

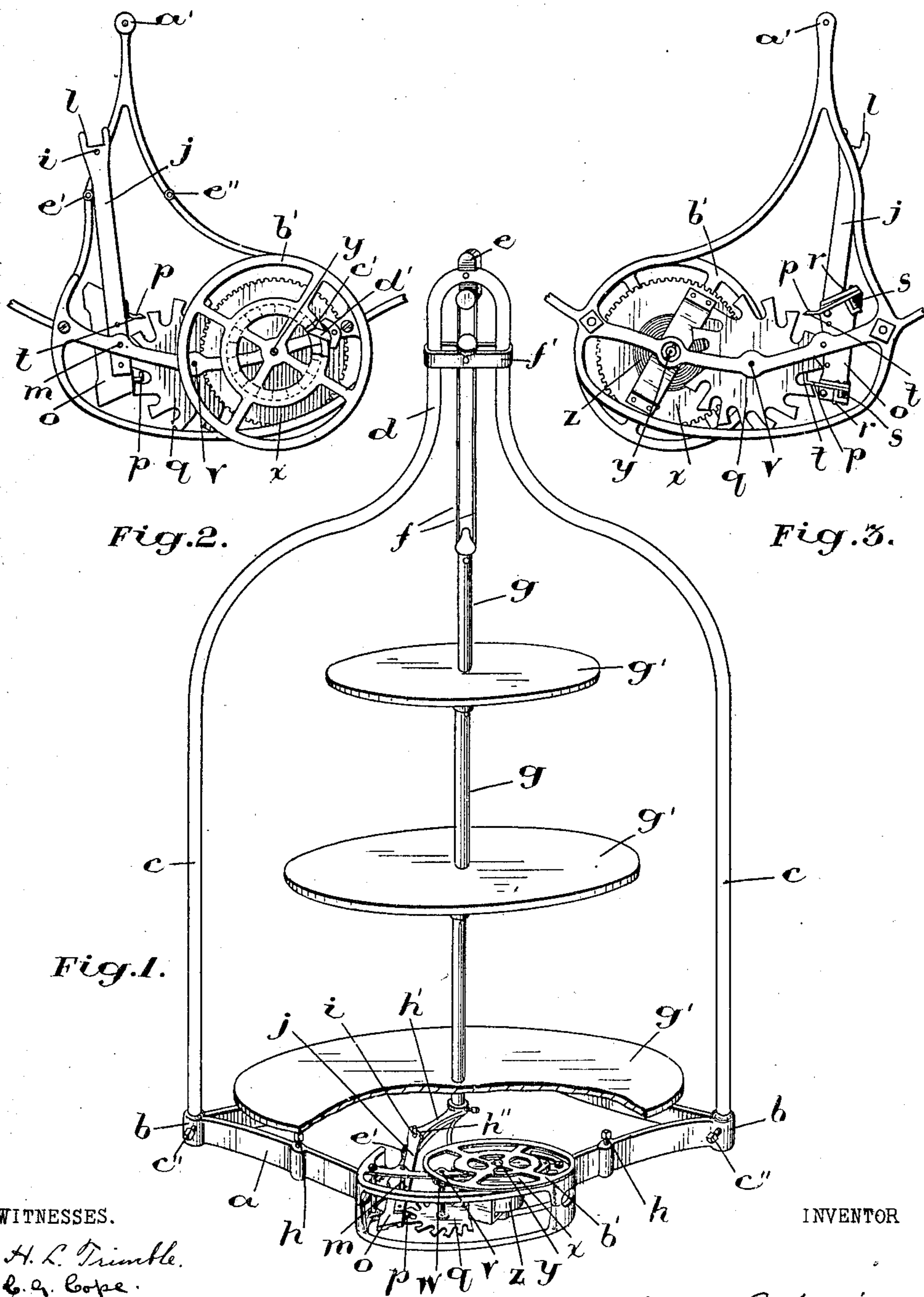
No. 871,190.

PATENTED NOV. 19, 1907.

W. J. SHORTILL.  
DISPLAY DEVICE.

APPLICATION FILED APR. 5, 1907.

2 SHEETS—SHEET 1.



WITNESSES.

