Sept. 24, 1957 D. SAINT ET AL 2,807,309

MOTOR OPERATED SWING

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Fig. 1.

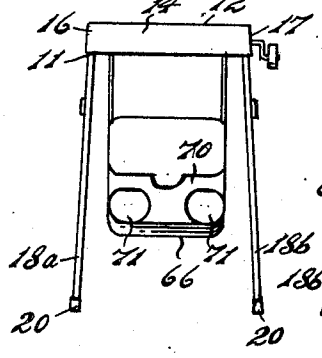


Fig. 2.

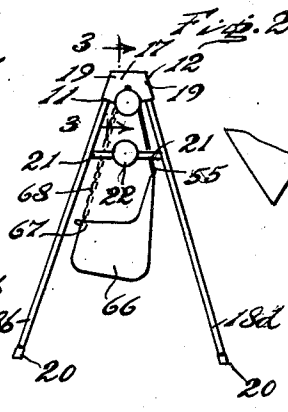


Fig. 6.

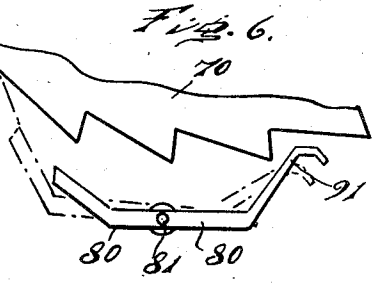


Fig. 5.

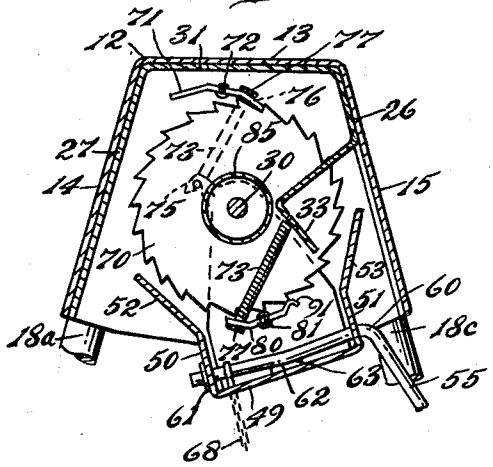


Fig. 4.

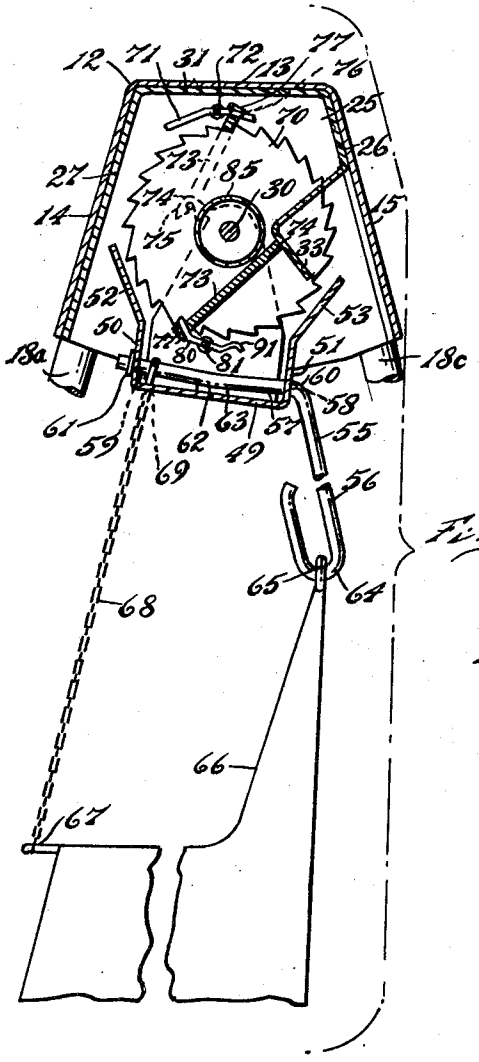
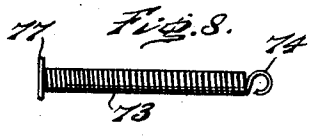


Fig. 7.



Fig. 8.



