Aug. 21, 1923. 1,465,663

L. B. GRAHAM

SPRING MOTOR

Filed May 26. 1921

Fig. 1

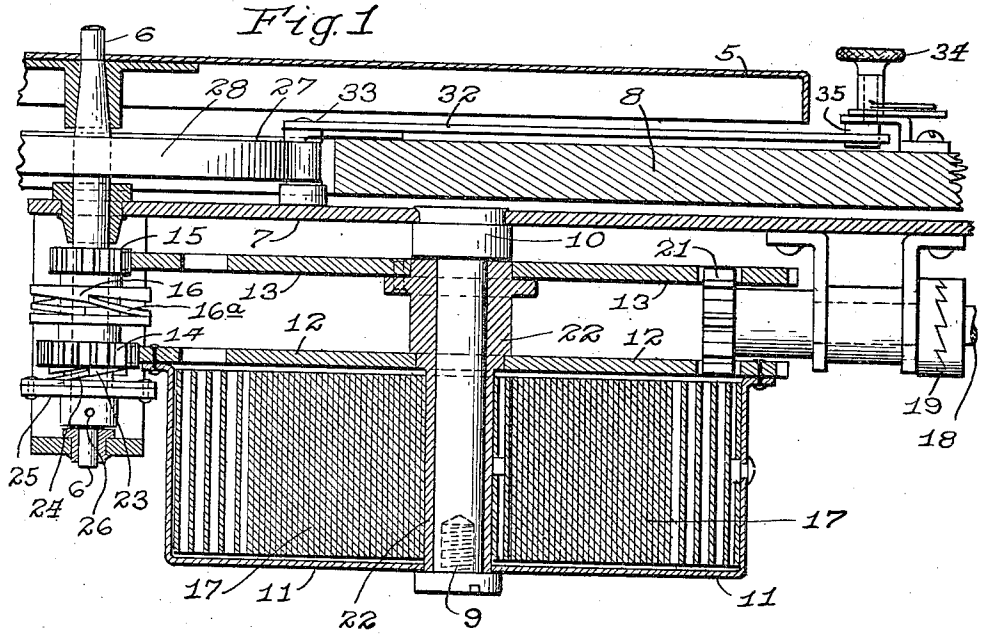


Fig. 3

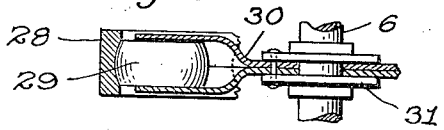
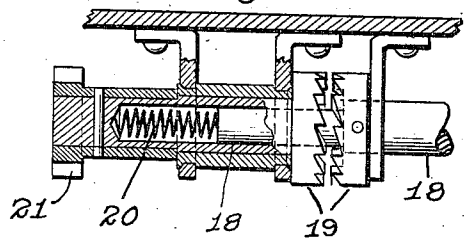


Fig. 4



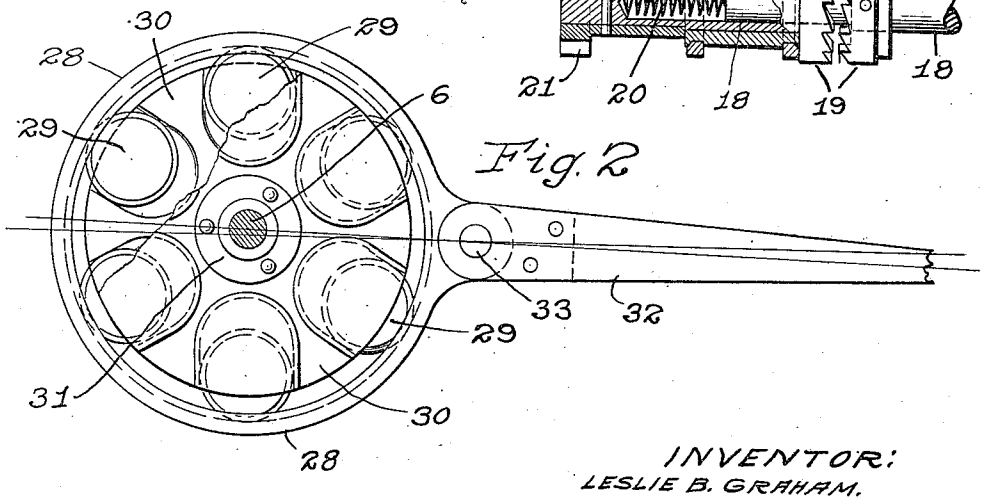


Fig. 2

INVENTOR:
LESLIE B. GRAHAM.

By Clarence W. Taylor

ATTY.

Patented Aug. 21, 1923. 1,465,663

UNITED STATES PATENT OFFICE.

LESLIE B. GRAHAM, OF EAST CHICAGO, INDIANA, ASSIGNOR TO GRAHAM-WITTENBORN CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SPRING MOTOR.

Application filed May 26, 1921. Serial No. 472,733.

To all whom it may concern:

Be it known that I, LESLIE B. GRAHAM, a citizen of the United States of America, residing at East Chicago, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Spring Motors, of which the following is a specification.

My invention relates to improvements in spring motors, and the principal objects of my improvements are:

First: To provide a spring motor of low cost in manufacture consisting of few gears, whereby all parts may be made by what is known as sheet metal stamping or screw machine work;

Second: To provide a spring motor whereby a partial rewinding of the spring may be accomplished by its own power while it is operating.

My invention relates to improvements in spring motors, particularly to improvements in connection with the construction disclosed in my pending application, Serial #469,664 filed May 14, 1921.

