F. MAGIDSON.

SPRING MOTOR MECHANISM.

APPLICATION FILED OCT. 16, 1919.

1,342,857.

Patented June 8, 1920.

2 SHEETS—SHEET 1.

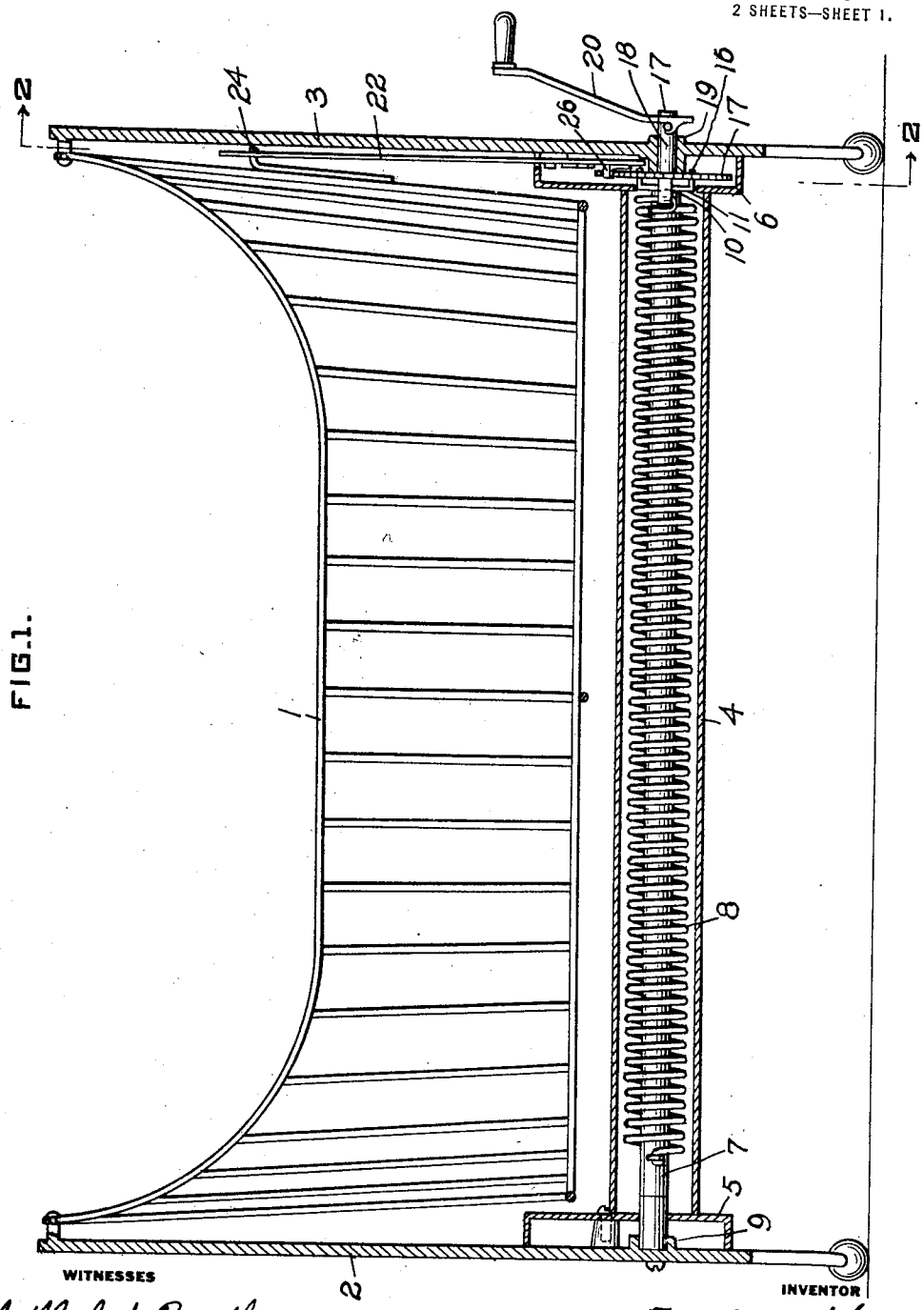


FIG. 1.

WITNESSES

J. Herbert Bradley.

INVENTOR

Frank Magidson

By Jno. S. Green

His atty.

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2 SHEETS—SHEET 2.

FIG.3.

