No. 897,111. PATENTED AUG. 25, 1908.

C. H. DE LAMONTE.

SPRING MOTOR MECHANISM.

APPLICATION FILED JULY 29, 1907.

Fig. 1.

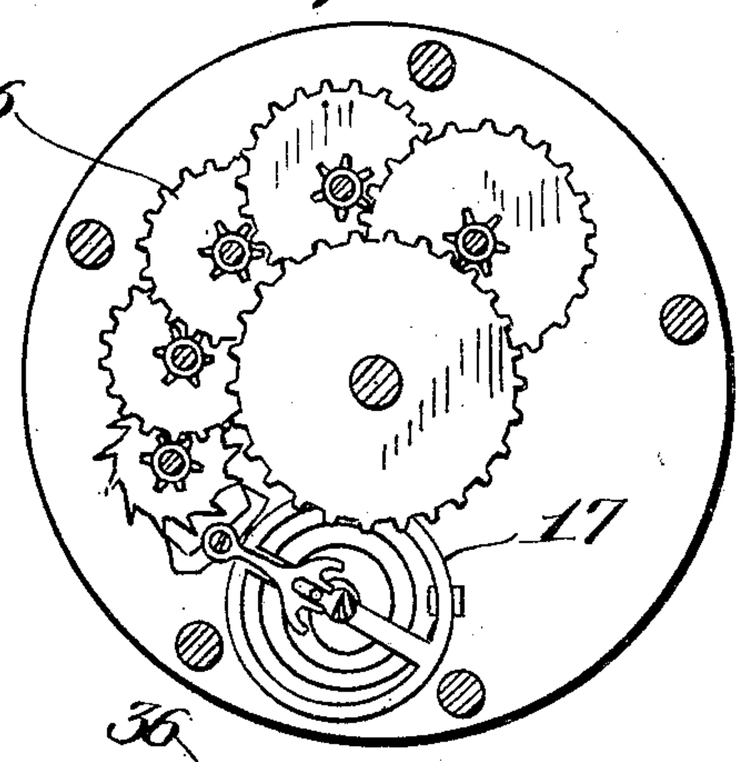


Fig. 4.

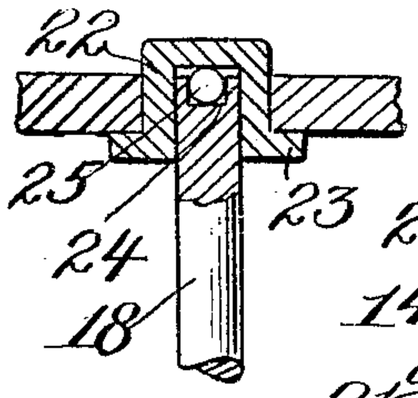


Fig. 2.

