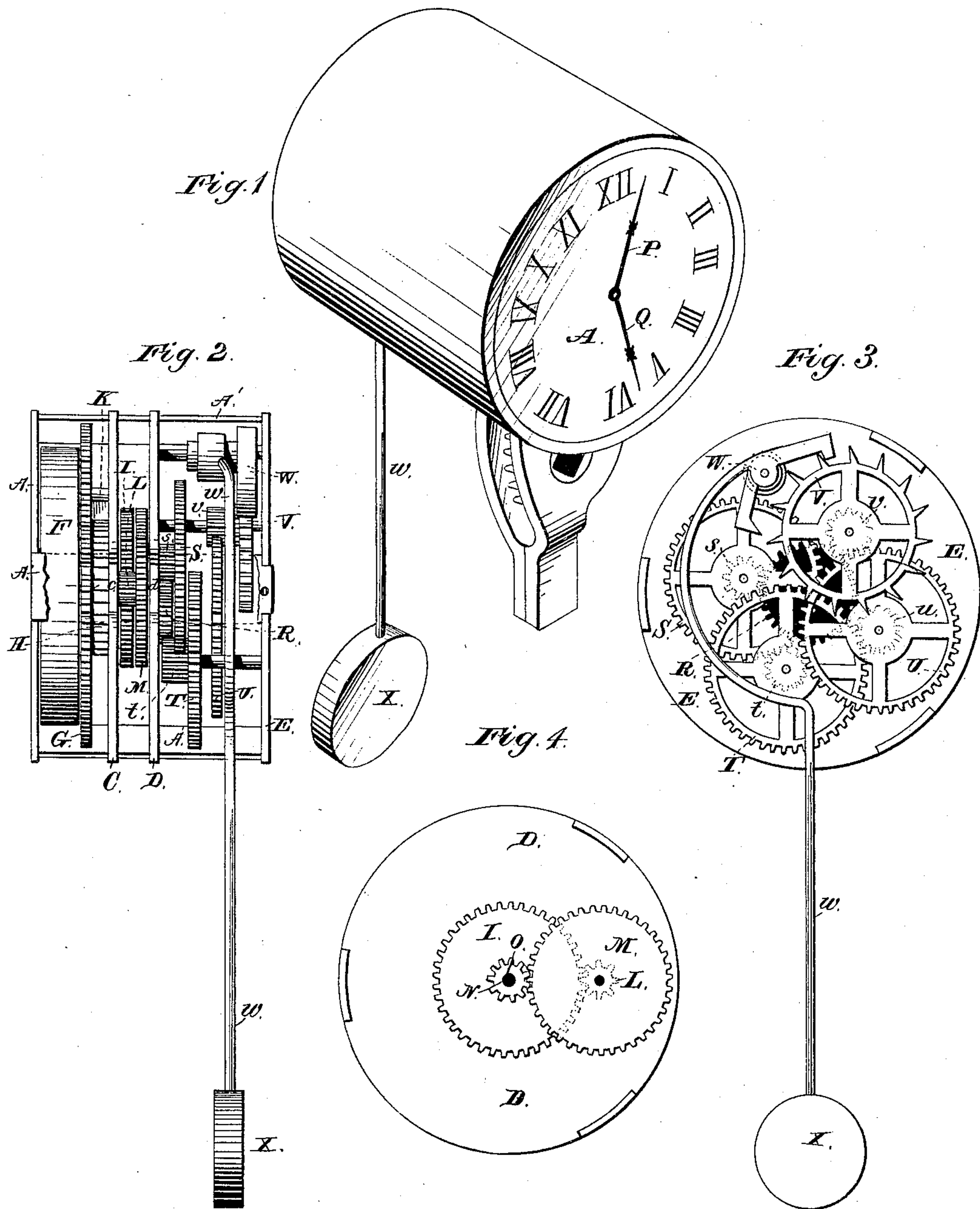
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W. E. DOOLITTLE.

