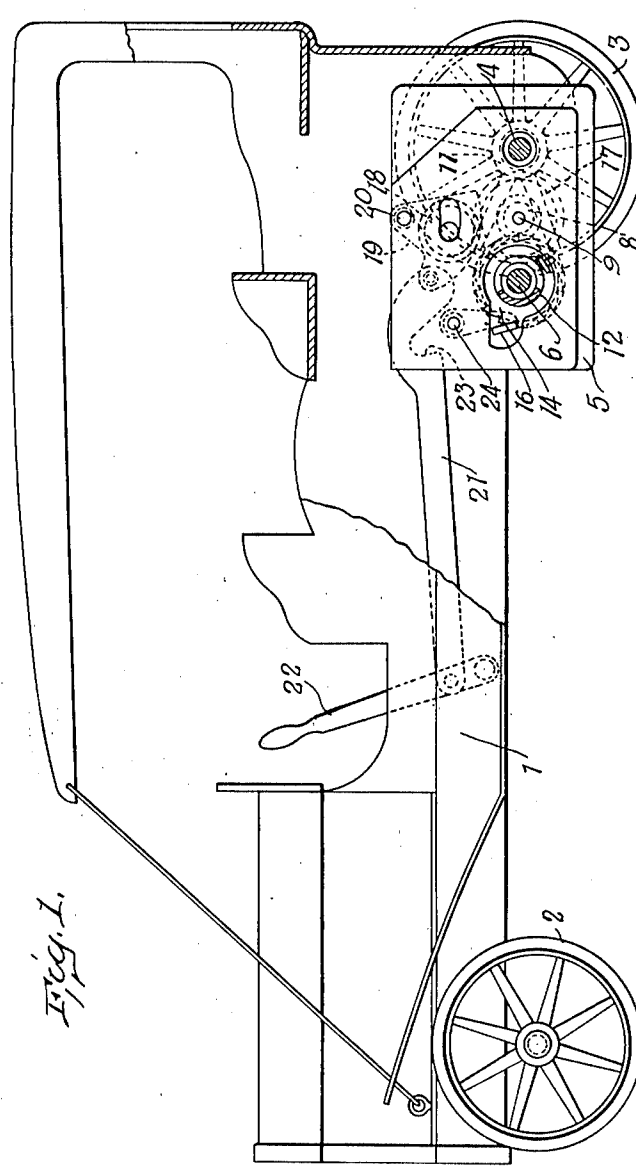


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 SPRING ACTUATED TOY.
 APPLICATION FILED DEC. 7, 1911.

1,063,959.

Patented June 10, 1913.