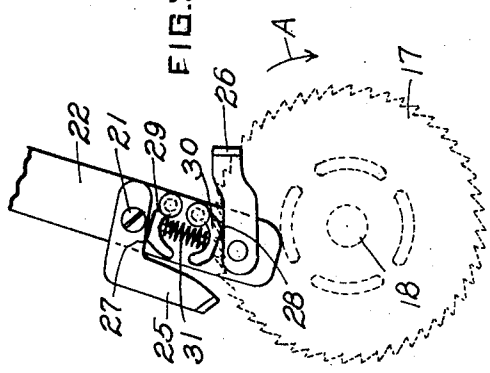


FIG.4.

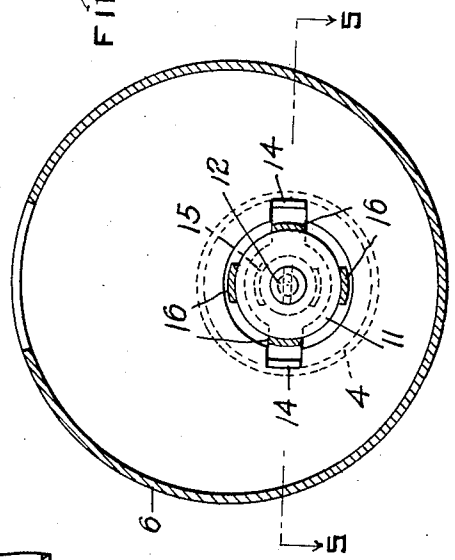
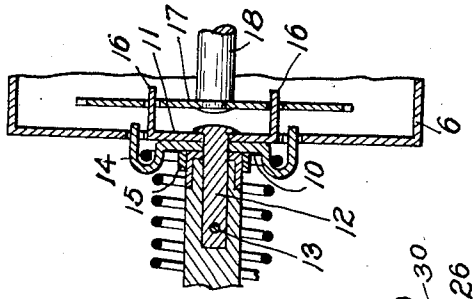


FIG.5.



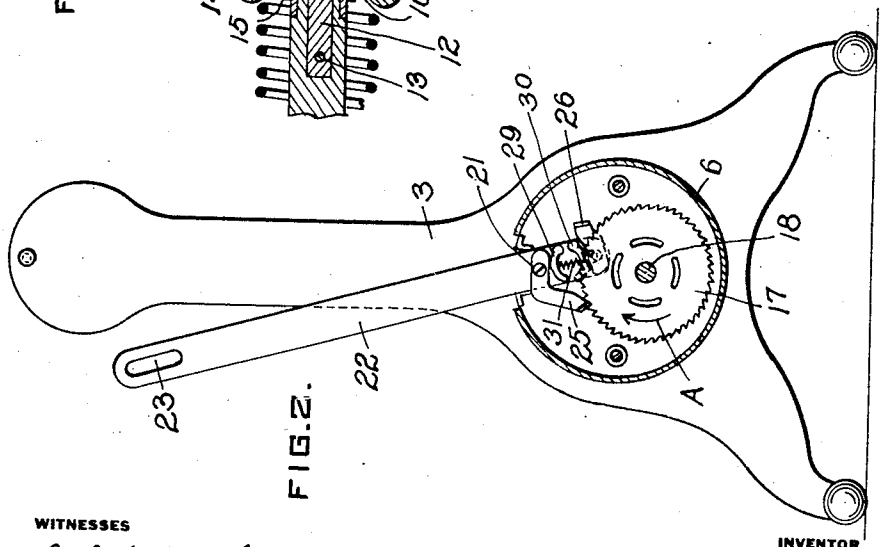


FIG.2.

WITNESSES

J. Hebert Bradley.

INVENTOR

Frank Magidson

By Jno. S. Green

his Atty.

UNITED STATES PATENT OFFICE.

FRANK MAGIDSON, OF UNIONTOWN, PENNSYLVANIA.

SPRING-MOTOR MECHANISM.

1,342,857. Specification of Letters Patent. Patented June 8, 1920.

Application filed October 16, 1919. Serial No. 331,138.

To all whom it may concern:

Be it known that I, FRANK MAGIDSON, a citizen of the United States, and a resident of Uniontown, in the county of Fayette and State of Pennsylvania, have made a new and useful Invention in Spring-Motor Mechanisms, of which the following is a specification.

My invention relates to spring motors and consists in the method of connecting the energized spring with an escapement wheel and in permitting step by step rotation of the latter to oscillate a pivoted arm or lever which may be connected to any suitable device. I have illustrated my invention as applied to a doll's automatic cradle. The objects of my invention are to provide a simple, efficient and economical assembly and mechanism for a spring power source and its escapement.