H. L. Trimble.  
C. G. Cope.

INVENTOR

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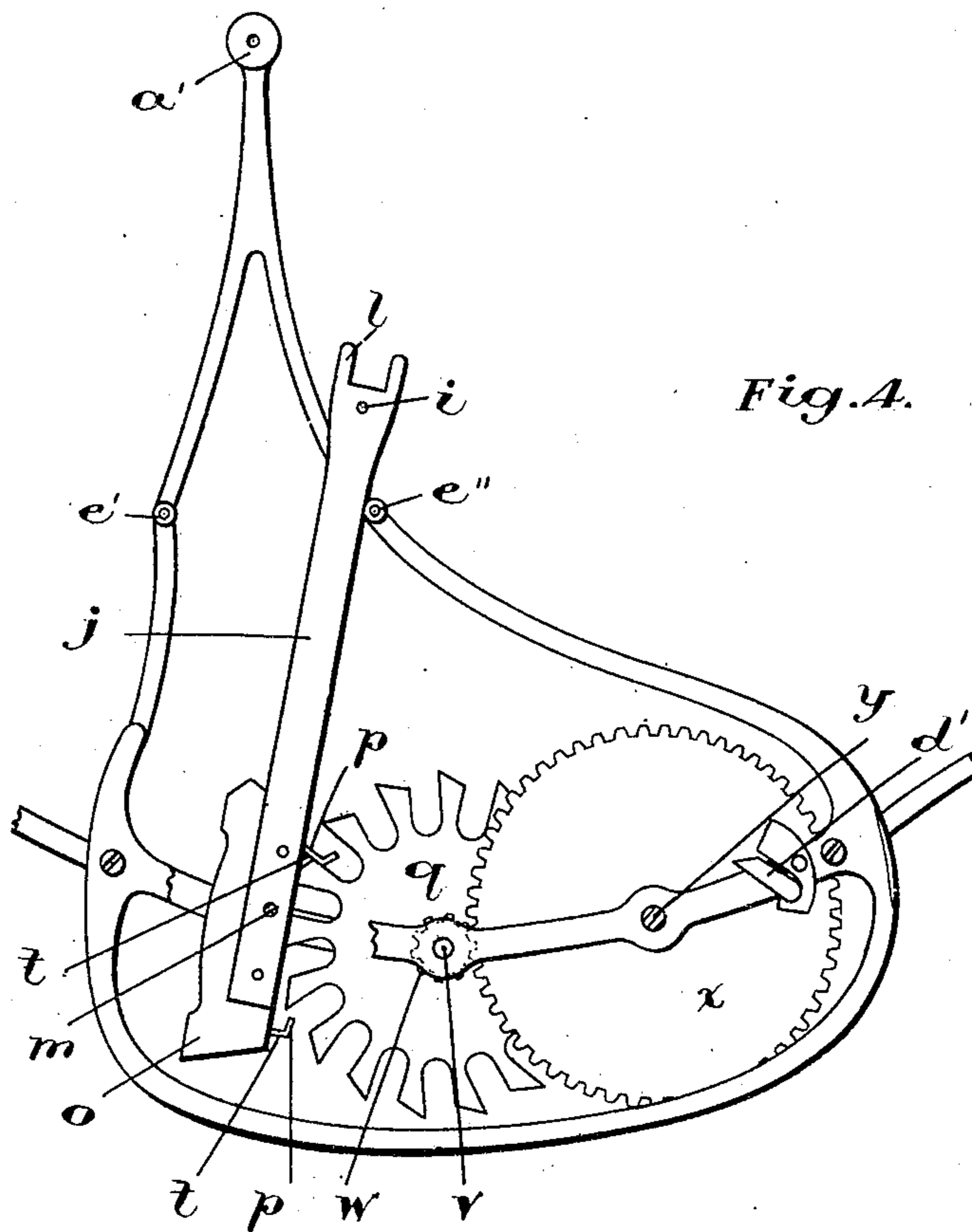


Fig. 4.