3 SHEETS—SHEET 1.



Witnesses

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 David P. Clark,

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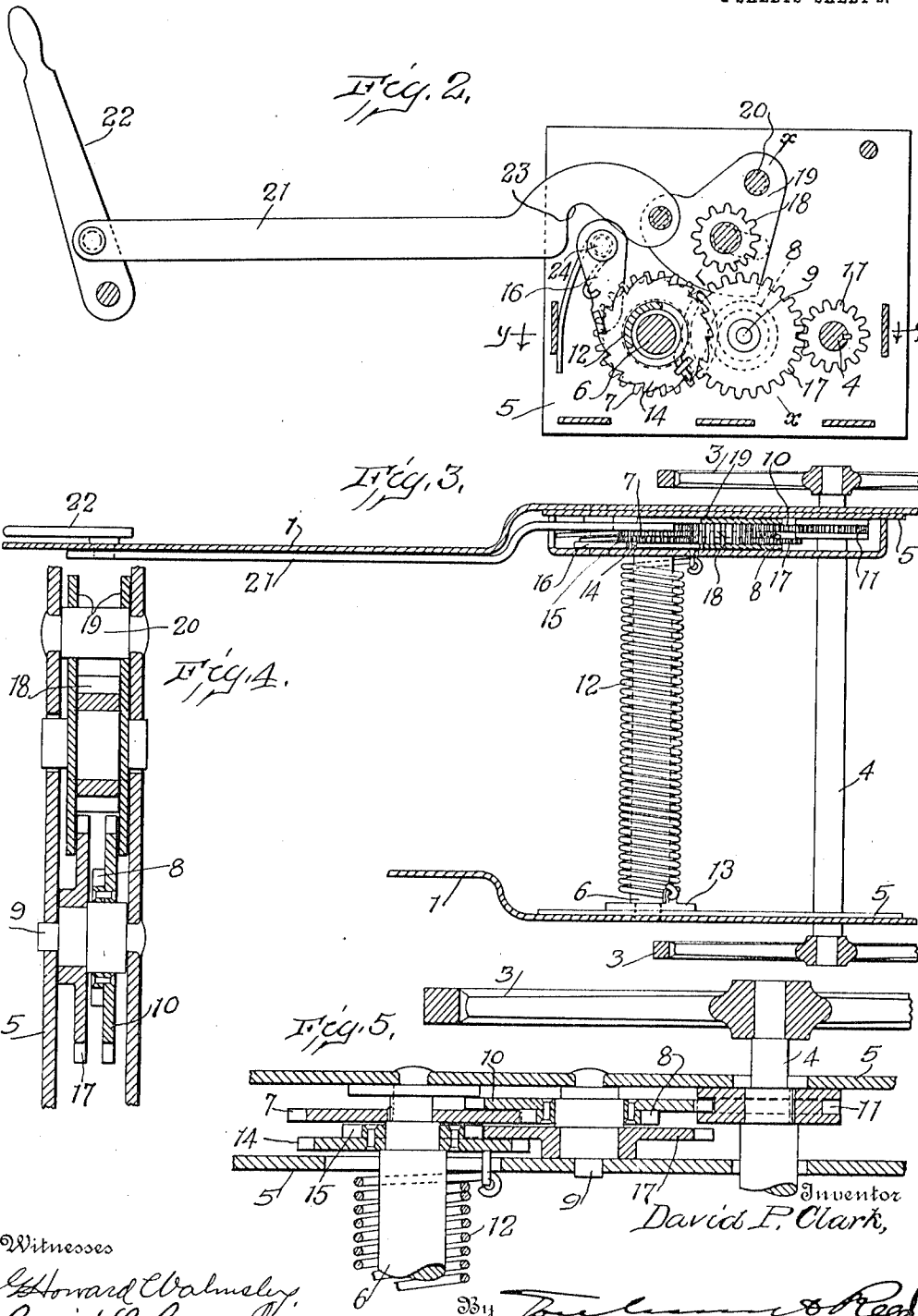
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

DAVID P. CLARK, OF DAYTON, OHIO.

SPRING-ACTUATED TOY.

1,063,959.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DAVID P. CLARK, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Spring-Actuated Toys, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to spring-actuated toys and more particularly to locomotive toys of this type.

The object of the invention is to provide a toy of this character in which the spring may be wound up, or compressed, by moving the toy over the floor in the same direction that it is propelled by the unwinding, or expansion, of the spring; and further, to so construct the toy that a relatively small number of revolutions of the axle will compress the spring and the expansion of the spring so compressed will impart a relatively large number of revolutions to said axle; thus enabling the spring to be quickly compressed to an extent sufficient to propel the toy a long distance.

In the accompanying drawings, Figure 1 is a side elevation of a toy embodying my invention; Fig. 2 is a longitudinal section, taken through the rear portion of such a toy, showing the gearing in elevation; Fig. 3 is a horizontal section taken immediately above the gearing; Fig. 4 is a section taken on the line $x x$ of Fig. 2; and Fig. 5 is a section taken on the line $y y$ of Fig. 2.

In these drawings I have illustrated one embodiment of my invention and, for the purpose of this illustration, have shown the invention as applied to a toy, the body 1 of which is formed in imitation of an automobile touring car. The forward portion of this body is supported by steering wheels 2, of the usual construction, and the rear portion of the body is supported by propelling wheels 3 mounted on an axle 4 rotatably supported by the body. In the present instance this axle is journaled in supplemental side members 5 constituting a frame which supports the several active parts of the device. Obviously, however, this supplemental frame could be omitted and the parts mounted directly in the side walls of the toy, where these have sufficient rigidity. Rotatably mounted in the frame members 5 parallel with the axle 4, and