In the drawings Figure 1 is a longitudinal, vertical section and view of such a cradle as I have mentioned which is operated by my improved mechanism; Fig. 2 is a section on line 2—2 of Fig. 1 showing the oscillating parts at one extreme of their movements; Fig. 3 is an enlarged section, similarly taken but showing the parts at the other extreme of their movements; Fig. 4 is a vertical, transverse section showing the method of anchoring one end of the motor spring and Fig. 5 is a section on line 5—5 of Fig. 4.

The cradle body 1 may be of any desired shape and construction and at each end is swung from standards 2 and 3. These standards, with a connecting member 4, comprise the cradle stand which houses and to which is attached the spring motor mechanism which operates the cradle body. Member 4 consists of a sheet metal tube and at each end is secured to pan shaped pieces 5 and 6 which provide an enlarged hearing for stands 2 and 3 respectively and are secured to convenient lugs on the latter. Piece 6 houses the detent mechanism described below.

A core 7 for the motor spring 8 is journaled in a boss 9 in standard 2 and its opposite end is journaled in a disk element 10 and secured to another disk 11 by means of a flat pin 12. A pin 13 passes through core 7 and pin 12 and prevents their relative rotation. Pin 12 is riveted to disk 11. The hole in disk 10 for pin 12 is round, allowing relative motion while the slot for pin 12 in disk 11 is shaped to prevent relative rotation of the latter and core 7.

Alternate sectors of disk 10 are formed into lugs 14 and 15. The former engage the pan 6 and the latter form a journal bearing for core 7. Disk 11 is provided with lugs 16 which engage a ratchet wheel 17 mounted on a shaft 18 journaled in a boss 19 on standard 3.

One end of spring 8 is secured to core 7 and the other end is secured to lug 14 on disk 10 and is therefore immovably attached to the cradle stand. Any energy in spring 8 will tend to rotate core 7, disk 11 and ratchet 17 in the direction indicated by arrow A. This rotation is permitted only intermittently by the escapement mechanism best shown in Figs. 2 and 3.

Pivoted on stand 3 by a shouldered screw 21 is an arm 22. The upper end of arm 22 is slotted at 23 to engage a projection 24 on the cradle body. Whenever the cradle is moved to one side it will tend to swing back like a pendulum and through projection 24 its movement will be transmitted to arm 22. Also pivoted at 21 is a ratchet pawl 25 which is adapted to engage ratchet wheel 17 and prevent rotation of same. Mounted on the lower end of arm 22 is a pawl 26 adapted to engage wheel 17 and to be moved by same to the position shown in Fig. 3 or to be disengaged to permit arm 22 to be moved to the position shown in Fig. 2.

Pawls 25 and 26 have opposing faces 27 and 28 respectively. These faces are preferably straight although they may be arcuate. Pivoted on arm 22 are two small cams 29 and 30, one for each pawl. A spring 31 is compressed between them and held in place by lugs on the cams. Arm 22 may be recessed or slotted adjacent the spring to avoid contact with same. These cams bear against faces 27 and 28 respectively and when arm 22 is vertical the line of pressure through spring 31 and cams 29 and 30 passes through the pivots of pawls 25 and 26 and does not affect the latter. When arm 22 is moved to the position shown in Fig. 2 the line of pressure is through the tail of each pawl which rotates the tooth of pawl 25 into engagement with ratchet 17 and tends to rotate pawl 26 out of engagement with the wheel. When arm 22 is moved to the position shown in Fig. 3 the line of pressure is through the opposite portions of the pawls which tends to throw pawl 25 out of engagement and

pawl 26 into engagement with the ratchet wheel.

When either pawl is engaged with ratchet wheel 17 and the latter is pressing against the pawl tooth, the pawl will be held against removal. Now if the arm 22 be moved so as to engage the other pawl a continuance of the movement will turn wheel 17 against the spring 8 and release the hold on the first pawl and allow it to assume the position urged by the pawl cam and spring 31.