INVENTORS:
David Saint
Charles Rex Thomas

BY B. T. Wakeman Jr.

ATTORNEY

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MOTOR OPERATED SWING

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Fig. 3.

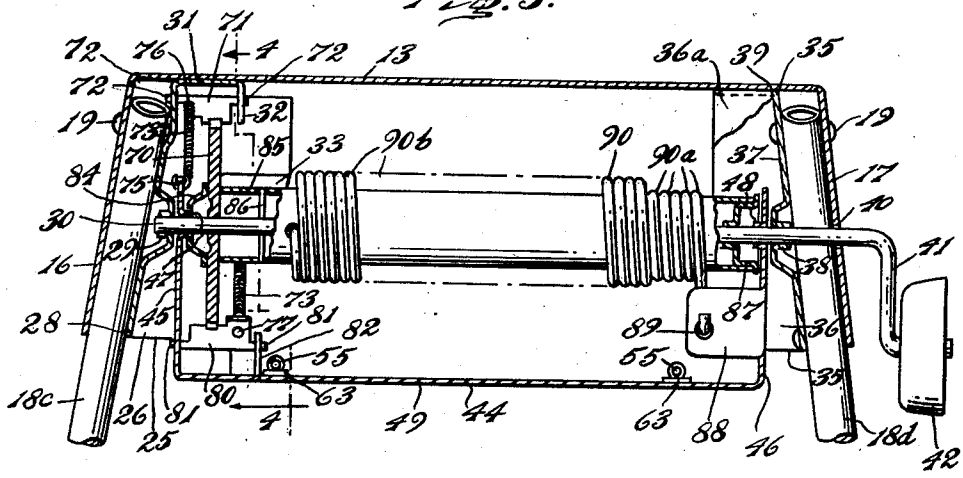


Fig. 9.

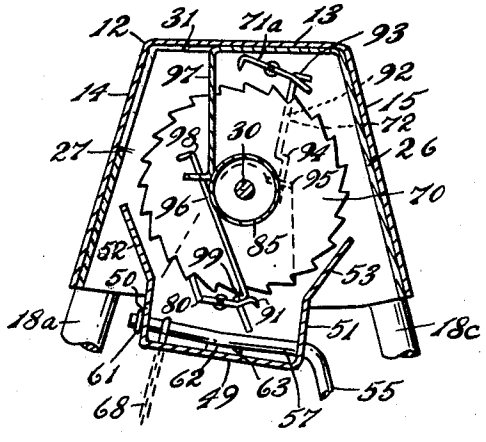
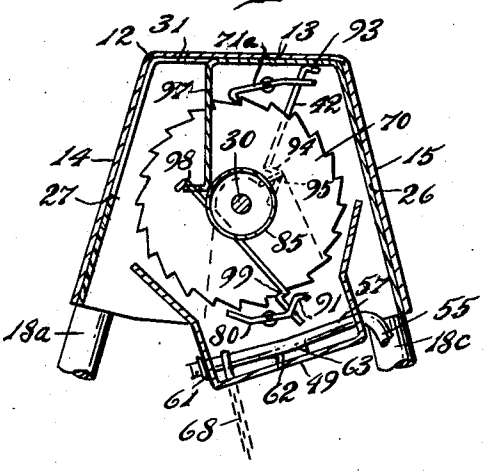


Fig. 10.



INVENTORS:
David Saint
Charles Rex Thomas

BY G. T. Wolcott

ATTORNEY

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MOTOR OPERATED SWING

David Saint, Rockledge, and Charles Rex Thomas, Southampton, Pa., assignors, by mesne assignments, to Graco Metal Products, Inc., Huntingdon Valley, Pa., a corporation of Pennsylvania

Application November 28, 1955, Serial No. 549,433

16 Claims. (Cl. 155—59)

This invention relates to swings, and more particularly to a swing having a built in motor for actuating the swing.

It is the principal object of the present invention to provide a motor operated swing which is relatively simple in construction so that it may be inexpensively constructed.

It is a further object of the present invention to provide a motor operated swing which is relatively safe and free from likelihood of injury to the child using the same as well as to others.

It is a further object of the present invention to provide a motor operated swing having an improved operating mechanism.

