

UNITED STATES PATENT OFFICE

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SPEED GOVERNOR FOR SPRING MOTORS

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The present invention relates to a governor for spring motors, such as are used for operating toy railway cars and other small mechanical devices. An object of the invention is to provide a governor of very simple construction, which may be easily assembled, either in the original assembly, or as a replacement, and which will be reliable and efficient in operation. A further object is to provide a governor which may be easily adjusted to cause the motor to run at any desired speed.

The present invention contemplates a speed governor, peculiarly adapted for wind-up toys wherein a speed responsive member is supported on a shaft for bodily rotation therewith and for transverse sliding movement only relative to the shaft, the member being under the control of a spring which permits such sliding movement on speeds in excess of a predetermined speed and being adapted to frictionally engage a fixed member upon further increase in speed.

The invention specifically includes a rotatable member adapted to carry a shoe which is mounted for slidable movement thereon. One side of the shoe forming member is heavier than the other side so that with the rotation of the parts the heavier side of the shoe will be moved outwardly by centrifugal force against the action of a spring. In this respect the rotatable member is provided with oppositely positioned transverse guide-ways formed in its side portions, to accommodate spaced apart parallel leg or guide members of the shoe, mounted thereon. The shoe and guides may conveniently be formed of a single strip of sheet metal bent to form a loop portion and parallel shank portions to straddle the rotatable members and to operate in the said guide-ways. A spring may be positioned upon the extremities of the shank portions and between the said rotatable member and a washer upon the end of the shanks.

With the above and other objects in view, an embodiment of the invention is shown on the accompanying drawings, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

Similar characters of reference denote like or corresponding parts throughout the several figures of the accompanying drawings forming a part of this specification and in which:

Fig. 1 is a vertical sectional view of a spring motor, as used for toy railway locomotives, and showing my improved governor in accordance with the present embodiment of the invention;

Fig. 2 is an enlarged detail side elevation of the governor and the rotatable pinion upon which the governor shoe is mounted, and showing the parts in the position of rest;

Fig. 3 is a sectional view of the parts shown in Fig. 2, but in their operating or extended position;

Fig. 4 is an end elevation of the governor and pinion, the latter being shown mounted in the side plates of the motor frame;

Fig. 5 is a bottom view of the governor as seen in Fig. 4; and

Fig. 6 shows a detached side view of the rotatable pinion shaft, seen in the preceding figures.

Referring to the drawings, the spring motor comprises a pair of side plates 10—10 secured in spaced relation by posts 11 at each corner, and between which plates the motor train of gears and pinions are disposed. The gear train consists of a large gear 12 mounted upon a shaft 13 to which one end of the spring 14 is secured, the other end being secured to one of the corner posts 11. The spring is designed to be wound by a key, (not shown), in the usual manner. The gear 12 meshes with a pinion 15 mounted upon a shaft 16, to which is also secured a gear 17, that meshes with a pinion 18 secured to a driven shaft 19, jour-

naled in the plates 10, and upon the ends of which are secured the driving wheels 20; other wheels 21 are mounted on a similar shaft 22.

5 A gear 23 is mounted upon the shaft 19 and meshes with and drives an elongated rotatable member in the form of a governor pinion 24 upon which the speed responsive member or shoe 25 of the governor is mounted. The
10 pintle ends 26—26 of the pinion 24 are journaled in bearings of the side plates 10—10. Transverse, recessed or cut-out guide-ways 27—27 for the speed responsive member are formed in the opposite sides of the toothed
15 face and intermediate the ends of the pinion.

This movable member of the governor may conveniently be formed of flat sheet metal, bent to shape, and comprises an arcuate shoe portion 28, the two end portions of which are bent under or inwardly as at 29—29 and then
20 disposed downwardly at right angles in parallel spaced relation to form parallel shanks or guides 30—30. These guides are of less width than the shoe portions and are slidably
25 received in the guide-ways 27. The ends of these parallel shank members project beyond the surface of the pinion 24 and carry a light coiled spring 31, positioned thereon between the face of the said pinion and a washer 32
30 mounted upon the end portions of said shanks. The said washer is pierced to receive the extreme end portions of the shank which are bent over upon the outer face of the said washer to retain the same in position and to
35 serve as a retainer for the said spring.

The heavier loop or shoe portion of the governor member is thus positioned to one side of the pinion axis while the lighter portions, including the spring 31 and guides 30,
40 are positioned upon the opposite side and in a manner to normally hold the shoulders 33 of the shoe against the face of the pinion teeth next adjacent to the shanks 30. In this connection it will be seen that these parts are
45 shown at rest or in their normal positions in Figs. 1, 2 and 4, while in Fig. 3 they are shown in their extended positions.

