Nov. 25, 1924.

1,517,008

A. B. JONES

BALANCE MECHANISM

Filed Dec. 9, 1921

Fig. 1.

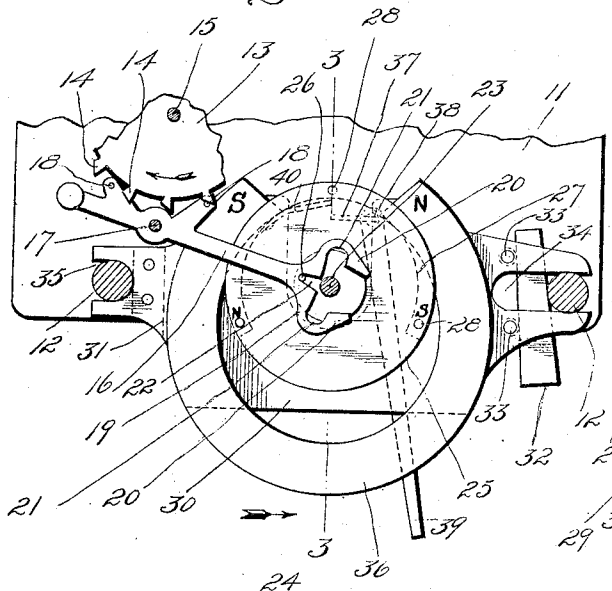


Fig. 3.

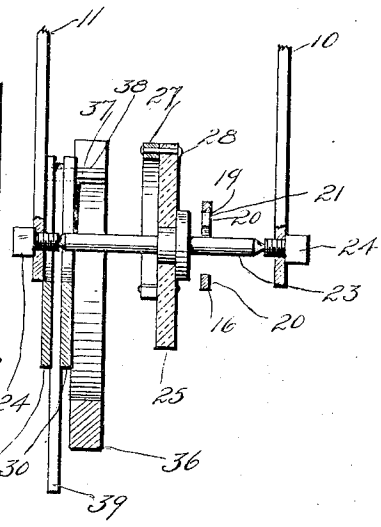
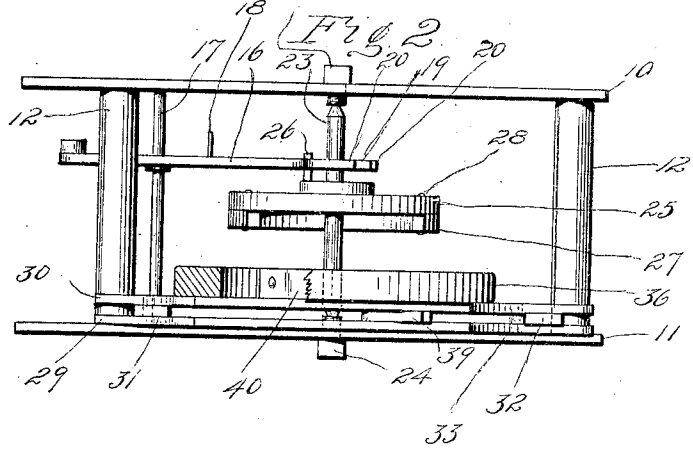


Fig. 2.



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Patented Nov. 25, 1924. 1,517,008

UNITED STATES PATENT OFFICE.

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BALANCE MECHANISM.

Application filed December 9, 1921. Serial No. 521,103.

To all whom it may concern:

Be it known that I, ANSEL B. JONES, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Balance Mechanisms, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to balance mechanisms especially as applied to timing devices and the like, although not necessarily limited thereto, and it is the principal object thereof to provide such mechanism as will operate without the use of the usual hair spring.

Among other aims and objects of the invention may be recited the provision of a device of the character mentioned wherein the actuation of an article by magnetic force may be varied, the number of parts few, and arranged with a view to compactness, in which the construction is simple, cost of production small and efficiency in operation high.