Operation: With arm 22 in a vertical position and pawl faces 27 and 28 horizontal, the pawls are so shaped that both engage the ratchet wheel and spring 8 may be wound up by crank 20. The cradle is then moved manually to approximately the point which brings the arm 22 to the position shown in Fig. 2. Ratchet wheel 17 is held against rotation by pawl 25 and spring 31 and cam 30 rotate pawl 26 to the position indicated. The cradle is released and its pendulous swing to the right, moving arm 22 with it, will shift the line of pressure through spring 31 and cam 30 to the opposite side of the pivot of pawl 26 and cause the tooth of the latter to engage the ratchet wheel near the end of the swing. The momentum of the cradle and its load will move arm 22 and wheel 17 a short distance beyond the point shown in Fig. 3 which permits release of the tooth of pawl 25 allowing the latter to rotate to the position shown in Fig. 3 impelled thereto by the action of cam 29. All of the power of spring 8 is now directed against the lower arm of lever 22 and tends to move it back to the position shown in Fig. 2 when wheel 17 will be stopped by pawl 25 but the momentum of the oscillating parts will be sufficient to reverse the rotation of wheel 17 against spring 8 enough to relieve the pressure on pawl 26 and permit same to assume its disengaged position. This cycle of movements is repeated as long as the motor spring retains energy. If at any time the mechanism be stopped midway of an oscillation, the inertia of the cradle and load will hold the mechanism quiescent until manually started again.

The advantages of my device lie in its simplicity, few parts and ease of assembly. Its efficiency is largely obtained by the mounting of most of the pawl reversing parts on the operated lever or arm 22. This arm and the parts most difficult to handle may be assembled and inserted in the completed cradle as a unit. The motion of the oscillating arm about a pivotal point spaced from the center of the ratchet wheel is a novel feature which enables the pawl reversing parts to function as they do. This reversing means is unusually quiet for an escapement mechanism and its simplicity will be demonstrated by a comparison with former patents issued to me on similar mechanisms, namely, Nos. 1,212,786; 1,212,787 and 1,212,789 and with that mechanism shown in a copending application of mine, Serial No. 291,247. The economy in cost of manufacturing is apparent.

I claim:—

1. An escapement mechanism for a spring impelled ratchet wheel, comprising a pair of pivoted ratchet pawls having opposed surfaces, a pivoted arm upon which one of said pawls is mounted and pawl reversing means mounted on said arm and bearing against said surfaces and adapted to shift to opposite sides of the pivots of said pawls as said arm is oscillated.

2. In a spring motor mechanism, a spring impelled ratchet wheel, a pivoted, oscillating arm, a pair of ratchet pawls, a pivoted cam for each of said pawls, each of said cams being adapted to engage its respective pawl with said wheel during alternate oscillations of said arm and to disengage same at the end of the intermediate oscillations.

3. An escapement mechanism for a spring motor comprising a spring impelled ratchet wheel, a pivoted, oscillating arm, a ratchet pawl mounted upon an immovable pivot, a ratchet pawl pivoted upon said arm, pivoted cams adapted to bear against said pawls and to engage and disengage them alternately with said wheel during successive oscillations of said arm.

4. In a spring motor mechanism, a coiled spring, a ratchet wheel impelled thereby, a pawl mounted upon a fixed pivot, a lever pivoted at a point spaced from the center of said wheel, a pawl mounted upon said lever, pivoted cams bearing against said pawls and adapted to alternately engage and disengage said pawls with said wheel as said lever is oscillated by alternate forces, namely, the energy in said spring and the gravity pull resulting from the application of said energy to said lever.

5. In an escapement mechanism, a spring impelled ratchet wheel, a lever pivoted outside the periphery of said wheel and provided with an arm extending toward the center of said wheel, a ratchet pawl pivoted upon said arm, a ratchet pawl pivoted upon a fixed pivot, each of said pawls having a tooth adjacent the teeth of said wheel, and respective cams bearing against the sides of said pawls, each cam adapted to rotate its respective pawl into or out of engagement with said wheel according to the side of the pawl pivot on which it bears, said cams being so mounted that oscillation of said lever shifts the bearing point of each cam from one side to the other of the pivot of its respective pawl.

6. In a spring motor, a spring impelled ratchet wheel and an escapement mechanism for same comprising an oscillating arm, pawls and pawl reversing means, said

means being mounted on said arm and said mechanism being assembled as a unit with said wheel.

7. In an escapement mechanism for a spring impelled ratchet wheel, an oscillating arm pivoted at a point spaced from the center of said wheel so that one end of said arm moves in an arc which intersects the periphery of said wheel when said arm is oscillated, a ratchet engaging pawl mounted on a fixed pivot, a ratchet engaging pawl pivoted on said arm end and means adapted to reverse said pawls at each end of the arcuate movement of said arm end.

8. In a spring motor mechanism, a core, an element provided with lugs which form a bearing for said core and provided with other lugs which engage a frame on which the mechanism is mounted and also engage one end of a spring which is coiled about said core and has its opposite end secured to said core, a ratchet wheel and a ratchet wheel engaging member non-rotatably secured to said core by means extending through said element.

In testimony whereof, I have hereunto subscribed my hand this 13th day of October, 1919.

FRANK MAGIDSON.