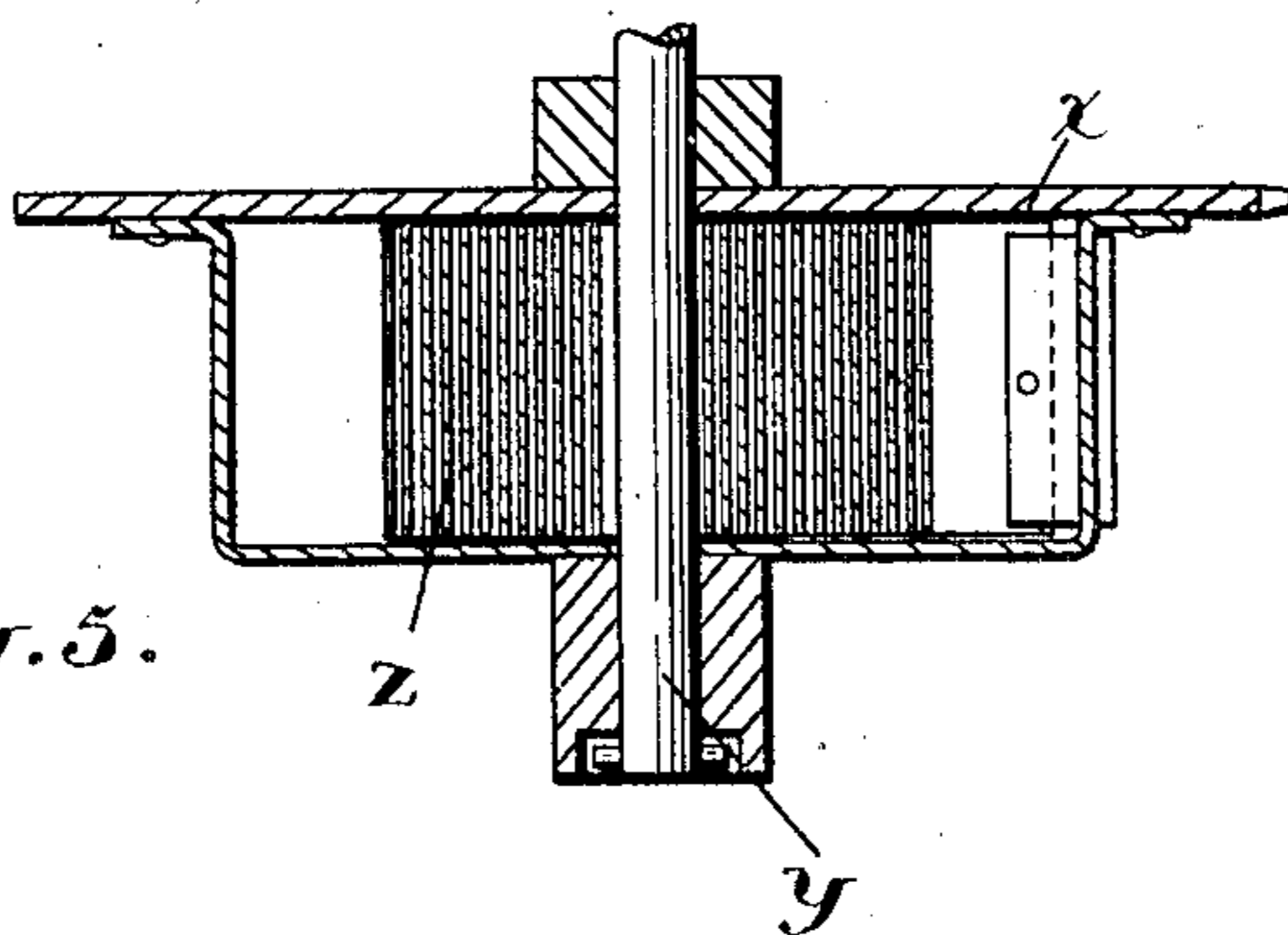


Fig. 5.