When the pinion operates at a speed in excess of a predetermined speed, the weighted
50 shoe moves outwardly against the action of the spring 31. In order to prevent excess speed of the motor, this shoe is brought against some fixedly carried part of the motor. Here the governor unit is located within the
55 motor between the shaft 19 and the adjacent corner post 11, so that with the rapid rotation of the pinion, the shoe will be forced outwardly and engage this shaft and post, and thereby check its rotation, and that of the train of
60 gearing, so that it will not exceed a predetermined speed.

The governor may be adjusted either by increasing or diminishing the tension of the spring 31, or by bending the shoe to change
65 the normal distance of its peripheral surface

from the axis of the pinion 24, it being understood that the lesser the distance, the farther the shoe must move before engaging the shaft 19 or post 11, or the more spring tension it must overcome, and the greater the speed of the motor before its acceleration is retarded. 70

I have illustrated and described a preferred and satisfactory embodiment of the invention, but it will be obvious that changes may be made therein within the spirit and scope thereof, as defined in the appended
75 claims. It will be understood that the rotatable member does not necessarily have to be in the form of a pinion, but may be a rotatable shaft having guides formed in its opposite side portions to accommodate the
80 slidable governor member, also that the guides and weight need not be integral.

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

1. A centrifugal speed governor for spring motors, including a rotatable member having transversely slotted side portions, a shoe carried thereon for bodily rotation therewith,
90 said shoe being secured to guides having sliding engagement with said member whereby the shoe may move outwardly under centrifugal action, resilient means interposed between said rotatable member and the ends
95 of said guides adapted to resist outward movement of the shoe, and fixed stop means for slidable engagement by the shoe.

2. A centrifugal speed governor for a spring motor mechanism, including a rotatable member having guide-ways formed in its opposite sides, a shoe having guides
100 straddling the rotatable member and slidable in the guide ways, said shoe being adapted to move outwardly under centrifugal action with the rotation of the rotatable member,
105 resilient means positioned between said rotatable member and the outer ends of the guides and adapted to resist said outward movement, of the shoe and a stop device for slidable engagement by said shoe. 110

3. A centrifugal speed governor for a spring motor mechanism including a rotatable member having guide-ways formed in its opposite sides, a shoe having guides
115 straddling the rotatable member sliding in the guide ways, said shoe being adapted to move outwardly under centrifugal action with the rotation of the rotatable member, a washer mounted upon the outer ends of
120 said guides, a spring interposed between the said rotatable member and washer and adapted to resist said outward movement of the shoe, and a stop device for slidable engagement by said shoe. 125

4. A centrifugal speed governor for a spring motor mechanism including a rotatably driven member, a member comprising a shoe portion having an extended arcuate surface for engagement with a stop device and
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- spaced leg portions extended from said shoe portion and adapted to straddle and have sliding engagement with said rotatably driven member, and resilient means interposed between said leg portions and said driven member adapted to resist excess speed of rotation of said driven member and motor. 70
5. A centrifugal speed governor for a spring motor mechanism including a driven shaft, a member comprising a shoe portion having an extended arcuate surface for engagement with a stop device and spaced leg portions extended from said shoe portion and adapted to embrace and have sliding engagement with said shaft, means secured on the ends of said leg portions connecting them together in spaced relation, and resilient means interposed between said last mentioned means and said shaft and adapted to resist said outward movement. 80
6. A centrifugal speed governor for spring motor mechanism, including a driven shaft having a pair of transverse parallel slots, a member comprising a shoe portion having an extended arcuate surface for engagement with a stop device and spaced leg portions extended from said shoe portion and adapted to embrace said shaft and have sliding engagement with said parallel slots, resilient means interposed between said leg portions and said shaft and adapted to resist said shaft and motor, and means to limit and determine the contracted normal position of said shoe. 85
7. A governor comprising a rotatable member having transverse guide ways, a speed responsive element having guides in the guide ways, and an excess of mass on one side of the axis of the rotatable member, springs means interposed between the rotatable member and speed responsive element for resisting outward movement of the heavy side of the speed responsive member, and a fixed element adapted to be engaged by the speed responsive element. 100
8. A governor comprising a rotatable member having transversely slotted sides, a speed responsive element having guides in the slots, and an excess of mass on one side of the axis of the rotatable member, spring means interposed between the rotatable member and speed responsive element for resisting outward movement of the heavy side of the speed responsive member, and a fixed element adapted to be engaged by the speed responsive element. 105
9. A governor comprising a transversely slotted, rotatable member, a speed responsive element, mounting means for securing the element to the slotted rotatable member for bodily rotation therewith and for transverse sliding movement only relative to the axis of rotation thereof and with the center of gravity eccentrically located, spring means opposing such bodily movement at speeds in excess of a predetermined speed, and a fixed element against which the speed responsive element is brought by further increase in speed, the mounting means also preventing rotation of the speed responsive element about the axis along which it is guided by the slotted member. 110
- Signed at Bridgeport, in the county of Fairfield and State of Connecticut. 115
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