March 13, 1951 E. E. MILLER 2,545,295

SWING

Filed Oct. 22, 1946 2 Sheets-Sheet 1

Fig. 1

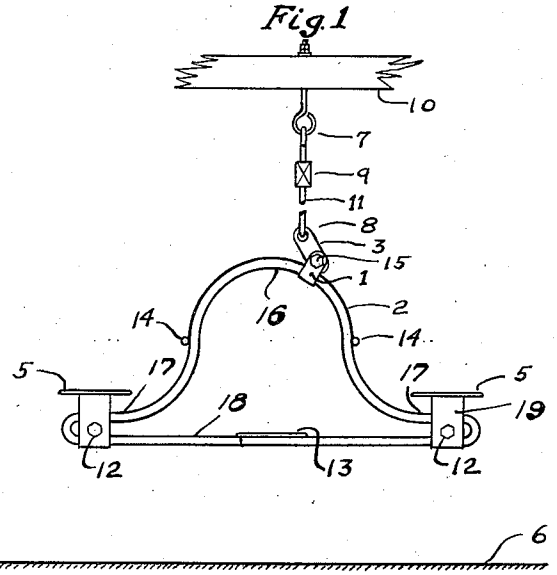


Fig. 2

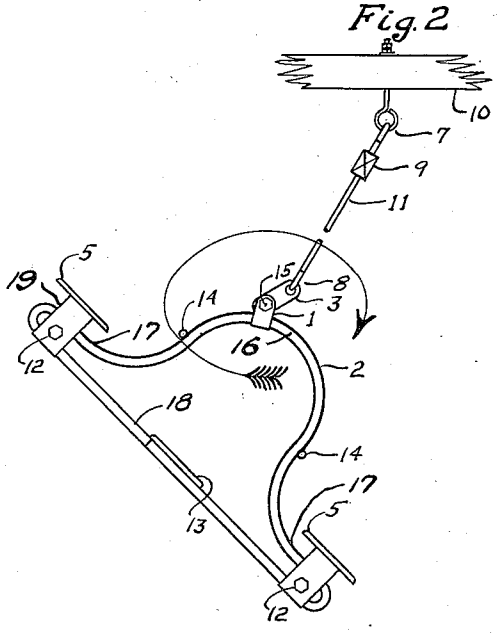
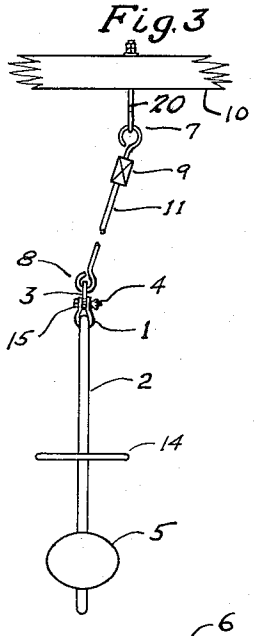


Fig. 3



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SWING

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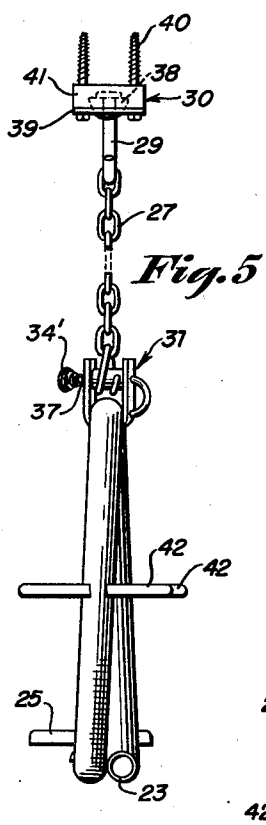