It is a further object of the present invention to provide a motor operated swing having an improved spring protective device.

It is a further object of the present invention to provide a motor operated swing having a spring operated ratchet escapement and rewind.

It is a further object of the present invention to provide a motor operated swing having a number of the component parts thereof made of sheet metal stampings.

It is a further object of the present invention to provide a motor operated swing which can be easily assembled and which will be free from likelihood of operating difficulties.

Other objects and advantageous features of the invention will be apparent from the specification 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 front elevational view of a motor operated swing in accordance with the present invention;

Fig. 2 is a side elevational view of the swing shown in Fig. 1;

Fig. 3 is an enlarged vertical sectional view taken approximately on the line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional view taken approximately on the line 4—4 of Fig. 3 and showing the ratchet mechanism in one position of operation;

Fig. 5 is a view similar to Fig. 4, showing the operating mechanism in another position of operation;

Fig. 6 is an enlarged fragmentary view illustrating phases of the operation of the lower ratchet;

Fig. 7 is an end elevational view of one form of spring employed in connection with the invention;

Fig. 8 is a side elevational view of the spring shown in Fig. 6;

Fig. 9 is a view similar to Fig. 4 showing a modified form of ratchet construction in one of its operating positions;

Fig. 10 is a view similar to Fig. 5 and showing the ratchet mechanism of Fig. 9 in a different operating position.

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 swing frame **11** is provided which includes a canopy **12**, preferably formed of sheet metal and having a horizontal top wall **13**, integral inclined front and rear walls **14** and **15**, and integral end walls **16** and **17**. The front and rear walls **14** and **15** and the inclined end walls **16** and **17** are preferably connected at their meeting edges to enhance the rigidity of the canopy **12**.

The end walls **16** and **17** have supporting legs **18***a*, **18***b*, **18***c* and **18***d* pivotally connected thereto, in any desired manner such as by rivets **19**. The supporting legs **18***a*, **18***b*, **18***c* and **18***d* are preferably formed of tubular material and can be provided with lower end feet **20**, of rubber or the like to prevent injury to the surface on which the swing is supported for use.

The legs **18***a*, **18***b*, **18***c* and **18***d* are adapted to be swung for storage to a substantially parallel position, as seen from the side, to downwardly diverging positions with their upper end portions engaging and stopped by the front and rear walls **14** and **15**. Pivotally connected collapsible holding arms **21**, connected by a movement limiting hinge **22**, can be provided for holding the legs **18***a*, **18***b*, **18***c* and **18***d*, in their outward positions but permitting the parallel arrangement thereof for shipping and storage.

An interior end frame plate **25** is provided, having a rear inclined wall section **26** and a front inclined wall section **27** secured to the rear wall **15** and front wall **14**, in any desired manner, such as by spot welding or the like. The frame plate **25** has an inclined end wall section **28** disposed in spaced relation inwardly from and parallel to the end wall **16** and the wall section **28** has formed therein a socket **29** for rotatably supporting a shaft **30**.

The frame plate **25** has a horizontally disposed upper section **31** which can be secured to the top wall **13** in any desired manner, such as by spot welding or the like, to provide rigidity, and has a vertically downwardly extending portion **32**, for purposes to be explained.

The frame plate **25** can also have, as shown in Figs. 3, 4 and 5, a forwardly and downwardly extending spring mounting bracket portion **33** for purposes to be explained.

Within the interior of the canopy **12**, another interior end frame plate **35** is provided, having inclined rear and front wall sections **36** and **36***a* which are preferably respectively secured to the rear and front walls **15** and **14**, in any desired manner, such as by spot welding or the like. The frame plate **35** has an inclined end wall section **37** disposed in spaced relation inwardly from and parallel to the end wall **17**, and the wall section **37** has formed therein a socket **38**, for rotatably supporting the shaft **30**.

The frame plate **35** has a horizontally disposed upper section **39** which can be secured to the top wall **13**, in any desired manner, such as by spot welding or the like, to provide added rigidity and can have the rivets **19** extending therethrough.

The shaft **30** extends through a clearance opening **40** in the end wall **17** and may have an exteriorly accessible crank arm **41** with a handle **42** for turning the same.

