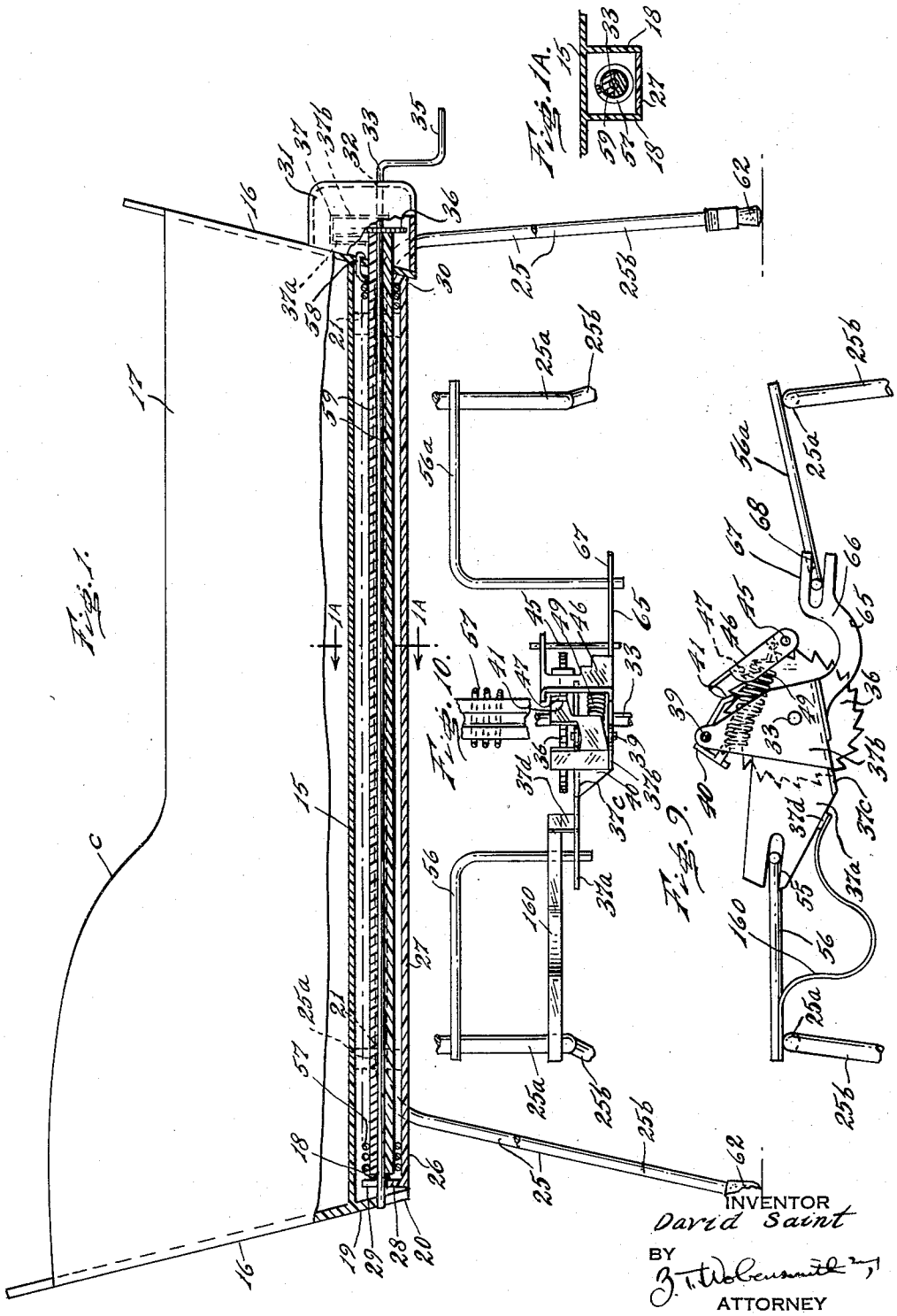
Sept. 5, 1961 D. SAINT 2,998,612

TOY CRADLES AND DRIVING MECHANISMS THEREFOR

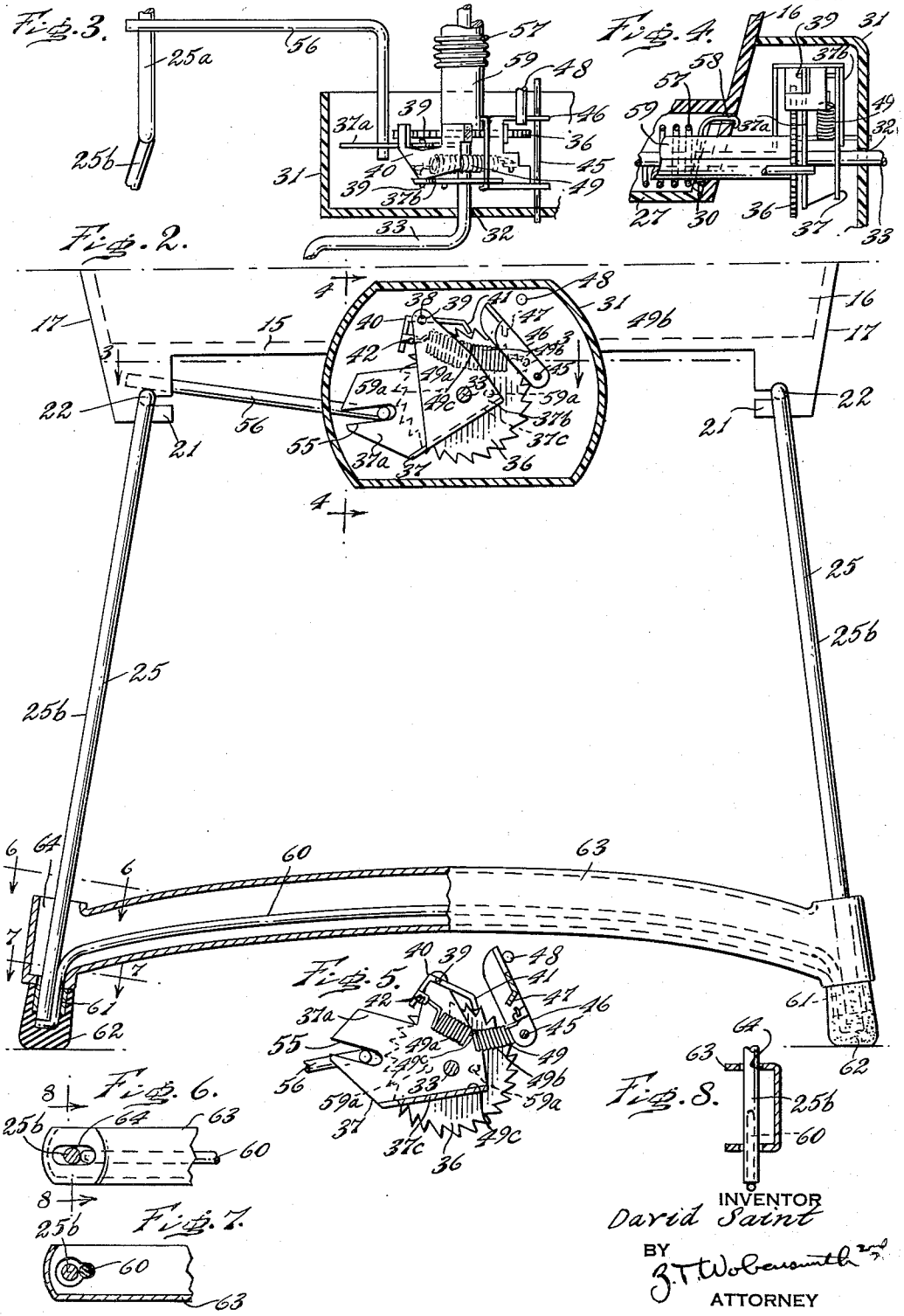
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TOY CRADLES AND DRIVING MECHANISMS THEREFOR

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TOY CRADLES AND DRIVING MECHANISMS THEREFOR

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This invention relates to top cradles and driving mechanisms therefor.