Fig. 5

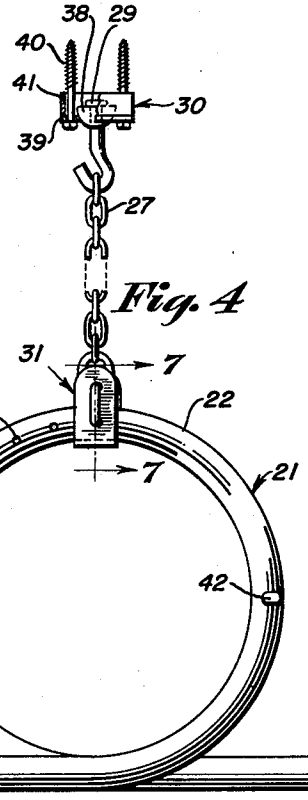


Fig. 4

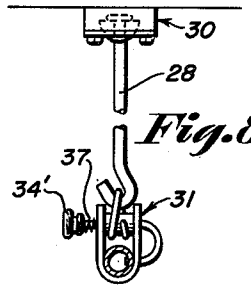


Fig. 8

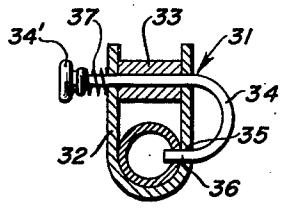


Fig. 7



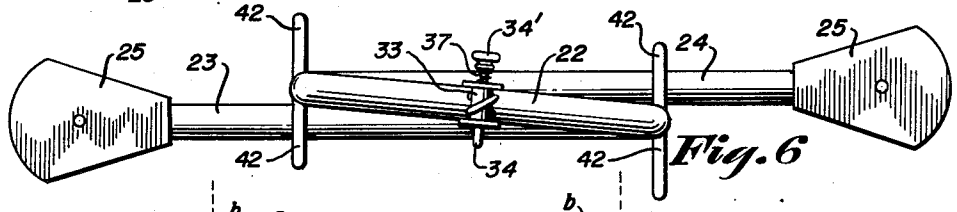


Fig. 6

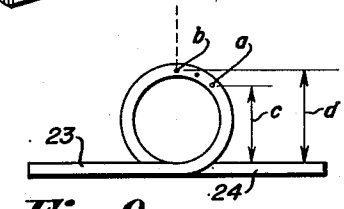


Fig. 9

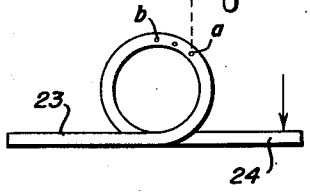


Fig. 11

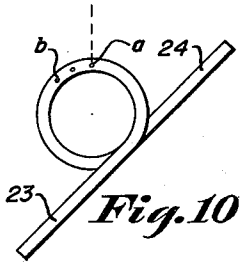


Fig. 10

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SWING

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Application October 22, 1946, Serial No. 705,934

12 Claims. (Cl. 155—62)

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This invention relates to a swing primarily for two riders, characterized by versatility of movements determined and controlled by the cooperative efforts of both riders or resultant from their competitive opposition. The swing is thus a source of stimulating play, exercise, and cultivation of mental and muscular coordination, adapted for home, playground, or gymnasium use.

One of the objects of the invention is to provide a swing comprising a substantially rigid frame having rider stations at opposite sides of its center of gravity, in which a portion of said frame between said rider stations extends above the center of gravity of the loaded swing, said frame being suspended from said elevated portion by single strand means which may be a chain, rod or rope, swingably supported, said frame being tiltable about an axis in its line of suspension at a point above its loaded center of gravity and rotatable about its axis of suspension.

Another object of the invention is to provide, in a swing of the type described, means for adjustably varying the relative distances between the body supporting stations and the axis of tilt of the swing.

A further object of the invention is the provision of a swing of the type described, having means for adjustably shifting the axis of tilt longitudinally of the elevated portion of the frame, to balance the swing for riders of materially different weight, and as an incident thereto, adjusting the distance of the swing from the floor or ground to accommodate the longer legs of the heavier rider.

Other objects of the invention will appear as the following description of practical embodiments thereof proceeds.

This application is a continuation-in-part of my pending application Serial No. 621,232, filed October 9, 1945, now abandoned.

In the drawings, Figures 1, 2 and 3 are views of one form of the invention, in which:

Figure 1 is a side elevation showing the swing horizontal;

Figure 2 is a similar view showing the swing tilted; and

Figure 3 is an end elevation of Figure 2.