preferably in front thereof, is a shaft 6 having rigidly secured thereto at one end thereof a gear 7. This gear meshes with a pinion 8 loosely mounted on a stud 9 carried by one of the side members of the frame 5 and is rigidly secured to and rotates with a gear 10 also loosely mounted on the stud 9 and meshing with a pinion 11 on the axle 4. It will be apparent that the ratio of this gearing is such that motion will be transmitted from the shaft 6 to the axle 4 at an increased speed and will be transmitted from the axle 4 to the shaft 6 at a decreased speed. Coiled about the shaft 6 is a spring 12 having one end rigidly secured thereto, preferably by connecting the same to a plate 13 rigidly secured to the shaft. The other end of the spring 12 is connected to a ratchet wheel 14 which is loosely mounted on the shaft 6 and has secured thereto and rotating therewith a pinion 15 also loosely mounted on the shaft 6. A spring-pressed pawl 16 mounted on the frame 5 engages the teeth of the ratchet wheel 14 and holds the same against rotation in one direction, namely, in the direction in which the expansion of the spring would tend to move it. The pinion 15 which is secured to the ratchet wheel 14 meshes with a gear 17 loosely mounted on the stud 9 and corresponding in diameter and the number of its teeth to the gear 10 which is also mounted on that stud.

In order that the spring may be wound from the axle, by a comparatively few rotations of the latter, and that the expansion of the spring will impart a large number of rotations to the axle we have provided means for connecting together the gears 10 and 17, thereby causing the ratchet 14 to be rotated by the rotation of the axle 4. The ratio of the gear 17 and the pinion 15 is such that the ratchet wheel, to which one end of the spring is connected, will be rotated at a much higher rate of speed than that at which the gears 10 and 17 are rotated, and, on the other hand, the ratio of the gear 10, pinion 8 and gear 7 is such that the shaft 6 to which the other end of the spring is connected will be rotated at a rate of speed less than the speed of the gears 10 and 17. It will be obvious, therefore, that when motion is simultaneously imparted to the ratchet wheel 14 and the gear 7 through their respective gearing that the spring will

be compressed owing to the more rapid rotation of the ratchet wheel.

The connection between the gears 10 and 17 may be made in any suitable manner. In these drawings I have illustrated one convenient method for forming this connection. As here shown a pinion 18 of a width sufficient to engage both the gears 10 and 17 simultaneously is movably supported adjacent to the gears and means provided for moving this pinion into and out of engagement with the gears, thereby making and breaking the connection between the same. Preferably, the pinion 18 is rotatably mounted in a pivoted frame 19 hung on a stud 20 carried by the supporting frame 5. Movement may be imparted to the frame 19 and pinion 18 by any suitable means. As here shown this is accomplished by means of a rod 21 pivotally connected to the frame 19 and extending forwardly therefrom to a point near the driver's seat, where it is connected with a lever 22. The manipulation of this lever will move the pinion into and out of engagement with the gears and the location of the lever is not only a convenient one but it places the lever in the same position occupied by the controlling lever of an automobile, thus adding to the toy an additional feature and one that is very attractive in the eyes of a child. The lever 21 is preferably provided with a notch 23 arranged to engage a stud 24 and limit the rearward movement of the frame 19 and pinion 18.

In the operation of a self propelled toy equipped with the invention the pinion 18 is moved into mesh with the gears 10 and 17 and the axle 4 is rotated by moving the toy over the floor a few times in a forward direction. This motion is transmitted through the pinion 11 to the gears 10 and 17 and from these gears the motion is transmitted at increasing and decreasing speeds, respectively, to the gear 7 and ratchet wheel 14. Inasmuch as one end of the spring is connected with the gear, through the medium of the shaft 6, and the other end of the spring is connected with the operating wheel it will be obvious that the more rapid rotation of the ratchet wheel will cause the spring to be compressed. The pawl 16 holds the ratchet wheel against movement under the influence of the spring and so long as the pinion 18 is in mesh with the gears 10 and 17 the shaft will likewise be held against movement under the tension of the spring. When it is desired to propel the toy over the floor the lever 22 is thrown forward to move the pinion out of engagement with the gears. This releases the shaft from the pawl 16 and it is free to rotate under the influence of the spring. This rotation of the shaft is transmitted through the gear 7, pinion 8 and gear 10 to the pinion 11 on the axle 4, and, owing to the ratio of the gears,