It is the principal object of the present invention to provide a toy cradle and operating mechanism therefor which is relatively simple in construction and reliable in its operation.

It is a further object of the present invention to provide a simple but effective motor actuation for cradles and the like.

It is a further object of the present invention to provide a motor actuating mechanism for oscillatory devices having an improved character of escapement.

It is a further object of the present invention to provide a toy cradle in which the major components can be made of molded synthetic plastic and of sheet metal stampings.

Other objects and advantageous features of the present invention will be apparent from the description and claims.

The nature and characteristic features of the invention will be more readily understood from the following description, taken in connection with the accompanying drawings forming part thereof, in which:

FIGURE 1 is a side elevational view of a cradle in accordance with the present invention;

FIG. 1A is a fragmentary vertical sectional view taken approximately on the line 1A—1A of FIG. 1;

FIG. 2 is a fragmentary end elevational view, enlarged, of the cradle shown in FIG. 1, and with parts broken away to show the actuating mechanism;

FIG. 3 is a fragmentary horizontal sectional view taken approximately on the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary vertical sectional view taken approximately on the line 4—4 of FIG. 2;

FIG. 5 is a fragmentary view of a portion of the actuating mechanism shown in FIG. 2 in another operating position;

FIG. 6 is a transverse sectional view taken approximately on the line 6—6 of FIG. 2;

FIG. 7 is a transverse sectional view taken approximately on the line 7—7 of FIG. 2;

FIG. 8 is a fragmentary sectional view taken approximately on the line 8—8 of FIG. 6;

FIG. 9 is a fragmentary end elevational view similar to FIG. 2 showing a modified form of the invention; and

FIG. 10 is a fragmentary horizontal sectional view, similar to FIG. 3, and of the construction shown in FIG. 9.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

Referring now more particularly to the drawings, a cradle receptacle C is provided which includes a bottom wall 15, inclined end walls 16, and side walls 17, preferably formed as a single piece of molded synthetic plastic material. The bottom wall 15 has integrally formed on the lower face thereof a pair of spaced ribs 18, closed at one end by an end wall 19 with a recess 20 therein, for purposes to be explained. The bottom wall 15 also has formed thereon, extending downwardly from the side

walls 17, spaced pairs of lugs 21 with bearing notches 22 formed on the inner portions thereof.

In order to support the cradle C in an elevated position for movement, legs 25 are provided, preferably formed of pieces of wire, bent to an inverted U-shape with central horizontal portions 25*a* engaged in the notches 22 in the lugs 21 and outwardly inclined end portions 25*b*.

A closure plate 26 is provided, having a horizontal wall portions 27 closing the opening between the ribs 18 with an upstanding end 28 having a recess 29 for facing relation with respect to the recess 20 and an upwardly extending end plate 30 for the purposes to be explained. The closure plate 26 is secured in position in any desired manner such as by a suitable adhesive applied along the meeting portions of the ribs 18 and the wall portion 27.

An outer housing 31 is provided, secured to one of the end walls 16 and has an opening 32 through which a crank rod 33 extends. The rod 33 is journalled in the meeting recesses 20 and 29 at its inner end.

The crank rod 33 has an outer end actuating portion 35 for manual turning for winding, as hereinafter explained. The rod 33 has a ratchet wheel 36 secured thereto for rotation therewith. Mounted on the rod 33, for free pivotal movement thereon, a ratchet frame 37 is provided having side wall portions 37*a* and 37*b* connected by a connecting portion 37*c*. The side wall portions 37*a* and 37*b*, at the upper ends, are provided with aligned openings 38 for the reception of pivots 39 formed on a ratchet 40 for pivotally mounting the same. The ratchet 40 has a tongue portion 41 for engagement with one of the teeth of the ratchet wheel 36 for receiving the counterclockwise impulse, as seen in FIGS. 2 and 5, from the ratchet wheel 36. The ratchet 40 also has an actuating portion 42 for swinging the ratchet 40 to retract the tongue portion 41 under certain conditions.