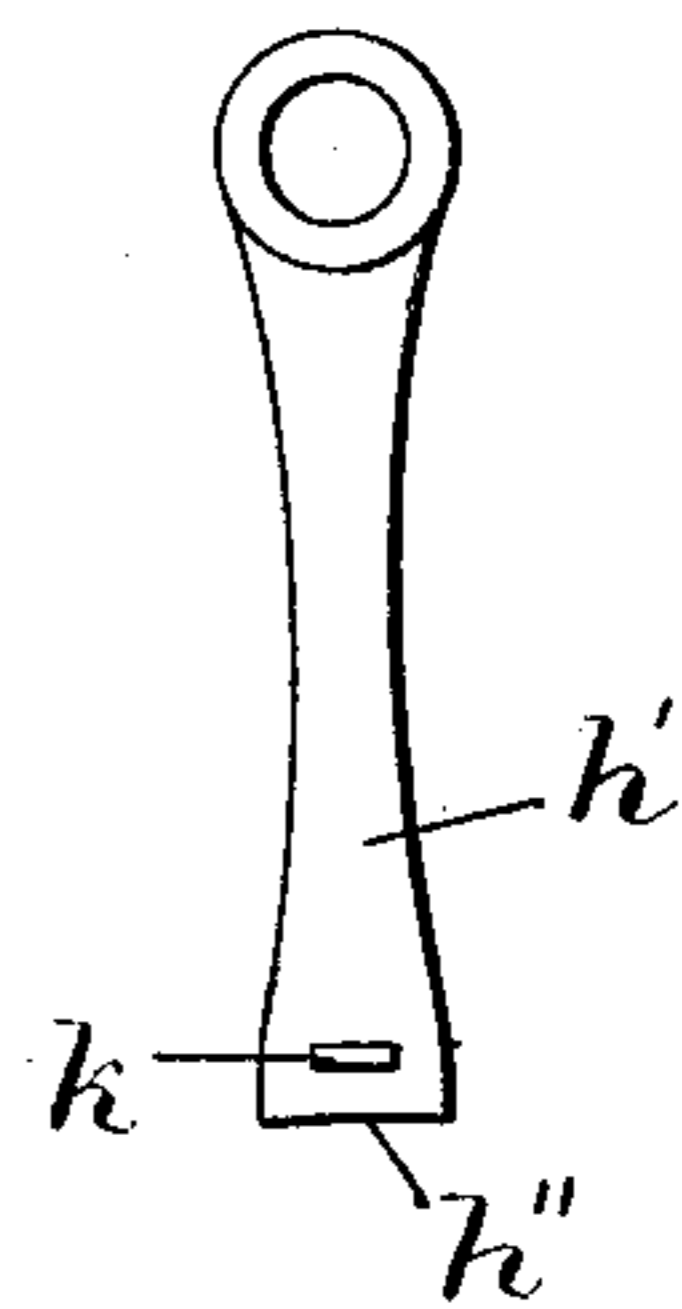


Fig. 6.

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# UNITED STATES PATENT OFFICE.

WILLIAM J. SHORTILL, OF MARKDALE, ONTARIO, CANADA.

## DISPLAY DEVICE.

No. 871,190.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed April 5, 1907. Serial No. 366,547.

*To all whom it may concern:*

Be it known that I, WILLIAM J. SHORTILL, of Markdale, in the county of Grey and Province of Ontario, Canada, have invented certain new and useful Improvements in Display Devices; and I hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to a display device having an oscillating standard with one or a series of supporting racks secured to it and oscillated by an escapement mechanism, assisted by the twisting and untwisting action of the flexible member which suspends the oscillating standard from a fixed support, the general construction and arrangement of the parts being hereinafter set forth and particularly pointed out in the claims.

For a full understanding of the invention reference is to be had to the following description, and to the accompanying drawings in which,

Figure 1, is a perspective view of the display device with the lower-most supporting rack partly broken away to show the escapement mechanism. Fig. 2, is a plan view of the escapement mechanism looking at it from the top. Fig. 3, is a similar view to Fig. 2, looking at the escapement mechanism from the bottom. Fig. 4, is a plan view of the escapement mechanism with the winding wheel removed. Fig. 5, is a sectional view of part of the escapement mechanism showing the attachment of the ends of the motor spring to the shaft and spur wheel, and Fig. 6, is an inverted view of the pendulum arm.

Like characters of reference refer to like parts throughout the specification and drawings.

The base *a* of the display device is shown in Fig. 1, to be of a substantially elliptical shape with vertical sockets *b* at the ends of its major axis to receive the standards *c* of the supporting frame, which are removably secured in the sockets by set screws *c'* or other fastening means to provide for the separation of the parts for transportation, storage, and other purposes, the standards *c* being inwardly curved near their upper ends to form a contracted top *d* to the center of which is secured a supporting member *e*.