the axle 4 is rotated at a much higher rate of speed than is the shaft 6 and consequently the expansion of the spring will impart to the axle a number of rotations many times greater than the number required to compress the spring. In addition to the very material advantage of being able to compress the spring by a few short movements of the propelling wheels over the floor and to secure from this compression a long movement of the toy and the simplicity of the whole mechanism, the invention possesses another very decided advantage, namely, that it is practically impossible to wind the spring so tight as to break it, this resulting from the fact that the compression is secured through the frictional engagement of the propelling wheels with the floor and before the spring is wound tight enough to injure the same the wheels will slip over the floor.

While I have illustrated one embodiment of the invention and have shown the same as applied to a self-propelled toy it will be apparent that the invention is not necessarily limited to toys of this type and that by substituting other devices for the propelling wheels on the axle 4 and thereby transforming this axle into a shaft, the invention may be applied to stationary toys without other change. Further it will be apparent that various alterations may be made in the mechanism herein shown and described without departing from the principle of the invention and I therefore wish it to be understood that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. In a toy, an axle, a spring to propel said toy, a pair of gears connected respectively with the opposite ends of said spring, gearing connecting said pair of gears with said axle and comprising a pair of intermediate gears having their axes between the axes of the first-mentioned pair of gears and the axis of said axle, and means to connect both said intermediate gears with said axle to enable them to receive motion simultaneously from said axle when it is rotated in a forward direction, or to connect only one of said intermediate gears with said axle to enable the gear so connected to transmit forward motion from said spring to said axle.

2. In a toy, an axle, a pinion mounted thereon, a shaft, two gears mounted to rotate about the axis of said shaft, a spring coiled about said shaft and connected at its opposite ends with the respective gears, intermediate gears connected with the first-mentioned gears, one of said intermediate gears being also connected with said pinion, and means to cause said intermediate gears

to rotate in unison or permit one of said intermediate gears to have movement independently of the other of said intermediate gears.

5 3. In a toy, an axle, a pinion mounted thereon, a spring, a connection between said pinion and said spring comprising two gears rotatable about a common axis and connected respectively with the opposite ends
10 of said spring, means to connect said gears one to the other to cause them to rotate simultaneously in the same direction, and means to hold one of said gears against movement in one direction when the two
15 gears are disconnected.

4. In a toy, the combination, with an axle, and a pinion mounted on said axle, of a spring to propel said toy, two gears of different diameters connected respectively with
20 the opposite ends of said spring, an intermediate gear interposed between the larger of the first-mentioned gears and said pinion, a second intermediate gear connected with the smaller of the first-mentioned gears,
25 means for holding said smaller gear against rotation in one direction, and means to connect said intermediate gears one with the other to cause the same to rotate simultaneously.

5. In a toy, the combination, with an axle, a rotatable shaft, and a spring mounted on said shaft and having one end secured thereto, of a pinion rigidly secured to said axle, a gear rigidly secured to said shaft, an intermediate gear connected with said pinion, a
35 pinion secured to said intermediate gear and meshing with the first-mentioned gear, a pinion loosely mounted on said shaft and connected with the other end of said spring,
40 means for holding said last-mentioned pinion against rotation in one direction, a gear meshing with said pinion, and means to cause said last-mentioned gear to rotate simultaneously with said intermediate gear.

6. In a toy, the combination, with an axle, a rotatable shaft arranged substantially parallel with said axle, and a spring mounted on said shaft and having one end secured thereto, of a pinion rigidly secured to said axle,
50 two intermediate gears independently rotatable on a common axis between said axle and said shaft, one of said gears meshing with said pinion, a pinion secured to the last-mentioned gear, a gear rigidly secured to
55 said shaft and meshing with the last-mentioned pinion, a ratchet wheel loosely mounted on said shaft and having the other end of said spring connected thereto, a pinion rigidly secured to said shaft and meshing with the other of said intermediate gears,
60 and means for connecting said intermediate gears one to the other to cause the same to rotate in unison.