The shaft **30** has carried thereon a cradle **44** which has spaced parallel end walls **45** and **46** with journal sections **47** and **48** formed therein. The cradle **44** has a bottom connecting wall section **49**, upwardly extending front and rear wall sections **50** and **51** and outwardly flared wall sections **52** and **53**.

The cradle **44** is adapted to have secured thereto, in any desired manner, a pair of relatively rigid seat actuating pusher arms **55**. The arms **55** have inclined arm portions **56** and an upper end portion **57** which extends

forwardly through an opening 58 in the rear wall section 51, above the bottom wall 49 and through an opening 59 in the front wall section 50.

The arms 55 are held in position by the bent portions 60 which connect the portions 56 and 57 in engagement with the rear wall section 51 and by pins 61 through the end portions 57 in front of the front wall section 50.

In order to provide a rigid connection between the pusher arms 55 and the cradle 44, the upper end portions 57 are each bent to provide, intermediate their extremities, a central depressed part 62, and a pair of centrally disposed upwardly extending bosses 63 in the wall section 49 may be provided with which the parts 62 engage when turned downwardly to operating positions. The pusher arms 55 preferably each have hooks 64 on the lower portions thereof, in which upper portions 65 of a seat 66 are engaged. The seat 66 has a forward extension 67 to which chains 68 are connected, the chains 68 extending upwardly and through openings 69 in the wall section 49 and to and in engagement with the portions 57 of the pusher arms 55.

While the seat 66 may be of any desired type, it is preferred that it have a front section 70 with leg openings 71 through which the legs of the child extend when the child is seated with its back in engagement with the upwardly extending portion of the seat 66 to retain the child in position for swinging.

The shaft 30 has mounted thereon and secured in any desired manner, such as by knurling or the like, a ratchet wheel 70 having a toothed periphery as illustrated in Figs. 3, 4 and 5. An upper ratchet plate 71 is provided, having projections 72 pivotally mounted on the frame section 28 and on the frame section 32, and at one position of the cradle 44 is normally urged by a spring 73 into engagement with the periphery of the ratchet wheel 70 while at another position the ratchet plate 71 is permitted to move out of engagement with the periphery of the ratchet wheel 70. One end of the spring 73, as shown in Figs. 7 and 8, is provided with a hook 74 which is in engagement with a projection 75 provided on the end wall 45 of the cradle 44.

While the spring 73 may engage with the ratchet plate 71 in any desired manner, it is preferred that the ratchet plate 71 be provided with an opening 76 therethrough, for the spring 73, and that the spring 73 have as an abutment, an extra turn 77 of enlarged diameter, as illustrated in Figs. 7 and 8.

A lower ratchet plate 80 is also provided and has a pair of projections 81 which are pivotally mounted in the end wall 45 and in an upward projection 82 from the wall section 49. A spring 73 is also provided, similar to the spring 73 previously described, with a hook 74 in engagement with a spring mounting bracket portion 33 on the frame plate 25. The lower ratchet plate 80 is adapted to be moved, dependent upon the position of the cradle 44, by its spring 73 into engagement with the periphery of the wheel 70 or to retract from such engagement and this in alternation with respect to the upper ratchet plate 71, thereby providing an escapement.

A collar 84 may be provided, secured to the ratchet wheel 70 on one face thereof for positioning the ratchet wheel 70 and the shaft 30. Extending from the other face of the ratchet wheel 70, a tubular portion 85 is provided which serves as a drum. The tubular portion 85 is secured to the ratchet wheel 70 in any desired manner, such as welding, and also, if desired, a pin 86 can be provided extending through the tubular portion 85 and through the shaft 30 for preventing motion between these parts.

The opposite end of the tubular portion 85 has a mounting sleeve 87 secured thereon, in any desired manner, such as by a press fit, for mounting the opposite end of the tubular portion 85 on the shaft 30.

The cradle 44 has an abutment tongue 88 extending therefrom within which one end 89 of a coil spring 90 is engaged. The coil spring 90 is provided with a plurality of turns, indicated at 90*a*, preferably about four to six in number, so as to engage when spring 90 is wound up the exterior of the tubular portion 85 and with the remaining and greater number of turns, indicated at 90*b*, at the same time of larger internal diameter than the external diameter of the tubular portion 85. The other end of the spring 90 is in hooked engagement with the tubular portion 85.