Figures 4 to 8 illustrate a modified form of the invention in which Figure 4 is a side elevation, one end portion of the frame being omitted, part of the view being in section;

Figure 5 is an end elevation;

Figure 6 is a plan view;

Figure 7 is a section through the clevis which provides the axis of tilt and adjusts said axis longitudinally of the frame, said section being taken along the line 7—7 of Figure 4;

Figure 8 is an end elevational view of the clevis, showing a rod substituted for a chain as the suspending means;

Figures 9 to 11, inclusive, are related figures showing diagrammatically how the swing is

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bodily elevated under the balance of unequal weights when suspended offset from its symmetrical axis of balanced suspension.

Referring now in detail to the several figures, and first adverting to the form of invention shown in the group of Figures 1 to 3, a frame 2 is provided, formed of a rod or tube symmetrically bent in a vertical plane to provide oppositely disposed end loops forming arms 17, and an upwardly curved bight 16, intermediate the end loops and rising a considerable distance above the end loops in the horizontal position of the swing shown in Figure 1. The lower sides of the end loops are connected by a straight portion 18 of the frame. Seats 5 are adjustably supported by the arms 17 by bolts 12, passing through supporting brackets 19, which engage the sides of the end loops. The seats are adjustable toward or away from the central portion of the swing.

A middle seat 13 is supported upon the straight portion of the frame, as by welding, and transverse handles 14 are welded or otherwise secured to the sides of the bight 16.

The elevated portion of the frame represented by the bight 16 rises to a height which is above the center of gravity of the swing when loaded. A clevis 1, which as shown, is a U-shaped member embracing the arcuate portion of the bight 16, which extends between the handles, being slidable therealong, and is adapted to be clamped thereto in various longitudinal positions of adjustment by means of a tilted cam link 3, pivoted between the sides of the clevis on the bolt 15, the lower side of which comes into clamping engagement with the bight 16 when the upper end of the link is pulled upwardly by the loaded weight of the suspended swing.

The clevis 1 is prevented from loosening and slipping from its position of adjustment by means of the wing nut 4 on the bolt 15, which can be tightened to hold the link frictionally between the sides of the clevis.

The upper end of the link 3 is connected to a suspending rod 11, having a hooked end 8 engaging an eye in the link 3, affording an axis of tilt for the frame 2. The upper end of the rod 11 is connected to a swivel joint 9, which in turn is suspended by means of the eye 7 and eye bolt 20 from a supporting timber or member 10. From the above description it will be readily understood that the swing has the following elementary movements:

(a) The frame can swing on the lower end of the suspension member as a seesaw, by reason of the pivotal connection of the link 3 with the hook end 8 of the suspending rod.

(b) The frame can rock laterally on a horizontal axis at the lower end of the suspension member, by reason of the free connection of the upper end of link 3 with the hooked end 8 of rod 11.

(c) The frame can rotate as a merry-go-round,

around the longitudinal axis of the suspension member, by virtue of the swivel joint 9.

(*d*) The frame and suspension member can swing laterally as a unit in all directions relative to the upper supported end of the suspension member, by means of the eye bolt 20 and hook 7.

(*e*) The frame and suspension member can rotate as a unit in either direction, as a merry-go-round or whirligig, around a vertical axis extending through the upper end of the suspension member, this being possible by reason of the eye bolt 20 and hook 7.

It is apparent that under the concerted or competitive efforts of the riders, the swing is capable of a wide variety of compound movements resultant from the simultaneous execution of any plurality of said elementary movements.

The seats will generally be adjusted to balance the swing for riders whose weights do not differ greatly. Where one rider is considerably heavier and taller than another, the clevis 1 may be adjusted along the bight 16 to an offset position with respect to the symmetrical axis of balanced suspension of the swing. This causes the empty swing to assume a tilted position when in balance, but it is restored to horizontal position when the heavier rider mounts the seats on the high side. This adjustment also lifts the entire swing with respect to the floor or ground level, in a manner which will be fully explained in connection with the description of the second form of the invention, providing an accommodation for the longer legs of the heavier rider.