The improvements in the details and arrangement of parts will be apparent from an inspection of the accompanying drawings in connection with the description hereinafter contained and wherein a preferred embodiment of the invention is disclosed for the purpose of imparting an understanding of the same.

In the drawings,

Figure 1 is a plan view of my improved mechanism;

Figure 2 is a fragmentary elevation thereof; and

Figure 3 is a sectional elevation taken generally upon line 3—3 of Figure 1, and looking in the direction of the arrow.

It has been the practice heretofore in balance mechanisms for timing devices and the like to partially actuate the balance wheel by a spring which is effected by temperature, but in my device it is actuated without the use of such spring and hence not affected in any material degree by changes in temperature and the velocity of movement thereof may be varied.

Having more particular reference to the drawings in connection with which like reference characters designate corresponding parts, 10 and 11 designate respectively the top and bottom plates of a clock mechanism which are held apart by the usual pillars 12, 13 is the escapement wheel having teeth 14 thereon and mounted upon a shaft 15. This escapement wheel is of a well known type and operates in the usual manner from the main spring in the direction designated by the arrow in Figure 1.

The escapement lever 16 is mounted on the shaft 17 journaled in the plates 10 and 11 and is provided with the usual escapement pins 18 and the head portion 19. This head portion has two oppositely disposed fingers 20, stop shoulders 21 upon the inside thereof and the radial slot 22. This escapement lever also operates in a well known manner, being actuated in one direction by the escapement wheel 13 until one of the stop shoulders 21 banks against the staff 23 and in the opposite direction by the balance wheel mechanism. Staff 23 is shown herein as pointed at each end and is journaled in the adjustable bearings 24. Mounted on the staff is the balance wheel 25, in which is fixed the ruby pin 26 that projects into the radial slot 22.

This balance wheel is made of material that is not affected by temperature, preferably of fiber or the like. Connected with the balance wheel 25 by screws or rivets 28 or the like, is a magnet 27.

The numerals 29 and 30 respectively designate upper and lower plates which are held apart at one end by the block 31 and at the other end by the wedge 32, which latter bears upon one side against the fixed pins 33 and upon the other side against the pillars 12 which lie within the slots 34 and 35 of said plates.

Attached to the upper plate 30 is a magnet 36, so arranged relatively to the staff 23 that the opposite poles thereof are an equal distance upon each side thereof.

The magnets 27 and 36 are so arranged that when at zero the (north) pole of one magnet is upon the same side of the center of the staff 23 as the (south) pole of the other magnet. The relative position of the parts when at rest being shown in Figure 1.

When the balance wheel 25 is moved in one direction about its axis by the escapement wheel 13, the escapement lever 16 and ruby pin 26, the magnets actuate the escapement lever in the reverse direction when the pressure upon the lever is released, that is, when one of the stop shoulders 21 either banks against the staff 23 or approximately so. This return movement of the balance

wheel also actuates the escapement lever to return it to the position, where it will be again actuated by the escapement wheel 13, and the head of the escapement lever 16 is then moved to the opposite side of the center of the staff 23. The operations being then repeated as above described.

In operation the magnet 27 and balance wheel 25 are held at the central or zero point of their movement when at rest and are returned to this position from any other point that the strength of the impulse exerted upon, and momentum of, these parts may place them within the range of operation which is about a half circle to the right or left hand from the said zero point according to the construction of the magnets 27 and 36.

The relative magnetic attraction between the magnets is determined in a measure by the relative distance between them and in order that such attraction may be varied in order to change the time keeping properties of the clock mechanism, the magnet 36 may be moved toward and away from the magnet 27 by shifting the plates 30, with the magnet 36 connected therewith, axially relatively to the pillars 12 and locking the same in their new positions by the wedge 32. A finer adjustment of this magnetic attraction is obtained by varying the width of the gap between the ends of the magnet 36. To accomplish this I have provided a closure plate 37 pivotally connected with the magnet 36 near one end thereof by the pin 38 and having an arm 39 that projects outwardly between the plates 29 and 30. Manual manipulation of this lever moves the closure plate 37 toward and away from a plate 40 that is fixed near the opposite end of the magnet 36, thereby varying the width of the gap and correspondingly varying the magnetic power of said magnet 36.