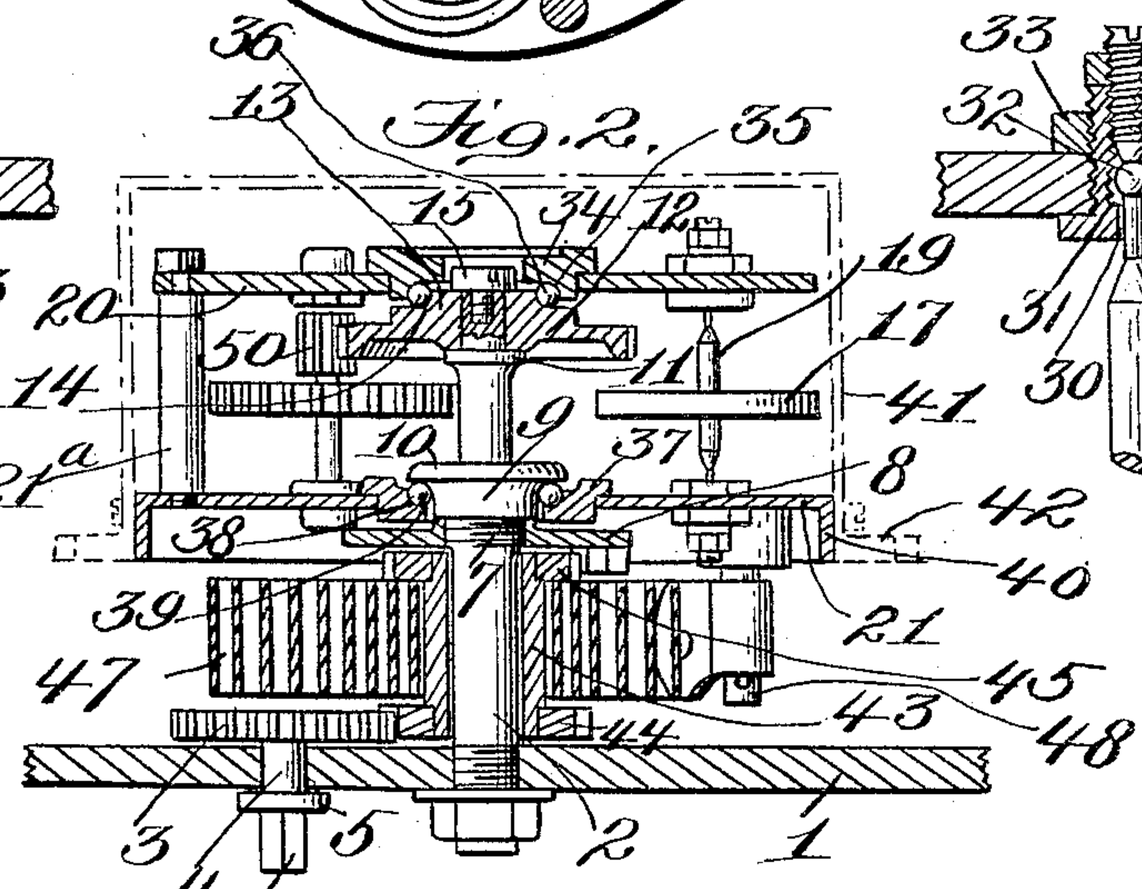


Fig. 5.

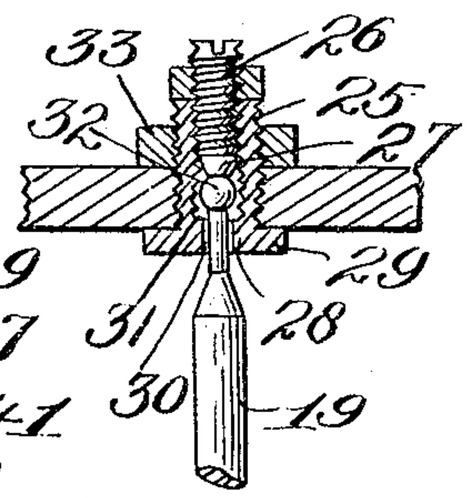
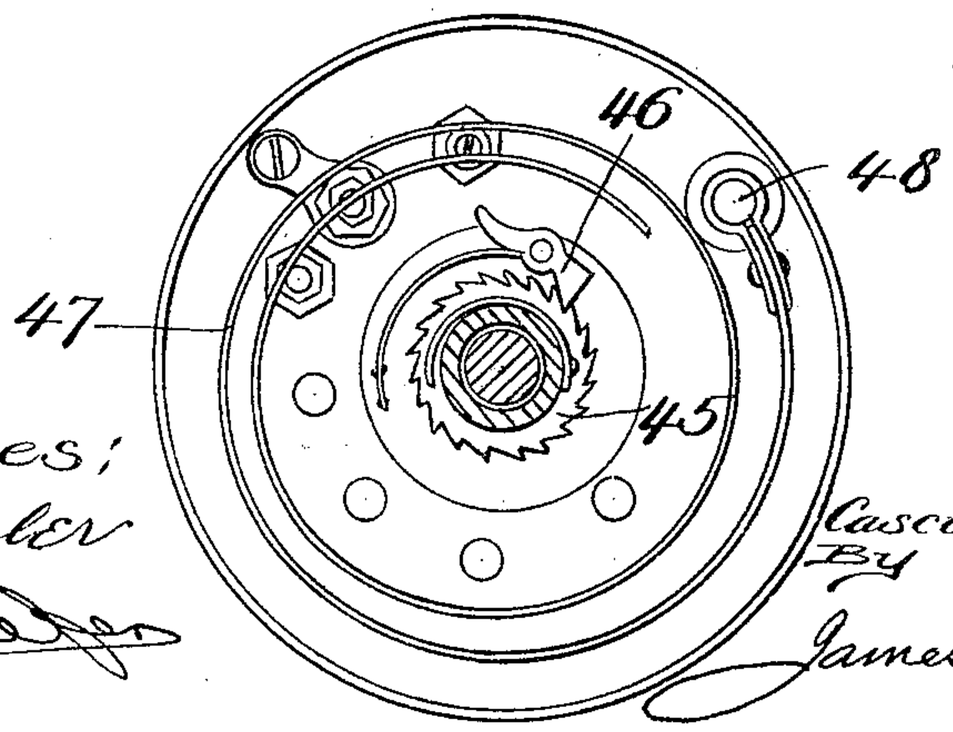