CLOCK MOVEMENT.

No. 251,532.

Patented Dec. 27, 1881.



Witnesses.

Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.

Wm. E. Doolittle, by
Geo. S. Prindle, his Att'y

(Model.)

2 Sheets—Sheet 2.

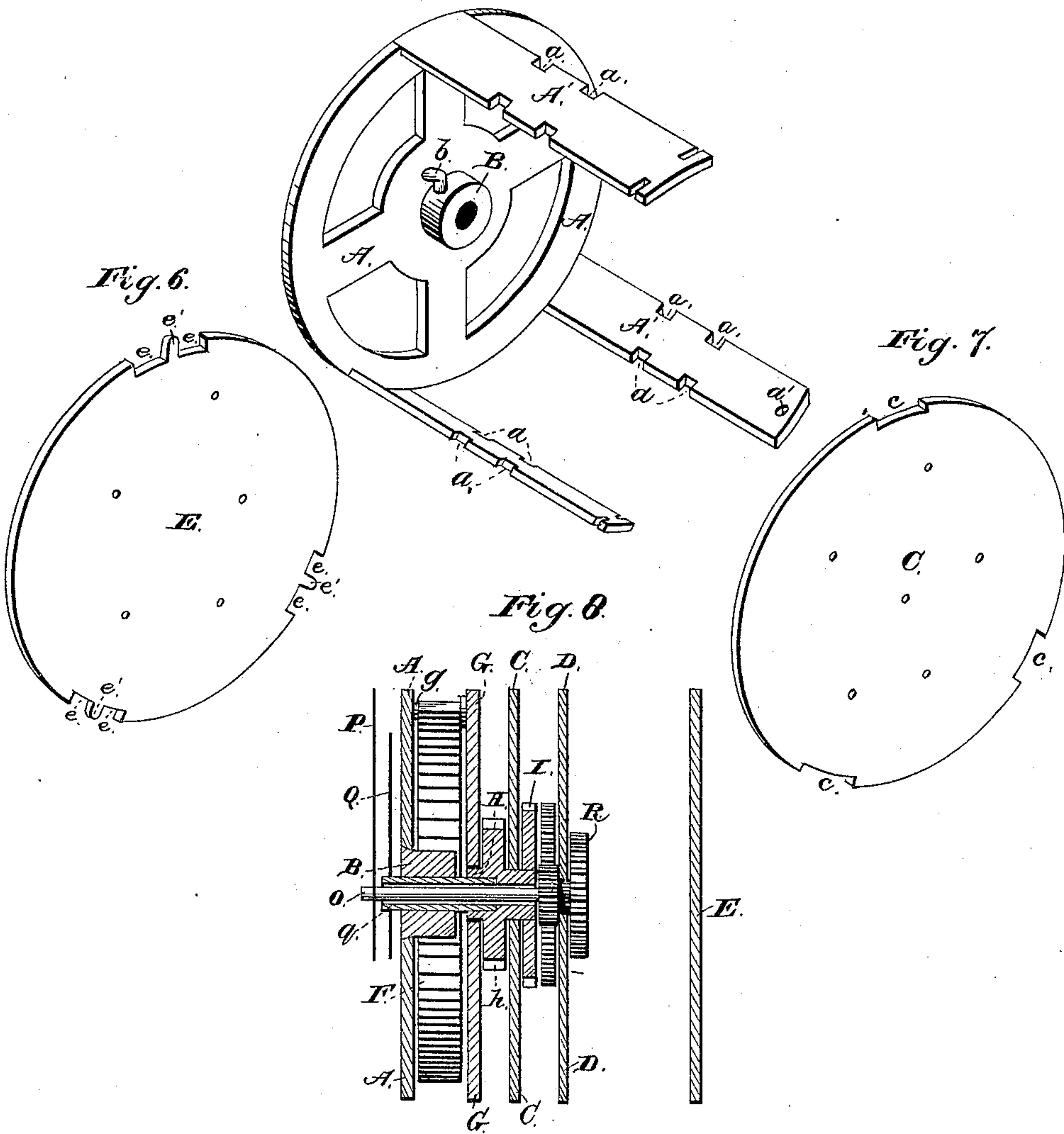
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Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM EDSON DOOLITTLE, OF WEST HAVEN, CONNECTICUT.