In order to enhance the safety of the structure, and prevent undesirable slipping as well as undesired unwinding of the spring 90, the lower ratchet plate 80 may be provided with a bent or curved portion 91 which will be struck by one or more of the teeth of the ratchet wheel upon rapid movement of the ratchet wheel 70 thereby, and act to impel the ratchet plate 80 into locked or ratchet engaging position.

In the form of the invention shown in Figs. 9 and 10, in place of the springs 73, the ratchet plates 71*a* and 80 are preferably gravity actuated. For this purpose the upper ratchet plate 71*a* has a rod 92 in engagement therewith. The rod 92 has a hooked upper end 93 extending through an opening in the ratchet plate 71*a*, and a downwardly extending portion with an offset 94 which is engaged by a tongue 95 carried by the cradle 44 in one position of the cradle 44, as shown in Fig. 10, and is of sufficient weight to move the ratchet plate 71*a* out of engagement with the ratchet wheel 70 in another position of the cradle, as shown in Fig. 9.

The lower ratchet plate 80 also has an actuating rod 96 in engagement therewith, the rod 96 being slidably carried by a bracket 97 extending from the top wall 31 of the frame plate 25. The rod 96 has a hooked upper end 98 for engagement with the bracket 97 and, as illustrated in Fig. 9, has an offset 99 movable into engagement with the ratchet plate 80 for moving the plate 80 into engagement with the ratchet wheel 70. Swinging movement of the cradle 44 also causes the rod 96 to be positioned at an elevation where the ratchet plate 80 moves out of engagement with the ratchet wheel 70 (see Fig. 10).

The mode of operation will now be pointed out.

The handle 42 is utilized to turn the shaft in a clockwise direction, as seen from the right of Fig. 3, to wind the spring 90. The lower ratchet plate 80 normally tends to prevent undesired unwinding of the spring 90.

If now the seat 66 is moved to start the motion, or if the spring force of the spring 90 should start the motion, the ratchet plates 80 and 71 successively engage and disengage the teeth of the ratchet wheel 70, the springs 73 tending alternately to pull the ratchet plates 80 and 71 into engagement and permit disengagement, as illustrated in Figs. 4 and 5.

It will be noted that the rotation of the hook 75 moves with the cradle 44 towards the rear, controls the resilient actuation for engagement of ratchet plate 71 with the ratchet wheel 70 simultaneously the movement of the cradle 44 towards the rear permits the lower ratchet plate 80 to move out of engagement with the ratchet wheel 70. It will be further noted that the rotation of the hook 75 which moves the cradle 44 towards the front permits ratchet plate 71 to move out of engagement with ratchet wheel 70, simultaneously the movement of the cradle towards the front controls the resilient actuation for engagement of ratchet plate 80 with the ratchet wheel 70. In this manner, and with the ratchet plates 71 and 80 providing an escapement, the cradle 49 and the swinging seat 66 supported thereby will be propelled and oscillated until the spring 90 is unwound.

The action of the lower ratchet plate 80 is illustrated in some detail in Fig. 6. From this it will be seen that upon excessively rapid movement counter clockwise of the ratchet wheel 70, the teeth thereof upon contact with the curved portion 91 and by their impact thereagainst

tend to swing the ratchet plate **80** into engagement with the teeth in a manner which would not occur in normal step by step movement of the ratchet plate **80** which occurs as the cradle **44** swings and in cooperation with the upper ratchet plate **71**.

The provision of the turns **90***a* of the spring **90** prevents turns **90***b* from being wound solid on drum **85**. When the spring turns **90***a* are wound to a tight condition and to what is apparently the utmost extent, by turning of the handle **42**, upon movement of the cradle in a direction further tending to wind the spring **90**, these turns **90***a* function as a clutch overtravel device, permitting some further winding of turns **90***b* thus preventing hook **89** from being over stressed.