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SPRING MOTOR MECHANISM.

No. 897,111. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed July 29, 1907. Serial No. 386,067.

To all whom it may concern:

Be it known that I, CASCIOUS H. DE LA MONTE, a citizen of Mexico, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Spring Motor Mechanisms, of which the following is a specification.

This invention relates to a spring motor mechanism adapted for use for rotating a record tape carrier drum of a speed recorder of a construction similar to that set forth in my copending application Serial Number 383,967, filed July 18, 1907. Although the motor mechanism is designed primarily for operating the tape-carrying drum of a speed recorder, yet it is adapted for any other purposes for which it is found applicable; and the object thereof is to provide, in a manner as hereinafter set forth, a spring motor mechanism having its operation so governed that the element which is rotated by the mechanism will make a complete revolution in a predetermined number of hours, preferably six.

A further object of the invention is to embody in the mechanism a controlling gear in the form of a clock train having the various shafts thereof suspended between adjustable ball bearings carried by the pillar plates and which reduces friction to a minimum when the motor is operated.

A further object of the invention is to arrange the power-transmitting spring exteriorly of the controlling gear and so connect said spring to one of the pillar plates that movement will be imparted directly to said plate, the latter having its movement controlled by the operation of the clock train so that said pillar plate will make one complete revolution in a predetermined number of hours, preferably six.

Further objects of the invention are to provide a spring motor mechanism which shall be simple in its construction, strong, durable, efficient in its use, having its movement controlled, readily set up and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists in the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, wherein like characters denote corresponding parts throughout the several views, and in which—

Figure 1 is a sectional plan of the controlling gear; Fig. 2 is a vertical sectional view of a spring motor mechanism in accordance with this invention; Fig. 3 is an inverted plan of the lower pillar plate; Fig. 4 is a detail showing the bearing for each end of the shafts of the gears of the controlling gear; Fig. 5 is a like view showing the bearing for each end of the shaft of the balance wheel.

Referring to the drawings by reference characters, 1 denotes a base plate in which the lower end of the main staff 2 of the motor mechanism is fixedly secured. Supported slightly above the base 1 is a winding gear 3, having a bearing stud 4 which extends through the base 1, is formed with a flange 5 and has a squared lower end 6 to receive a key to enable the convenient rotating of the winding gear 3.