Attached to the supporting member *e* is the upper end of the flexible twisting member, which consists of duplex wires or cords *f* connected at their lower ends to the oscillating standard *g*.

The oscillating standard *g* at its lower end is pivotally mounted on a bearing *a'*, forming part of the framework of the base *a*, and vertically aligned with the supporting member *e*, to facilitate the oscillation of the standard *g*. Connected to the standard *g* are a series of racks *g'*, the lowermost one of which contacts the bearing members *h* projecting above the top surface of the base *a* and adjustably connected thereto. At the lower end of the standard *g* but above the bearing *a'* is a pendulum arm *h'* having a curved face *h''* which engages with the pin *i* of the escapement lever *j*, and carried by the underside of the pendulum arm *h'* is an impulse member *k* which engages with the forks *l* at the free end of the escapement lever to enable the escapement lever to cause the oscillating movement of the standard *g*. The escapement lever *j* is provided with a stud *m* pivotally supported in the framework of the base, and connected to the escapement lever *j* is the pallet plate *o* to which are fulcrumed two pallets *p* to engage with the teeth of the scape wheel *q*. The pallets *p* rock on their fulcrum *r* when actuated by the teeth of the scape wheel, and are returned to and yieldingly held in their normal position by compression springs *s*. The faces *t* of the pallets *p* are beveled to engage with the teeth of the scape wheel *q*, to facilitate the clearance of the teeth of the scape wheel, and to break the force of the movement of the scape wheel as it revolves and thus reduce the impact of the teeth against the pallets.

The scape wheel is mounted on a shaft *v* journaled in the framework of the base *a*, and fixed on the shaft *v* is a pinion *w* which meshes with the teeth of the spur wheel *x*. The spur wheel *x* is loosely mounted on the shaft *y* journaled in bearings forming part of the framework of the base and is revolved by a coiled spring *z*. One end of the coiled spring *z* is securely connected to the spur wheel *x* and the other end is securely connected to the shaft *y*. The shaft *y* is provided with a hand wheel *b'* by which it can be turned to wind the coiled spring *z* and is also provided with a ratchet wheel *c'* with the teeth of which engages a spring tensioned detent dog *d'* pivoted to the framework of the base. The spring *z* is tightly coiled by the revolution of the hand wheel *b'* and shaft *y* and the unwinding revolution of the shaft is prevented by the engagement

of the detent dog  $d'$  with the teeth of the ratchet wheel  $c'$ .

The oscillation of the standard  $g$  is commenced by manually turning it in one direction until the flexible member  $f$  is twisted, and the escapement lever  $j$  is in contact with the pin  $e'$  projecting from the framework of the base. The untwisting action of the flexible member causes the reverse movement of the standard, which brings the impulse member  $k$  into position between the forks  $l$  of the escapement lever, and moves the escapement lever sufficiently to release the pallet then in engagement with the tooth of the scape wheel to permit of the movement of the scape wheel until the movement of the latter is arrested by the other pallet. This movement of the scape wheel, by the engagement of its released tooth with the pallet as it moves past the latter completes the action of the escapement lever, and brings the latter into engagement with the stop  $e''$ . When the escapement lever has passed the point intermediate the stops  $e'$  and  $e''$ , the forks  $l$  impel the impulse member  $k$  and cause the oscillation of the standard to twist the flexible member, the oscillation of the standard being continued until the force of the impulse is expended, or until the curved face of the pendulum arm engages with the pin  $i$ , when the further oscillation in that direction is arrested. The untwisting movement of the flexible member then occurs and starts the oscillation of the standard  $g$  in the reverse direction to its former movement and causes the pendulum arm to bring the impulse member again into position between the forks of the escapement lever. The motion of the parts is then repeated but in the opposite direction to that last described and the oscillating movement of the standard in opposite directions is continued until the spring has expended its force. Each movement of the escapement lever  $j$  releases the engaging pallet from the tooth with which it is in contact, and permits the revolution of the scape wheel to the extent of one tooth, its revolution then being arrested by the succeeding tooth coming into contact with the other pallet positioned, to engage it, by the action of the escapement lever. Each movement of the escapement lever causes a corresponding movement of the standard, which twists the flexible member  $f$  so that the untwisting action of the latter may start the movement of the escapement lever in the opposite direction to that of its preceding movement, the teeth of the scape wheel during said movement of the escapement lever, exerting their force on the pallets, and impelling the lever to complete its travel between the stops  $e'$ ,  $e''$ .

