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E. G. MIDDLETON

JUMPING TOY

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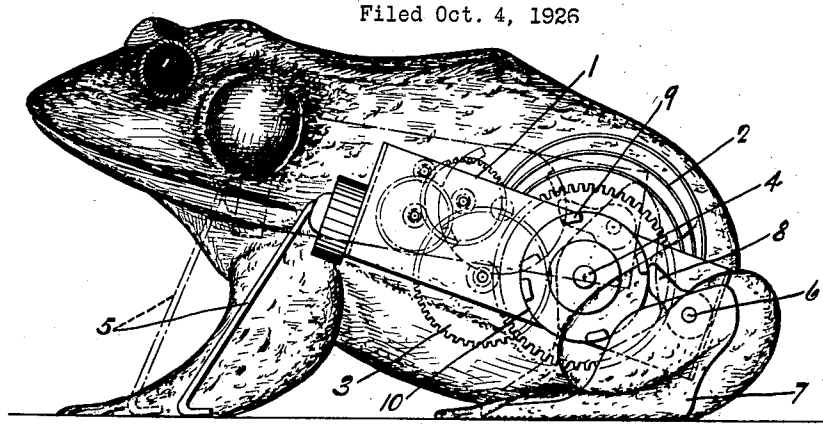


Fig. 1.

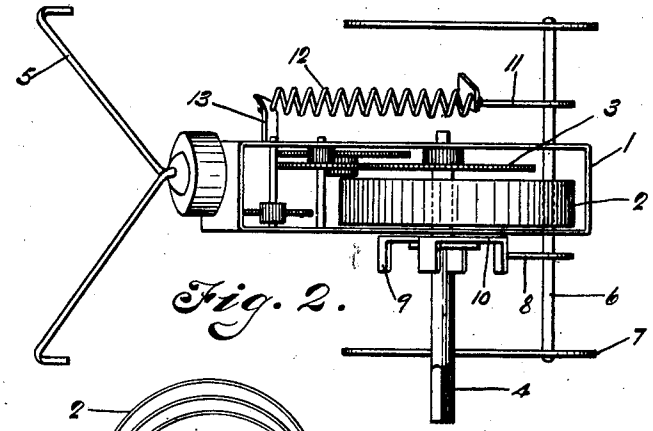


Fig. 2.

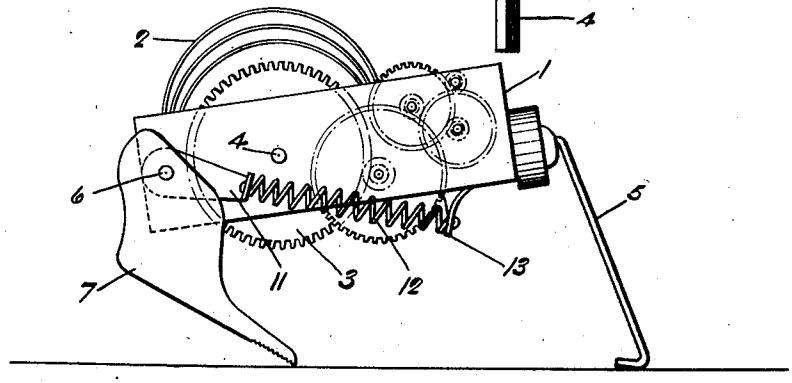


Fig. 3.

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UNITED STATES PATENT OFFICE.

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JUMPING TOY.

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My invention relates to toys and more particularly to hopping or jumping toys in simulation of an animal such as a rabbit, a kangaroo or a frog.

It is recognized that motor operated toys in simulation of animals have heretofore been patented in which the propelling legs are retracted under spring tension and suddenly released to give to the toy a succession of intermittent impulses by which a hopping or jumping movement is imparted. The present invention however, involves a simplification of the impelling or hopping mechanism by which the cost of manufacture may be materially decreased. In the present construction there is provided a rock shaft upon which the impelling legs are fixedly secured. The shaft is provided with a rock arm which engages with a pin wheel or cam disc. The rotation of the disc operates the rock arm against spring tension and as the wheel or disc continues to move the rock arm is suddenly released thus allowing the spring to react while the legs are in contact with a supporting surface. The body of the toy is thus lifted upwardly and forwardly giving to it sufficient momentum to carry it somewhat beyond the mere range of operation of the legs. The actuating spring is a helical tension spring connected to a second rock arm carried by the shaft. The spring is placed under tension by the operation of the rock arm and tends to return such arm to a dead center relation with the spring connection and the shaft. The shaft and its connected rock arm are capable of rocking movement in either direction against the tension of the spring, which by its contractive movement tends to return the parts to their normal intermediate position whichever direction they may have been rocked. This enables the rewinding of the spring motor without the necessity of providing pawls, detents or jointed construction to enable the reverse movement of the driving disc or pin wheel.