The staff 2 is formed with a screw-threaded portion 7 adapted to be engaged by a disk 8, the latter having a screw-threaded central opening whereby it can be secured to the screw-threaded portion 7 of the staff 2. To the screw-threaded portion 7 is furthermore secured a tapering collar 9 having its top formed with a flange 10, the collar 9 constituting one-half of a ball race (the other half of the ball race will be hereinafter referred to). The staff 2 at a point removed from its upper end is flanged as at 11 and against which abuts a gear wheel 12, the latter being fixed to the staff 2. Surrounding the top of the staff 2 and abutting against the gear 12 is a disk cut away in a curvilinear manner, as at 14, to constitute one-half of a ball race (the other half of said race will be hereinafter referred to). Secured in the top of the staff 2 is a screw 15, the head of which is of such diameter as to project over and upon the disk 13, thereby securing said disk between the head of the screw and the gear 12. The screw 15 also acts as a means in connection with the disk 13 for retaining the gear 12 in position.

The controlling gear which is in the form

of a clock train is referred to, generally, by the reference character 16 and it is thought unnecessary to specifically describe the gears and pinions which constitute the train, as they are of known construction; therefore all that will be described are the bearings for the shafts of the gears of the clock train and the bearings for the shaft of the balance wheel 17. Each of the shafts of the gears of the train is indicated by the reference character 18 and the shaft of the balance wheel 17 is indicated by the reference character 19. As the bearings for the upper and lower ends of each of the shafts 18 are the same, but one bearing will be described and the same procedure will be had with respect to the bearings for each end of the balance shaft 19. The controlling gear is interposed between an upper pillar plate 20 and a lower pillar plate 21. These plates are spaced apart by the pillars 21ª. Openings are provided in each of the pillar plates to receive the bearing cups 22. The cups 22 are flanged, as at 23. The flanges of the bearing cups 22 are adapted to engage the inner faces of the pillar plates. The bearing cups are of such diameter as to receive the ends of the shafts 18. Each end of the latter is formed with a recess 24 in which is mounted a bearing ball 25, the latter not only engaging the bottom wall of the recess at the top of the shaft and the top wall of the recess at the lower end of the shaft, but also engaging the inner face of the end of the bearing cup. Each of the pillar plates is provided with openings to receive the bearing for the balance wheel shaft 19. Each of these bearings consists of a screw-threaded sleeve 25 into which extends a threaded element 26 having a tapering inner end 27. The sleeve 25 at its inner end is formed with an inwardly-extending annular flange 28 and an outwardly-extending annular flange 29, the flanges 29 abutting against the inner faces of the pillar plates and the flanges 28 forming the sleeves 25 with a contracted passage 30 and a shoulder 31. Each end of the shaft 19 is reduced in diameter and extends through a contracted passage 30 and engages a bearing ball 32 which is mounted within the sleeve. The ball 32 is engaged by the tapered inner end of the screw-threaded element 26. The flanges 28 not only form the contracted passages 30, but act as bearings for the reduced ends of the shaft 19. The sleeve 25 is exteriorly screw-threaded and which is engaged by a lock-nut 33. The elements 26 provide means for adjusting the balls 32 with respect to the reduced ends of the shaft 19 so as to compensate for wear.

The pillar plate 20, approximately centrally thereof, is formed with an opening in which is mounted a flanged band 34, the lower face of which is cut away in a curvilinear manner, as at 25, and associates with the curvilinear portion 14 so as to complete a ball race for the bearing balls 36. The pillar plate 21 is cut away, approximately centrally thereof, and has mounted in the cut-away portion a flanged band 37 having a curvilinear portion 38 in its upper face which associates with the tapering collar 9 so as to form a ball race for the bearing balls 39. The pillar plate 21 is furthermore provided with a depending annular flange 40 to which is connected the element which is to be rotated (as shown in dotted lines, a speed recorder tape-carrying drum 41 provided with a gear 42).

Surrounding the staff 2 is a collar 43, the lower end of which carries a gear 44 meshing with the winding gear 3 and the upper end of which carries a ratchet wheel 45 adapted to be engaged by a pawl 46 carried by the disk 8 to prevent back rotation of the sleeve 43. Surrounding the sleeve 43 and having one end connected thereto is a power-transmitting spring 47, the other end of said spring being attached to a lug 48 depending from the lower face of the pillar plate 21.