Referring now to the modified form of invention shown in the group of Figures 4 to 8, the swing frame comprises a rod or tube 21, bent to form a central circular loop 22, the ends of which pass each other at the bottom of the loop substantially in contact, and extend oppositely in a line tangent to the loop, forming arms 23 and 24. These arms have seats 25 secured thereto. The central loop 22 is of such size that its upper portion extends above the center of gravity of the loaded swing. The frame in one quadrant of the loop 22 is shown provided with a series of circumferentially spaced holes 26, one of the holes of the series being in the symmetrical axis of balance suspension of the swing. The frame is suspended at a point materially above a horizontal line passing through the seats, by means of a single strand including a chain 27, Figures 4 and 5, or a rod 28, Figure 8, from the hook end 29 of a universal joint 30, fixedly supported overhead. The lower end of the chain 27 or rod 28, as the case may be, is pivotally connected to a clevis 31, which may be of any desired construction, but as shown, consists of a U-shaped saddle 32, embracing the upper arcuate portion of the loop 22, the sides of which straddle a pivot pin 33. Said sides and the pivot pin have aligned apertures through which a latch bolt 34 passes, having an operating knob 34' at its end. The saddle 32 also has a hole 35, which may be aligned with any of the holes 26 by shifting the clevis, and the latch bolt has a return end 36 slidable through the hole 35 and into any one of the holes 26 with which it may be aligned. A spring 37 held in compression between the knob 34' and the adjacent side of saddle 32, normally holds the return end of the latch bolt in latched position. By pressing the knob 34' against the spring 37, the latch bolt may be retracted into unlatched position.

The shank 29 of the universal joint 30 is pivoted in a radial bore in a hemispherical bearing 38, which rests upon a spherical seat formed in the plate 39, the latter being supported by lag screws 40, which are adapted to be anchored to an overhead timber. A ring shaped spacer 41 intervenes between the timber and plate 39, resting upon the latter, enclosing the joint and preventing the swivel joint from being cramped against the overhead support. The length of the suspending strand is materially greater than the distance of its point of connection with the frame from a horizontal line through the seats.

This form of swing is capable of the full range of movements which attend the first described modification. It has the following elementary movements:

(*a*) The frame can swing on the lower end of the suspension member as a seesaw, by reason of the pivotal connection afforded by the pivot pin 33.

(*b*) It can rock laterally on a horizontal axis at the lower end of the suspension strand, by reason of the freedom of movement of the lower link which embraces the pivot pin.

(*c*) It can rotate as a merry-go-round around the longitudinal axis of the suspension member, by reason of the universal joint at the upper end of the suspension member.

(*d*) The frame and suspension member can swing laterally as a unit in all directions relative to the upper supporting end of the suspension member, by reason of the universal joint 30, and this movement can also take place by reason of the engagement of the upper link of the chain with the hook 29.

(*e*) The frame and suspension member can rotate as a unit in either direction, as a merry-go-round or whirligig, around a vertical axis, extending through the upper end of the suspension member, this being possible either through the universal joint at the upper end of the suspension member or the connection of the upper link of the chain to the hook 29 in that form which discloses the chain.

Although one of the purposes of the invention is to enable the riders to execute movements to discomfit one another, it is nonetheless desirable that the swing shall have inherent stability. Since the axis of tilt is above the center of gravity of the swing when loaded, the latter will tend to return to a position of stability with the frame in a vertical plane, and will not automatically tilt sidewise and dump the riders.

Since the end portions of the frame preferably freely pass one another at the bottom of the loop 22, the loop contributes a certain amount of resiliency to the frame, so that if one end of the swing bumps the ground, the jar communicated to the high rider will be mollified.

Figure 4 shows the clevis positioned to balance the swing with respect to its symmetrical axis of balanced suspension, that is, the lever arms represented by the horizontal distances between the seats and the line of suspension are equal. This position is shown diagrammatically in Figure 9. In the event that the riders are of materially different size and weight, the clevis 31 may be shifted to one of the other holes 26 of the series, thus offsetting the line of suspension from said symmetrical axis of balanced suspension. This causes the empty frame when hanging gravitationally, to assume the tilted position shown in Figure 10. The clevis in its lateral position of adjustment *a* is closer to the line of the arms 23 and 24 than when in its symmetri-

cal position of adjustment *b*, as indicated by the lines *c* and *d* in Figure 9, so that when the heavier rider mounts the high seat and the frame swings to the horizontal position shown in Figure 11, the arms **23** and **24** are at a higher level from the floor or ground than when the frame is symmetrically balanced with respect to its line of suspension, as in Figure 10. This accommodates the height of the swing above the floor or ground to the longer legs of the larger rider.