A practical embodiment of the invention is illustrated in the accompanying drawings which are a part hereof and in which similar characters of reference indicate corresponding parts in all of the views.

The invention consists in the novel features and parts and in the novel combination and arrangement of the same, which will be more fully described hereinafter and thus pointed out in the claims hereunto appended.

In the drawings:

Figure 1 is a sectional view of the entire motor.

Figure 2 is a plan view of the governor with the upper plates partly broken away to show its construction.

Figure 3 is a partial section of the governor.

Figure 4 is a section throughout the winding device, showing the release spring.

In Figure 1 the usual turntable is shown as at 5, mounted upon the shaft 6, which is supported in the frame 7, this frame being in turn supported by the usual shelf 8. At 9 is shown a stud secured in the frame 7, as at 10, provided for the purpose of supporting the spring barrel 11, together with its driving gears 12 and 13. These gears 12 and 13, are shown in mesh with pinions 14 and 15, which are mounted upon the shaft 6. The pinions 14 and 15 are loosely mounted upon shaft 6 and driven by the teeth 16 and pawls 16^a secured to pinion 14 which is also mounted loosely upon shaft 6, for the purpose of allowing these pinions to rotate in opposite directions during rewinding of spring 17.

For rewinding I make use of the usual crank, not shown, which may be attached to the crank shaft 18, which has on its end, a part of a clutch 19. Normally the clutch sections are held apart by the spring 20, preventing turning of the crank while the motor is in action.

Rewinding is accomplished by pressing the crank inward until the clutch 19 is engaged, then by rotation of the crank, the rewinding pinion, as shown at 21, and which meshes in a series of holes of both gears, will cause the gears 12 and 13 to rotate in opposite directions and charge spring 17, one end of which is attached to the barrel 11, and the other end to the sleeve 22. Rotation of the gears 12 and 13 in opposite directions will also cause pinions 14 and 15 to rotate in reverse to each other.

Forming a part of the pinion 14, are the ratchet teeth 23, these teeth engaging the pawls 24, provide a means for retaining the charge of spring 17. And as the pinion 14 rotates clockwise due to receiving motion from the outer end of the spring 17 through the barrel 11, and gear 12, a clockwise direction of rotation will be imparted to the pawls 24, by the ratchet teeth 23 of pinion 14. These pawls will in turn impart a clockwise direction of rotation to the shaft 6 through the disk 25 and key 26. To the pinion 14 the pawls 16^a are attached, which in turn rotate the pinion 15 through the ratchet teeth 16, that are formed integral with pinion 15. The pinion 15 being rotated clockwise will also rotate the gear 13 counter-clockwise and accomplish a partial rewinding of the spring 17, at its inner end through the sleeve 22, to which the spring's inner end is attached.

To attain a high ratio in revolutions of the shaft 6, to each turn of the spring's unwinding, I make use of a difference of pitch

diameters between the gears 12 and 13, and between the pinions 14 and 15 as follows: Assume all of the gears to be of number 32 pitch, and that the gear 12 to have 170 teeth, gear 13 to have 173 teeth, pinion 14 to have 23 teeth, and pinion 15 to have 20 teeth. Then as the gear 12 makes one revolution counter-clockwise it will cause the pinion 14 to rotate seven and four-tenths turns in a clockwise direction; and pinion 15 will also make seven and four-tenths turns clockwise which will in turn rotate the gear 13 counter-clockwise through a distance of seven and four-tenths times twenty, which would equal 148 teeth. Now as the gear 13 has 173 teeth, it will fall short of making one complete turn, by the distance of 25 teeth. Therefore, if we divide 173 by 25, we get the result of six and nine-tenths. Then, to get the total number of rotations of the shaft 6, to one turn of the spring's unwinding, we multiply seven and four-tenths by six and nine-tenths, and get the result of fifty-one, which would equal the number of revolutions of shaft 6 to each turn of the spring's unwinding.

If desired, the governor shown may be omitted and the usual fly ball and spring type may be embodied.

I do not limit myself to the construction shown, but may embody two or more springs together with a re-arrangement of the gearing to get the same results without departing from my invention.

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

1. In a spring motor, two gears of a different pitch diameter, two pinions of a different pitch diameter meshing with the two gears of different pitch diameters, and a spring having one of its ends attached to drive one of the gears of different pitch diameter, and its other end attached to the other gear of different pitch diameter, means for partially rewinding the power spring by its own power.

2. In a spring motor, two gears of different pitch diameters, and two pinions of different pitch diameters, both pinions mounted upon one shaft, and both gears mounted upon another shaft, means for driving one of the gears by one end of the power spring, and means for driving one end of the power spring by the other gear and through the pinions of different pitch diameters.

3. In a spring motor, two gears of different pitch diameters, and two pinions of different pitch diameters, one of said gears being connected to one end of a spring, and the other of said gears being connected to the other end of said spring.

4. A spring motor driving a power receiving shaft through a pair of gears, and a pair of gears receiving power from the power receiving shaft to partially rewind the power spring, and a means for manually rewinding the power spring.

5. In a spring motor, a power source for driving a power receiving shaft through a pair of gears, a pair of gears receiving power from the power receiving shaft for partially rewinding the power source, and a means for controlling the speed of the power receiving shaft.

6. In a spring motor, two gears mounted upon a spring axis and two other gears mounted upon driven shaft, means for allowing the gears to rotate in the same direction, and means for allowing the gears to rotate in opposite directions.

7. In a spring motor, a spring having both of its ends rotating about its axis in the same direction during release of its power, a shaft receiving motion from one end of the spring, gearing for operating the shaft, and gearing for rotating the other end of the spring

In testimony whereof I affix my signature.

LESLIE B. GRAHAM.