A shaft 45 is provided, mounted in one of the end walls 16 and carried by the housing 31, on which a pawl 46 is pivotally mounted, the pawl 46 having a tongue portion 47 for engagement with one of the teeth of the ratchet wheel 36 for restraining the counterclockwise movement, as seen in FIG. 2, of the ratchet wheel 36, under certain conditions of operation.

The end wall 16 which carries the shaft 45 is also provided with a stop 48 for limiting the swinging movement of the pawl 46.

The ratchet 40, in offset relation to the pivots 39, has one end of a spring 49 connected thereto. The other end of the spring 49 is connected to the pawl 46 in offset relation to the pivotal mounting on the shaft 45 for swinging the pawl 46 to tooth engaging and disengaging positions.

The spring 49 has a pair of helical portions 49*a* and 49*b* with a continuous connecting part 49*c* therebetween which provides a hinge action intermediate the ends of the spring 49 permitting the spring 49 to buckle rather than be crushed under compression. The spring 49 is of predetermined size and length so that in one condition of operation and upon counterclockwise movement of the ratchet frame 37 (see FIG. 2), it acts in tension; and in another condition of operation, and upon clockwise movement of the ratchet frame 37 (see FIG. 5), it acts in compression and with a hinge action.

The wall portion 37*a* of the ratchet frame 37 is provided with a notch 55 with which one end of an actuating rod 56 is in sliding engagement, the other end of the rod 56 being rigidly connected to the horizontal portion 25*a* of one of the legs 25 by spot welding or in any other desired manner.

The crank rod 33 has a helical power spring 57 connected thereto at the inner end thereof through an opening in the rod 33, the other end of the spring 57 being

in engagement in an opening **58** in the end wall **16**. A split collar **59** is provided, mounted on the rod **33**, and for engagement by the spring **57** upon winding thereof, and has end portions **59***a* extending into and in engagement with the ratchet wheel **36** for turning therewith.

The leg portions **25***b* on the opposite sides and at one end of the cradle receptacle C have extending therebetween a resilient or spring rod **60** which has its ends extending downwardly within collars **61** and with the lower ends turned outwardly, feet **62** of rubber or the like being provided in engagement with and in covering relation to the lower ends of the leg portions **25** and the spring rod **60**. The leg portions **25** at the opposite end of the cradle receptacle C are also provided with feet **62** of rubber or the like.

In order to provide a limit stop and thus control the extent of swinging movement of the legs **25** with respect to the cradle receptacle C, a frame **63** is provided of substantially C-shape in vertical cross section and being relatively closely fitting with respect to the leg portions **25***b* and the spring rod **60** at the lower portion thereof, as illustrated in FIG. 7, and having a sidewise extending slot **64** provided for a swinging movement at the upper parts thereof, as illustrated in FIG. 6.

In the form of the invention illustrated in FIGS. 9 and 10, the ratchet frame **37** has an oppositely extending bracket **65** offset as at **66**, and having an oppositely extending wall section **67** provided with a slot **68** for the reception of an actuating rod **56***a* similar to the rod **56** and rigidly connected at its outer end to the opposite horizontal portion **25***a* of the other leg **25**.

In this form of the invention the spring rod **60** is not employed, but in place thereof a leaf spring **160** is rigidly connected at one end of the ratchet frame **37**, as by spot welding to a tongue **37***d* carried thereby. The spring **160** extends over and is rigidly connected at its other end to the horizontal portion **25***a* of the leg **25**, as by spot welding, and performs the same function as the spring rod **60**.

The mode of operation will now be explained.

The crank arm **35** is turned in a direction to wind the power spring **57**, the ratchet tongue **41** and pawl tongue **47** and their interconnection providing an escapement and preventing the undesired unwinding of the power spring **57**. The spring force of the power spring **57** acting on the shaft **33** starts the unwinding movement of the shaft **33**.

Assuming first that the ratchet frame **37** is in the position shown in FIG. 2 and is moving counterclockwise, the pawl tongue **47** is in engagement with one of the teeth of the ratchet wheel **36** and the ratchet tongue **41** passes above several teeth, raised from engagement by the tension of spring **49** while the spring **49** tends to hold the tongue **47** in engagement.