7. In a toy, the combination, with an axle,
65 a rotatable shaft arranged substantially par-

allel with said axle, and a spring mounted on said shaft and having one end secured thereto, of a pinion rigidly secured to said axle, two intermediate gears independently rotatable on a common axis between said
70 axle and said shaft, one of said gears meshing with said pinion, a pinion secured to the last-mentioned gear, a gear rigidly secured to said shaft and meshing with the last-mentioned pinion, a ratchet wheel loosely mounted
75 on said shaft and having the other end of said spring connected thereto, a pinion rigidly secured to said shaft and meshing with the other of said intermediate gears, a pinion of a width sufficient to enable it to mesh
80 simultaneously with both of said intermediate gears, a supporting frame for said pinion movably mounted adjacent to said gears, and means for imparting movement to said frame.

8. A self-propelled toy comprising a body portion having seats near the front thereof, an axle journaled near the rear of said body portion, propelling wheels secured to said
85 axle, a pinion carried by said axle, a shaft rotatably supported in front of said axle and substantially parallel therewith, a spring coiled about said shaft and having one end secured thereto, a gear rigidly secured to
90 said shaft, a pinion loosely mounted on said shaft and connected with the other end of said spring, means to hold said pinion against rotation in one direction, two intermediate gears arranged between said axle
95 and said shaft and mounted to rotate about a common axis, one of said intermediate gears meshing with the pinion on said shaft, and a pinion secured to the other of said intermediate gears and meshing with the gear on
100 said shaft, the last-mentioned intermediate gear meshing with the pinion on said axle, a pinion movably mounted adjacent to said intermediate gears and of a width sufficient to enable it to mesh simultaneously with both
105 of said intermediate gears, an actuating rod connected with said gear, and a lever mounted adjacent to the seat in the forward portion of said body and connected with said actuating rod.

9. In a toy, an axle, a spring to propel
115 said axle, two gears connected respectively with the opposite ends of said spring, a pinion secured to said axle, gearing interposed between said pinion and the gears connected with said spring and comprising two inter-
120 mediate gears movable about a common axis, and a pinion having bodily movement relatively to said intermediate gears and adapted to mesh simultaneously with both of them.

10. In a toy, an axle, a spring to propel
125 said axle, two gears connected respectively with the opposite ends of said spring, a pinion secured to said axle, gearing interposed between said pinion and the gears
130

connected with said spring and comprising two intermediate gears movable about a common axis, a pinion having bodily movement relatively to said intermediate gears and adapted to mesh simultaneously with both of them, and an actuating device mounted at a point remote from said pinion and connected therewith to impart bodily movement thereto.

10 11. In a toy, an axle, a spring to propel said toy, gearing connecting said spring with said axle and consisting in part of two gears rotatable about a common axis, and
15 a pinion having bodily movement relatively to said gears and adapted to mesh simultaneously with both of them.

12. In a toy, an axle, a spring to propel said toy, gearing connecting said spring with said axle and consisting in part of two
20 gears supported independently of said axle and rotatable about a common axis, and operable means for connecting said gears with and disconnecting the same from each other.

13. In a toy, an axle, a spring to propel
25 said axle, two gears connected respectively with the opposite ends of said spring, a pinion secured to said axle, gearing interposed between said pinion and the gears connected
30 with said spring and comprising two intermediate gears movable about a common axis, and operable means for connecting said

intermediate gears with and disconnecting the same from each other.

14. In a toy, an axle, a spring for propelling said toy, and two trains of gearing
35 connecting said spring with said axle, both of said trains of gearing being formed in part by the same gear, and means for connecting one of the gears of one of said trains of gearing to one of the gears of the other
40 train of gearing to cause the gears so connected to have simultaneous movement.

15. An automobile toy comprising a body portion having a seat, an axle, and ground
45 wheels supporting the rear portion of said body, a spring to propel said toy, two gears connected respectively with the opposite ends of said spring, means to connect said
50 gears with said axle to cause both of said gears to be moved in the same direction when said axle is rotated forwardly, means for disconnecting one of said gears from
55 said axle, and an operating device for said connecting means arranged adjacent to said seat.

In testimony whereof, I affix my signature in presence of two witnesses.

DAVID P. CLARK.

Witnesses:

J. W. AIKMAN,
HARRIET L. HAMMAKER.