We claim:

1. A power operated swing comprising a frame, a horizontal shaft carried by said frame, a cradle member carried by said shaft, a seat supported by said cradle member, a coil spring surrounding said shaft and secured at one end to said cradle member and at the other end in anchored relation to said shaft, a ratchet wheel secured to said shaft, and a pair of ratchet members for alternate engagement with said ratchet wheel, one of said ratchet members being carried by said frame and the other of said ratchet members being carried by said cradle member.

2. A power operated swing as defined in claim 1 in which the frame comprises a canopy, and supporting legs pivotally secured to said canopy.

3. A power operated swing as defined in claim 1 in which the frame comprises a canopy, supporting legs secured to said canopy, and supporting members for said shaft, said supporting members each having aligned shaft receiving sockets.

4. A power operated swing as defined in claim 1 in which the frame comprises a canopy, supporting legs pivotally secured to said canopy, and supporting members for said shaft, said supporting members each having aligned shaft receiving sockets and having portions rigidly secured to said canopy.

5. A power operated swing as defined in claim 1 in which the shaft has a concentric drum secured thereto in which said other end of said spring is anchored.

6. A power operated swing as defined in claim 1 in which the shaft has a concentric drum secured thereto, and said drum has a plurality of turns of said spring which when wound tight come into engagement therewith and at the same time a plurality of turns of said spring in spaced relation thereto.

7. A power operated swing as defined in claim 1 in which the shaft has a concentric drum secured thereto in which said other end of said spring is anchored, and said drum has a plurality of turns of said spring which when wound tight come into engagement therewith and at the same time a plurality of turns of said spring in spaced relation thereto.

8. A power operated swing as defined in claim 1 in which one of the ratchet members has a pivotal mounting and has disposed on one side of the pivotal mounting a ratchet wheel engaging edge and on the other side of said pivotal mounting a curved portion which upon engagement by the teeth of the ratchet tends to impel said ratchet member into ratchet wheel engaging position.

9. A power operated swing as defined in claim 1 in which one of the ratchet members has a pivotal mounting and has disposed on one side of the pivotal mounting a curved portion which upon engagement by the teeth of the ratchet tends to impel said ratchet member into ratchet wheel engaging position.

10. A power operated swing as defined in claim 1 in which one of the ratchet members has a spring in engagement therewith for urging the ratchet member into ratchet wheel engaging position in one position of said cradle member.

11. A power operated swing as defined in claim 1 in which one of the ratchet members has a rod in engagement therewith for urging said ratchet member into and out of engaging position with respect to said ratchet wheel upon movement of said cradle member.

12. A power operated swing comprising a canopy, supporting legs secured to said canopy, spaced end frame plates secured to said canopy, each of said frame plates having a shaft receiving socket, a shaft supported in said sockets, a ratchet wheel secured to said shaft contiguous to one of said frame plates, a drum on said shaft disposed between said frame plates, a cradle having upstanding end portions carried on said shaft contiguous to said frame plates, a seat suspended from said cradle, a pair of ratchet escapement members for alternate engagement with said ratchet wheel, one of said ratchet members being carried by said one of said frame plates and another of said ratchet members being carried by said cradle, and a coil spring mounted on said drum and having one end in engagement with said cradle and the other end in engagement with said drum.

13. A power operated swing comprising a canopy, supporting legs secured to said canopy, spaced end frame plates secured to said canopy, each of said frame plates having a shaft receiving socket, a shaft supported in said sockets, a ratchet wheel secured to said shaft contiguous to one of said frame plates, a drum secured to said shaft and disposed between said frame plates, a cradle having upstanding end portions carried on said shaft contiguous to said frame plates, a seat suspended from said cradle, a pair of ratchet escapement members for alternate engagement with said ratchet wheel, one of said ratchet members being carried by said one of said frame plates and another of said ratchet members being carried by said cradle, a coil spring mounted on said drum and having one end in engagement with said cradle and the other end in engagement with said drum, and ratchet controlling members interposed respectively between said one of said ratchet members and said cradle and between said other of said ratchet members and said one of said frame plates.

14. A power operated swing as defined in claim 13 in which said ratchet controlling members are coil springs.

15. A power operated swing as defined in claim 13 in which said ratchet controlling members are rods.

16. A power operated swing as defined in claim 1 in which a rigid driving member is interposed between said cradle member and said seat.

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