Upon reaching the lowermost part of its oscillatory path the ratchet frame **37** will now move in a clockwise direction and as it does so the ratchet tongue engages the tooth to the right of that previously engaged on the ratchet wheel **36**. The condition of the spring **49** has changed from a condition of tension to a condition of no stress and then changed to a compressed condition. As the spring **49** is brought to a condition of compression and after the hinging action occurs, the pawl **46** is moved to a position to release the tongue **47**. The ratchet frame **37** now reverses its movement towards that initially referred to and as shown in FIG. 2, with the pawl tongue **47** brought to a position of engagement with the tooth to the right of that previously engaged on the the ratchet wheel **36**, the tongue **41** passing as before above the ratchet wheel teeth.

The ratchet tongue **41** and the pawl tongue **47** thus successively engage and disengage the teeth of the ratchet wheel **36**. The spring **49** tends alternately to pull the ratchet tongue **41** and the pawl tongue **47** into positions for engagement and disengagement as illustrated in FIGS. 2 and 5. The oscillating movement of the ratchet frame **37** is effective through the actuating rod **56** and its connection to the horizontal portion **25***a* of the leg **25** for aiding in the oscillatory motion of the cradle.

The oscillation thus imparted to the legs **25** is effective for oscillating the legs **25** in a sidewise direction with their fulcrums at their lower ends or at the feet **62**. As the pairs of legs **25** are moved from a central or neutral position in either sidewise direction, the spring rod **60** is stressed and bowed between its ends. The total extent of movement of the legs **25** is limited by their engagement in the ends of the recesses **64** in the frame **63**. A resilient or spring action is provided by the spring rod **60** tending to urge the legs **25** toward their neutral positions, but overrunning the neutral position first on one side and then on the other.

In the form of the invention illustrated in FIGS. 9 and 10, the leaf spring **160** acts in a similar manner to the spring rod **60**, but the force thereof is applied at a different location with respect to the legs **25**.

I claim:

1. A cradle comprising a receptacle having opposite sides and ends, leg members pivotally mounted longitudinally with respect to said receptacle on horizontal pivots on the lower part of said receptacle and extending downwardly with respect to said receptacle in supporting relation thereto, the leg members at opposite sides being in downwardly diverging relation, the lower ends of the leg members providing fulcrums for engagement with a supporting surface, a power source, an escapement connected to said power source and to one of said leg members, and a resilient member transversely of said receptacle and connected to the lower ends of leg members at opposite sides of said receptacle and applying a restoring force thereto, said resilient member being a rod and having end portions extending downwardly along the lower ends of a pair of leg members below one end of said receptacle, and collars engaging said end portions and said lower ends.

2. A cradle comprising a receptacle having opposite sides and ends, leg members pivotally mounted longitudinally with respect to said receptacle on horizontal pivots on the lower part of said receptacle and extending downwardly with respect to said receptacle in supporting relation thereto, the leg members at opposite sides being in downwardly diverging relation, the lower ends of the leg members providing fulcrums for engagement with a supporting surface, a power source, an escapement connected to said power source and to one of said leg members, and a resilient member transversely of said receptacle and connected to the lower ends of leg members at opposite sides of said receptacle and applying a restoring force thereto, said resilient member being a rod and having end portions extending downwardly along the lower ends of a pair of leg members below one end of said receptacle, and collars engaging said end portions and said lower ends, the lower ends of the leg members having feet thereon in enclosing relation to said collars and rod end portions.

3. A cradle comprising a receptacle having opposite sides and ends, leg members pivotally mounted longitudinally with respect to said receptacle on horizontal pivots on the lower part of said receptacle and extending downwardly with respect to said receptacle in supporting relation thereto, the leg members at opposite sides being in downwardly diverging relation, the lower ends of the leg members providing fulcrums for engagement with a supporting surface, a power source, an escapement connected to said power source and to one of said leg members, and a resilient member transversely of said receptacle and connected to the lower ends of leg members at opposite sides of said receptacle and applying a restoring force thereto, said resilient member being a rod and having end portions extending downwardly along the lower ends of a pair of leg members below one end

of the receptacle, and a stop member engaging said leg members and in enclosing relation to said resilient member.

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