By making the pallets to rock on their fulcrums, and by holding them in their

normal positions by means of tension springs, the pallets may recede from their normal positions by the engagement of the teeth of the scape wheel as the teeth successively come into engagement with them, and return to their normal positions under the influence of the tension springs, when clear of the engagement of the teeth of the scape wheel. This action of the pallets renders the operation of the mechanism comparatively noiseless, and minimizes the impact of the teeth of the scape wheel on the pallets.

To govern the speed of the oscillating movement of the oscillating standard, the flexible member is provided with a governor  $f'$  consisting preferably of a ball having two apertures therethrough, one for each of the duplex parts of the flexible member. By moving the governor  $f'$  in the direction of the standard, the speed of the oscillation is increased, and by moving it in the direction of the supporting member, the speed of the oscillation is reduced.

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

1. A display device consisting of a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, and supported at its lower end on a bearing forming part of the supporting means, a rocking lever moving the oscillating standard alternately in opposite directions, and means for actuating the rocking lever.

2. A display device consisting of a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, and supported at its lower end on a bearing forming part of the supporting means, a rocking lever moving the oscillating standard alternately in opposite directions, and means for actuating the rocking lever, said means consisting of pallet arms fulcrumed to the rocking lever, a rotatable scape wheel engaging with the pallets, and means to rotate the scape wheel.

3. A display device comprising a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, a bearing for the lower end of oscillating standard, a pendulum arm connected to the oscillating standard, an impulse member for the pendulum arm, a rocking lever fulcrumed to the supporting means having a forked end to engage with the impulse member, and means for actuating the rocking lever.

4. A display device comprising, a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible

twisting member, a bearing for the lower end of the oscillating standard, a pendulum arm connected to the oscillating standard, an impulse member for the pendulum arm, a rocking lever fulcrumed to the supporting means having a forked end to engage with the impulse member, and means for actuating the rocking lever, said means consisting of pallets connected to the rocking lever, a scape wheel engaging with the pallets, and a motor mechanism to actuate the scape wheel.

5. A display device consisting of a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member and supported at its lower end on a bearing forming part of the supporting means, a rocking lever alternately moving the oscillating standard in opposite directions, means for actuating the rocking lever, and a governor adjustable on the flexible twisting member.

6. A display device consisting of a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member and supported at its lower end on a bearing forming part of the supporting means, a rocking lever alternately moving the oscillating standard in opposite directions, means for actuating the rocking lever, said means consisting of pallets fulcrumed to the rocking lever, a rotatable scape wheel engaging with the pallets and means to rotate the scape wheel, and a governor adjustable on the twisting member.

7. A display device comprising a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, a bearing for the lower end of the oscillating standard, a pendulum arm connected to the oscillating standard, an impulse member for the pendulum arm, a rocking lever fulcrumed to the supporting means having a forked end to engage with

the impulse member, means for actuating the rocking lever, and a governor adjustable on the flexible member.

8. A display device comprising a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, a bearing for the lower end of the oscillating standard, a pendulum arm connected to the oscillating standard, an impulse member for the pendulum arm, a rocking lever fulcrumed to the supporting means having a forked end to engage with the impulse member, and means for actuating the rocking lever, said means consisting of pallets connected to the rocking lever, a scape wheel engaging with the pallets and a motor mechanism to actuate the scape wheel, and a governor adjustable on the flexible twisting member.

9. A display device comprising an oscillating standard having display racks connected thereto, a supporting means for causing the oscillation of the standard, and means governing the speed of the oscillation.

10. A display device comprising a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, and means co-acting with the flexible twisting member for causing the oscillation of the standard.

11. A display device comprising a supporting means, a flexible twisting member connected to the supporting means, an oscillating standard suspended from the flexible twisting member, means co-acting with the flexible twisting member for causing the oscillation of the standard, and means to govern the speed of the oscillating movement.

Markdale, December 3rd. 1906.

W. J. SHORTILL.

In the presence of—

CHAS. H. RICHES,  
OLIVE BATEMAN.