From the arrangement of the power-transmitting spring 47 it is evident that as the spring unwinds it will rotate the pillar plate 21 against the action of the controlling gear. The rotating of the pillar plate 21 will carry the train therewith, the pinion 50 of the train rolling around the gear 12. As the pillar plate 21 rotates it will carry the drum 41 therewith. The pillar plates 20, 21 will rotate upon the bearing balls 34 and 38, thereby reducing friction to a minimum.

The controlling gear is so set up that a complete revolution of the pillar plate 21 will be had every six hours, but it is evident that the train can be so arranged that a complete revolution of the pillar plate 21 can be had in less than six hours or more.

The motion from the power-transmitting spring is applied directly to the pillar plate which carries the controlling gear and not through an intermediate source, but as before stated, the movement of the pillar plate is regulated owing to the arrangement of the train.

The winding of the spring is had by rotating the gear 3 which, meshing with the gear 44, will rotate the collar 43 and thereby wind the spring, the pawl 46 being shifted from engagement with the ratchet 45 during this operation.

What I claim is—

1. A spring motor mechanism comprising the combination with a rotative element, of a base plate, a main staff fixed thereto, a sleeve mounted upon said staff and carrying at one end a ratchet wheel and at its other end a gear, a pair of pillar plates surrounding the upper portion of the staff, one of said plates connected to said rotatable element bearing balls interposed between the staff and the pillar plates, a gear carried by the staff, a gear train interposed between the

pillar plates and rolling around said gear, a motion-transmitting spring connected at one end to said sleeve and at its other end to one of said pillar plates and adapted, as it unwinds, to apply motion directly to the pillar plates to which it is connected, causing thereby the rotating of said pillar plate against the action of the said train, means connected with the staff and engaging said ratchet wheel to arrest the motion of the sleeve in one direction, and rotatable means engaging with the gear carried by the sleeve and adapted when rotated in one direction to wind up the spring.

2. A spring motor mechanism comprising the combination with a rotative element, of a base plate, a main staff fixed thereto, a sleeve mounted upon said staff and carrying at one end a ratchet wheel and at its other end a gear, a pair of pillar plates surrounding the upper portion of the staff, one of said plates connected to said rotatable element bearing balls interposed between the staff and the pillar plates, a gear carried by the staff, a clock train interposed between the pillar plates and rolling around said gear, a motion-transmitting spring connected at one end to said sleeve and at its other end to one of said pillar plates and adapted as it unwinds to apply motion directly to the pillar plate to which it is connected, causing thereby the rotating of said pillar plate against the action of the clock train, means connected with the staff and engaging said ratchet wheel to arrest the motion of the sleeve in one direction, rotatable means engaging with the gear carried by the sleeve and adapted when rotated in one direction to wind up the spring, and ball bearings mounted in each of the pillar plates for the shafts of the said train.

3. A spring motor mechanism comprising the combination with a rotative element, of a base plate, a main staff fixed thereto, a sleeve mounted upon said staff and carrying at one end a ratchet wheel and at its other end a gear, a pair of pillar plates surrounding the upper portion of the staff, one of said plates connected to said rotatable element bearing balls interposed between the staff and the pillar plates, a gear carried by the staff, a gear train interposed between the pillar plates and rolling around said gear, a motion-transmitting spring connected at one end to said sleeve and at its other end to one of said pillar plates and adapted as it unwinds, to apply motion directly to the pillar plate to which it is connected, causing thereby the rotating of said pillar plate against the action of the said train, means connected with the staff and engaging said ratchet wheel to arrest the motion of the sleeve in one direction, rotatable means engaging with the gear carried by the sleeve and adapted when rotated in one direction to wind up the spring, ball bearings mounted in each of the pillar plates for the shafts of the said train, the ball bearings for the staff of the balance wheel being adjustable.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CASCIOUS H. DE LA MONTE.

Witnesses:
ELI HENKLE,
WALTER H. JACKSON.