The object of invention is to simplify the structure as well as the means and mode of operation of hopping or jumping toys, whereby they will not only be cheaper in construction but will be more efficient and active in operation, of sturdy construction, having a minimum number of parts, of increased durability and unlikely to get out of repair.

A further object of invention is to provide impelling legs for such toy capable of operation in either direction facilitating the rewinding of the actuating motor without the necessisty of providing additional parts to accommodate such rewinding operations.

With the above primary and other incidental objects in view as will more fully appear in the specification the invention consists of the features of construction the parts and combinations thereof and the mode of operations or their equivalent as hereinafter described and set forth in the claims.

In the accompanying drawing wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a side elevation of the jumping mechanism for the toy and the driving motor therefor. Fig. 2 is a top plan view of the assembled operating mechanism. Fig. 3 is a side elevation from the side opposite that shown in Fig. 1.

Like parts are indicated by similar characters of reference throughout the several views.

In the present instance the jumping toy mechanism has been shown encased within a housing or body in simulation of a frog. It is to be understood, however, that the particular shape and appearance of the body or housing is immaterial. In lieu of simulating a frog the housing or body of the toy may be that of a rabbit, a kangaroo, or other jumping animal.

The actuating mechanism comprises a clock-work spring motor including the motor frame 1, the evolute spring 2, and the train of gears 3 governing the reaction of the spring 2 by which the main drive shaft 4 is operated. In the present instance the shaft 4 is both the actuating shaft and the rewinding shaft. The clock-work spring motor is of any suitable type such as is now a common article of commerce. A conventional form of clock-work motor has been shown for illustrative purposes only with no intent to limit the invention to the type of motor or its specific details. At its forward end the motor structure is supported upon downwardly and outwardly inclined legs or props 5. Mounted in the frame 1 of the motor near its rear end is a transverse rock shaft 6. Fixedly attached to each end of the rock shaft 6 are the impelling legs 7, which may be variously shaped in simula-

tion of the rear or jumping legs of the animal. Carried by the rock shaft 6 adjacent to one side of the motor frame 1 is a rock arm 8 which extends into the path of rotation of a series of lugs or projections 9 upon a rotating wheel or cam disc 10 carried by the main shaft 4. At the opposite side of the motor frame 1 the rock shaft 6 carries a second rock arm 11 to which is connected one end of a helical tension spring 12, the opposite and forward end of which is secured to a supporting lug or ear 13 projecting from the motor frame 1. The spring 12 operates to return the rock shaft 6 and its connected rock arm after each movement to its normal position wherein the connection of the spring 12 with the rock arm 11 will assume a dead center relationship with the connection of the spring 12 with the gear 13 and with the rock shaft 6, as is shown in Fig. 3, regardless of which direction the shaft and rock arm may have been turned from such normal or neutral position.

As the actuating wheel or cam disc 10 is rotated under the influence of the spring 2, the lugs or projections 9 engaging with the rock arm 8 elevate such arm against the tension of the spring 12, correspondingly operating the rock shaft 6 and the jumping legs 7 carried thereby. These legs 7 rest upon a supporting surface and as the shaft 6 is rocked the movement of the legs 7 allows the rear end of the motor frame 1 to descend to the position shown by solid lines in Fig. 1. When the lugs or projections 9 pass beyond the end of the rock arm 8 and release the arm, the tension spring 12 suddenly returns the rock shaft 6 and in so doing raises the impelling legs 7 upwardly to the position shown by dot and dash lines in Fig. 1 and shown in solid lines in Fig. 3. Not only does this operation of the legs 7 carry the body of the toy upwardly and forwardly as shown by dot and dash lines in Fig. 1, but the force and suddenness with which this movement is effected imparts sufficient momentum that the toy is carried bodily forwardly beyond the range of oscillatory movement of the legs 7.