Within the scope of the appended claims the details of my improved mechanism may be altered and I therefore do not limit myself to the exact construction herein shown and described.

What I claim as new and desire to secure by Letters Patent, is:

1. In a mechanism of the character described, a balance wheel comprising in part a magnet connected therewith, a second magnet adjacent to the first magnet; and positive means for partially operating said balance wheel.

2. In a mechanism of the character described, a balance wheel comprising in part a magnet connected therewith, a second magnet adjacent to the first magnet, and positive means for partially operating said balance wheel, and means for adjusting the relative positions of said magnets.

3. In a mechanism of the character described, a balance wheel comprising in part a magnet connected therewith, a second magnet adjacent to the first magnet, positive means for partially operating said balance wheel, and means for varying the magnetic attraction of one of said magnets.

4. In a mechanism of the character described, a balance wheel comprising in part a magnet connected therewith, a second magnet adjacent to the first magnet, positive means for partially operating said balance wheel, and means for varying the magnetic attraction of one of said magnets, comprising a member mounted adjacent to one end of one of said magnets and movable across the gap between the ends thereof.

5. In a mechanism of the character described, a balance wheel comprising in part a magnet connected therewith, a carriage, a second magnet connected with said carriage, and means for securing said carriage in any adjusted position.

6. In a mechanism of the character described, a balance wheel comprising in part a magnet connected therewith, a carriage, a second magnet connected with said carriage, and wedge means for securing said carriage in any adjusted position.

7. In a timing mechanism, top and bottom plates, a plurality of pillars therebetween, a staff rotatably connected with said plates, a balance wheel upon said staff comprising in part a magnet, a carriage, and a second magnet connected with said carriage.

8. In a timing mechanism, top and bottom plates, a plurality of pillars therebetween, a staff rotatably connected with said plates, a balance wheel upon said staff, comprising in part a magnet, a carriage, a second magnet connected with said carriage, and a member mounted adjacent to one end of the last mentioned magnet and movable across the gap between the ends thereof, having an arm projecting through said carriage.

9. In a timing mechanism, top and bottom plates, a plurality of pillars therebetween, a staff rotatably connected with said plates, a balance wheel upon said staff comprising in part a magnet, a carriage comprising companion plates with an open space therebetween for a portion of its width, fixed pins connecting said plates, a wedge operative between said plates for securing said carriage to said pillar in any adjusted position and contacting on one side with said pins and upon the opposite side against one of said pillars, and a second magnet connected with said carriage.

10. In a mechanism of the character described; a staff, a balance wheel, comprising in part a magnet supported on said staff, that portion thereof between the staff and magnet being of non-magnetic material and only affected slightly by variations in tem-

perature; a second magnet adjacent to the first magnet; and means for adjusting said magnets relatively to each other, whereby the magnetic influence of said magnets upon each other may be varied.

11. In a device of the class described, a stationary magnet having the poles equidistant from a median line, a balance wheel carrying fixed to the same a magnet the poles of which lie, when at rest, equidistant from the said median line, and means for partially operating said balance wheel, whereby, when moved from the said position of rest, the said balance wheel will of its own accord return to its said median position.

12. In a device of the class described, a stationary magnet having spaced north and south poles, a balance wheel carrying a magnet the north pole of which lies, when in a position of rest, a certain distance from the south pole of the stationary magnet, and the south pole of which, when in said position, lies the same distance from the north pole of the stationary magnet and means for partially operating said balance wheel, whereby, when moved from its position of rest, the balance wheel, will of its own accord return to the said position of rest.

In testimony whereof, I have hereunto affixed my signature.

ANSEL B. JONES.