CLOCK-MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 251,532, dated December 27, 1881.

Application filed June 3, 1881. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM E. DOOLITTLE, of West Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Time-Pieces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of a clock embodying my invention. Fig. 2 is a side elevation of the train separated from the casing. Fig. 3 is a rear elevation of the time-train, the rear plate being removed. Fig. 4 is a like view of the reducing-train. Fig. 5 is a perspective view of the frame of the movement prepared to receive the train-supporting plates. Figs. 6 and 7 are like views of the rear and intermediate plates separated from the frame, and Fig. 8 is a central longitudinal section of the movement excepting the time-train.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is the production of a time-piece in which, from the small number of the operative parts, wheels and pinions having large teeth may be employed, and the mechanism may be contained within a case much smaller than has heretofore been practicable when such wheels and pinions were used; to which end it consists, principally, in a time-piece in which the mainspring is placed immediately in rear of the dial and the time-train is journaled in rear of said mainspring, whereby each may occupy substantially the entire space laterally between the pillars or within the inclosing-frame, and actuate the hands through the axis of said mainspring, substantially as and for the purpose hereinafter specified.

It consists, further, in a time-piece in which the mainspring and time-train are separately, and in the order named, placed between stationary plates directly in rear of the dial, and occupy each substantially the entire space laterally between the pillars or frame and actuate the hands without the intervention of the usual central or minute arbor, substantially as and for the purpose hereinafter shown.

It consists, further, in a time-piece substan-

tially as described, the combination and relative arrangement shown of the mainspring, time-train, dial, and hands with the intermediate mechanism, whereby said hands are actuated without use of the ordinary central or minute arbor, substantially as and for the purpose hereinafter set forth.

It consists, finally, in the construction of the frame and its combination with the operative parts of the movement, substantially as and for the purpose hereinafter shown and described.

In the annexed drawings, A represents the front plate of the frame of my time-piece, which frame has any desired peripheral form, and at its center is provided with a hollow hub, B, that is provided upon or within its periphery with a hook, *b*, for engagement with the inner perforated end of a mainspring.

At suitable points around the periphery of the plate A are provided pillars A', which pillars are permanently attached to and form part of said plate, being blanked out of or cut from the same sheet of metal, and then bent to position.

At points near the longitudinal centers of the pillars A' are two plates, C and D, which are arranged parallel with the front plate, A, and are secured in position by means of two notches, *a*, cut in the opposite corners of each post and corresponding in width to the thickness of one of said plates, and a notch, *c* or *d*, which is provided within the periphery of each of said plates at the point of its intersection with each pillar, and corresponds in width and in radial dimensions to the width and thickness respectively of metal between said notches *a*. When said plates are pressed downward between said pillars the latter are moved radially apart until the plates reach position, when said pillars spring inward and the notched or recessed portions of said parts engage the solid portion of one part, fitting into and closely filling the notches of the other part. A third plate, E, corresponding in size and shape to the like features of the plates A, C, and D, is placed between the rear ends of the pillars A', and is secured in place by means of notches *a* and *c*, as heretofore described, or, in addition thereto, is provided with a stud, *e'*, which passes radially outward through a suitable opening,

a' , in each pillar, and is bent sidewise or riveted down, as desired.