When the tension of the spring 2 has been exhausted and it is necessary to rewind the motor a suitable key is fitted to the main shaft 4 and this shaft is rotated in an opposite direction. Inasmuch as the rock arm 8 extends into the path of rotation of the lugs or projections 9 they will engage such rock arms upon the reverse movement as well as upon the actuating or forward movement. During such rewinding operation the toy is ordinarily held in the hand and the impelling legs 7 are free to vibrate or operate idly. The reverse rotation of the wheel or disc 10 by the engagement of the lugs 9 with the rock arm 8 effects a downward operation of the arm 11 below its normal or dead center position as shown in Fig. 3 and the corresponding downwardly and rearwardly idle actuation of the jumping legs 7. It is this capability for movement in either direction from the normal or neutral position of the legs 7 and connected rock arm which enables the elimination of numerous small parts and joints which would otherwise be required. This capability of the impelling mechanism for idle reverse movements enables the parts to be rigidly and strongly constructed with minimum number of parts and none to become loose or misplaced. By reducing the number of parts the cost of manufacture and assembly is materially decreased. Likewise by reducing the number of parts and enabling the parts retained to be rigidly and fixedly connected without the necessity of pawls, detents and joints the durability of the toy is materially increased and its period of useful activity indefinitely extended. These are the important factors from both the viewpoint of the manufacturer and the purchaser. The toy industry being one in which competition is quite keen and one in which the minimum price at which the toy may be sold is a controlling factor, improvements as herein described which tend to simplify the construction, reduce the manufacturing cost, and at the same time increase the durability of the toy and eliminate its tendency to get out of order are equally important improvements and advancement in this art as would be a new principle or mode of actuation.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprises the preferred form of several modes of putting the invention into effect and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention I claim:

1. In a jumping toy or the like, an actuating motor, a rock shaft, rock arms carried thereby simulating impelling legs of a jumping animal, an actuator rotated by said mo-

tor, a rock arm on said shaft engaging the actuator, a second rock arm also carried by the rock shaft, a contractile spring under tension connected at one end to the motor frame and at the other end to the last mentioned arm in eccentric relation with the rock shaft and tending to maintain the lock arm and spring in longitudinal alignment and thereby hold said shaft and impelling legs in a predetermined position of adjustment from which the rock shaft and legs are capable of rocking movement in opposite directions, said actuator by its engagement with the coacting arm operating to move the rock shaft and place said spring under greater tension, and upon further movement to release the arm whereupon the legs are given a quick impelling movement under influence of the spring.

2. In a jumping toy, an actuating motor, oscillatory impelling legs, a spring connection between said legs and motor frame for holding the legs in a normal intermediate position, motor operated means for oscillating the legs in one direction from said normal position against the influence of the spring and for releasing the legs for reaction under influence of the spring, said legs being capable of reverse movement from such normal intermediate position against the tension of the same spring, during the resetting operation of the motor.

3. In a jumping toy, an actuating motor, a rock shaft, impelling legs carried by the rock shaft, a helical tension spring connection between said legs and motor frame for holding the legs in their retracted position intermediate the limit of their range of rocking movement and to return the legs thereto regardless of the direction in which they may be rocked from such intermediate retracted position, and an operative connection between the motor and rock shaft by which said legs are rocked in one direction under the influence of the motor and in the opposite direction during the operation of resetting the motor.

4. In a jumping toy, a motor, an actuating member capable of rotation in reverse directions, a rock shaft, a rock arm carried by the shaft and extending into the path of operation of the actuating member and actuating the rock shaft in reverse directions in accordance with the direction of operation of the actuating member, said member being operated in one direction under influence of the motor and in the opposite direction by the resetting of the motor, a spring eccentrically connected at one end to such rock shaft and at the other end fixed to the motor frame and placed under tension by the rocking movement of the shaft in either direction from normal position and impelling legs carried by the shaft, and intermittently retracted by said spring during the continued operation of said actuating member to impart jumping impulses to the toy.

5. In a jumping toy, a motor, an actuator capable of operation in reverse directions, a pair of oscillatory impelling legs, an operative connection between the actuator and said legs by which the legs are oscillated in reverse directions from a normal intermediate position in accordance with the directions of operation of the actuator, a spring operatively coupled at one end to said legs and connected at its opposite end to the motor frame and placed under tension by the movement of the legs in either direction from such normal intermediate position and by which the legs are returned thereto, said actuator being operated in one direction by the reaction of the motor and in the opposite direction by the resetting of the motor.

In testimony whereof, I have hereunto set my hand this 18th day of September, A. D. 1926.

ERNEST G. MIDDLETON.