While I have in the above description disclosed what I believe to be preferred and practical embodiments of the invention, it will be understood by those skilled in the art that the specific details of construction and arrangement of parts, as shown, are by way of illustration and not to be construed as limiting the scope of the invention.

What I claim as my invention is:

1. Swing comprising a frame formed of an elongated member bent intermediately to form a loop and having its end portions extending oppositely from the bottom of said loop forming arms which constitute rider supporting portions, suspending means for said frame secured to the top portion of said loop including a pivot pin extending transversely of said loop providing an axis of tilt for said frame, said pivot pin being above the center of gravity of the loaded swing whereby said frame tends to return to a stable position in vertical plane after having been displaced from stable position.

2. Swing comprising a frame formed of an elongated member bent intermediately to form a closed loop having its end portions freely contiguous at the bottom of said loop and extended in opposite directions constituting rider supporting portions, the top of said loop being above the center of gravity of the loaded frame, pivot means secured to the top of said loop providing a transverse axis of tilt for said frame, and a suspending strand supporting said swing from said pivot means.

3. Swing comprising a frame formed of an elongated member bent intermediately to form a closed loop having its end portions freely contiguous at the bottom of said loop and extended in opposite directions constituting rider supporting portions, the top of said loop being above the center of gravity of the loaded frame, pivot means secured to the top of said loop providing a transverse axis of tilt for said frame, and a suspending strand supporting said swing from said pivot means including a link loosely connected at one end to said pivot pin and at the other to the adjacent portion of said suspending strand.

4. Swing comprising a frame formed of an elongated member bent intermediately to form a closed loop having its end portions freely contiguous at the bottom of said loop and extended in opposite directions constituting rider supporting portions, the top of said loop being above the center of gravity of said frame, means adjustably securable at various circumferentially spaced points to the top of said loop including a transverse pivot pin providing an axis of tilt for said frame, and a suspending strand supporting said frame from said pivot pin.

5. Frame for a teetering play apparatus comprising an elongated structure formed of a bar having its middle portion bent to form a closed helical loop, and having its end portions freely contiguous at the bottom of said loop and extended rectilinearly in opposite directions, rider seats supported by said frame adjacent the ends of said rectilinear extended portions, constructed to permit the feet of riders to extend below the bottom of said frame for moving the apparatus, and suspension means for said frame adjustable about the upper arc of said loop.

6. Frame for a teetering play apparatus comprising an elongated structure formed of a bar having its middle portion bent to form a loop and having its end portions extending rectilinearly in opposite directions from the bottom of said loop, rider seats supported on said end portions, and suspension means adjustably securable at various single points about the upper arc of said loop.

7. Training swing comprising a frame formed with a medial convex part, and oppositely disposed horizontal arms, the convex part being elevated above the arms, seats on said arms, a clip adjustable along the convex part, and suspending means for said frame including a swivel device connected to said clip.

8. Training swing comprising a frame formed with a medial convex part and oppositely disposed horizontal arms, said convex part being elevated above the arms, handle bars extending transversely of the frame and secured thereto intermediate the convex part and each arm, seats on each arm, a clip adjustable along said convex part, and suspending means for said frame including a swivel device connected to said clip.

9. Swing comprising a frame formed with a medial circular part and oppositely disposed horizontal arms, with a bracing member extending substantially parallel with, but spaced from said arms and connecting the outer ends of said arms, seats mounted on brackets adapted to embrace and be adjustably slidable on adjacent portions of said arms and bracing member, a seat fixedly secured on the bracing member medial thereof and below the circular part, a clip adjustably slidable on the circular part, and suspending means for said frame including a swivel device connected to said clip.

10. Swing as claimed in claim 12, including handles on the frame intermediate the circular part and each arm.

11. Swing as claimed in claim 12, including handles secured to the frame intermediate the circular part and each arm, each handle comprising a bar extending crosswise of the frame.

12. Swing comprising a frame formed with a medial circular part and oppositely disposed horizontal arms, with a bracing member extending substantially parallel with, but spaced from said arms and connecting the outer ends of said arms, seats mounted on brackets adapted to be secured to and be adjustably slidable on adjacent portions of said arms and bracing member, a seat fixedly secured on the bracing member medial therewith and below the circular part, a clip adjustably slidable on the circular part, and suspending means for said frame including a swivel device connected to said clip.

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