To the hook b is secured the inner end of a mainspring, F , the outer end of which spring is attached to or upon a stud, g , that projects forward from the face of a winding-wheel, G , which is placed between said spring and the plate C . Said wheel is journaled upon one end of a hollow hub, H , the opposite end of which projects through the said plate C , and has secured thereon a toothed wheel, I . Between the winding-wheel G and the plate C the hub H is enlarged and its periphery provided with teeth h , so as to form a ratchet, which is engaged by means of a pawl, K , that is pivoted upon the rear face of said wheel, and is held in engagement with said teeth by means of a spring, the arrangement being such as to cause said pawl to pass over said teeth without engagement when said wheel is rotated in the direction necessary in order to wind or coil the spring F , and to engage with said teeth and cause said ratchet-wheel to revolve with said winding-wheel as said spring uncoils, all in the usual manner.

The wheel I meshes with and rotates a pinion, L , which is secured to and revolves with a toothed wheel, M , and said second wheel in turn meshes with and revolves a second pinion, N , that is secured upon an arbor, O , which passes outward through the ratchet-hub H and the hub B , and at its outer end receives a minute-hand, P . An hour-hand, Q , is secured upon one end of a sleeve, q , which has its opposite end contained within the outer end of said ratchet-hub, as seen in Fig. 8.

The wheels and pinions I , L , M , and N are graduated so as to give twelve revolutions of the last for one revolution of the first, the number of teeth on each being preferably thirty-two teeth for the first wheel, I , eight teeth for the first pinion, L , twenty-four teeth for the second wheel, M , and eight teeth for the second pinion, N ; but it will be apparent that any other arrangement of numbers which preserves the same ratio will secure the same result. This reducing-train enables me to make use of a short strong spring, and to bring the works within such compass as to enable them to be contained within a small case—a result that would not be practicable otherwise or by the use of other forms of mechanism.

The rear end of the arbor O extends through the plate D , and has secured thereon a toothed wheel, R , which meshes with a pinion, s , that is secured upon the first wheel, S , of the time-train, and causes the same to revolve. The first wheel, S , imparts motion to the pinion t of the second wheel, T , the latter, through the pinion u , to the third wheel, U , and said third wheel, through the pinion v , to the escape-wheel V , said wheels being arranged between the plates D and E , and having such size as to cause them to practically occupy laterally the

whole of the space between the pillars and overlap each other at the center, as shown—a result that would not be possible if the usual center shaft passed through the time-train and obstructed the central portion of the space.

A verge, W , provided with a pendulum-rod, w , and bob X , and arranged to engage with the teeth of the escape-wheel V , completes the movement, which, when provided with a dial and inclosed within a case, is ready for use.

The arrangement of the time-train at the rear of the clock enables me to dispense with the usual center arbor, whereby much larger and more coarsely-constructed wheels can be used for the time-train than would otherwise be possible.

The employment of the reducing-train renders practicable the use of the best form of spring for the purpose, while the utilization of said reducing-train for moving the hands enables me to dispense with the usual dial-wheels, the result of my said improvements being the production of a strong, efficient, and durable clock at a smaller cost and within a smaller compass than has heretofore been practicable.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A time-piece in which the mainspring is placed immediately in rear of the dial and the time-train is journaled in rear of said mainspring, whereby each may occupy substantially the entire space laterally between the pillars or within the inclosing frame and actuate the hands through the axis of said mainspring, substantially as and for the purpose specified.

2. A time-piece in which the mainspring and time-train are separately and in the order named placed between stationary plates directly in rear of the dial, and occupy each substantially the entire space laterally between the pillars or frame and actuate the hands without the intervention of the usual central or minute arbor, substantially as and for the purpose shown.

3. In a time-piece substantially as described, the combination and relative arrangement shown of the mainspring, time-train, dial, and hands with the intermediate mechanism, whereby said hands are actuated without use of the ordinary central or minute arbor, substantially as and for the purpose set forth.

4. The frame composed of the plate A , provided with the pillars A' , and the plates C , D , and E , having peripheral engagement with said pillars, in combination with the operative parts of the movement, substantially as and for the purpose shown and described.

WILLIAM EDSON DOOLITTLE.

Witnesses:

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GEO. W. METCALF.