Dec. 1, 1959 C. N. DELANO 2,915,311

OPERATING MECHANISM FOR AMUSEMENT DEVICES

Filed Jan. 23, 1956 2 Sheets-Sheet 1

Fig. 1

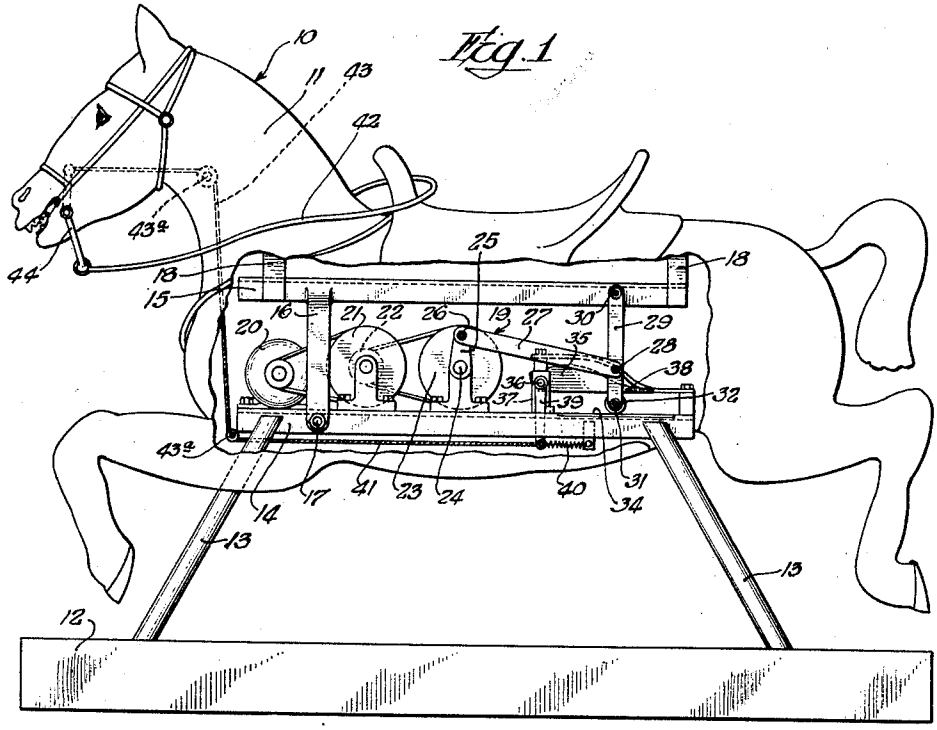

Fig. 2

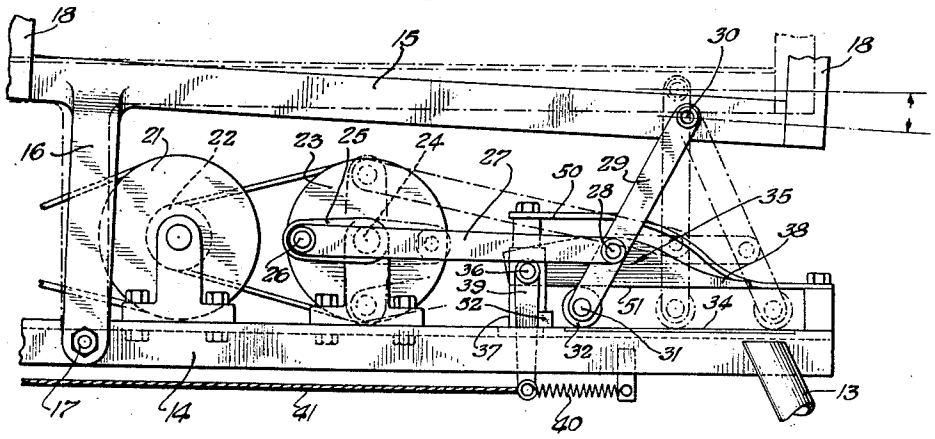

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Fig. 3

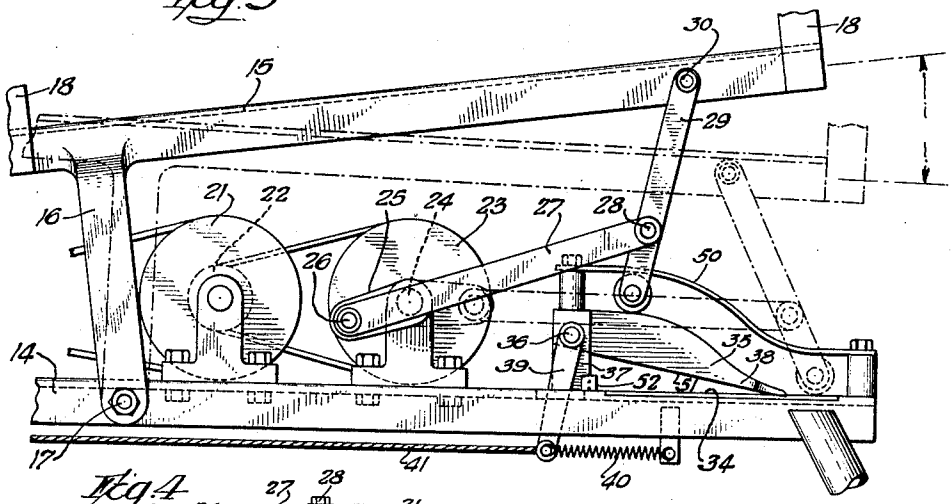


Fig. 4

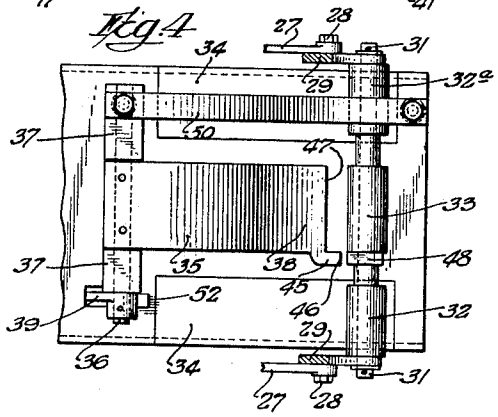


Fig. 5

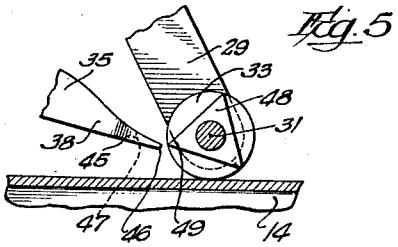
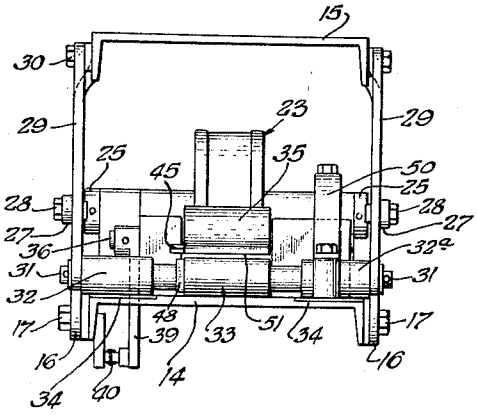


Fig. 6



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2,915,311

OPERATING MECHANISM FOR AMUSEMENT DEVICES

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Application January 23, 1956, Serial No. 560,605

10 Claims. (Cl. 272—53.1)

My invention relates in general to amusement devices and more particularly to an improved operating mechanism for a mechanical horse or the like.

In mechanical horses of the type which a person can ride, it is desirable that the movement simulate as closely as possible that of a real horse. Accordingly, it is desirable to have an operating mechanism capable of producing different motions and different speeds in such combinations as to provide gaits similar to those of a real horse. It is also desirable, that the rider be able to control the mechanism to produce the gait desired.

Although there are mechanisms available which have these capabilities to some extent, they possess certain disadvantages. For one thing, the mechanisms do not produce movements which simulate gaits of a real horse as closely as desirable. Also, these mechanisms are complex and expensive.

Accordingly, it is a major object of my invention to provide an improved operating mechanism for a mechanical horse which produces movements closely similar to those of a real horse.

It is another object of my invention to provide a mechanism capable of producing different motions and speeds in such combinations as to closely simulate gaits of a real horse.

It is also an object of my invention to provide such a mechanism, which will change gaits in response to the movement of reins by the rider.

It is a further object of my invention to provide such a mechanism which is simple to operate and inexpensive to manufacture and maintain.

These and other objects and advantages of my invention will be apparent from the following description thereof, and from an inspection of the accompanying drawings, in which:

Figure 1 is a partially sectioned side elevation of a preferred embodiment of my invention;

Figure 2 is an enlarged side elevation of the actuating mechanism of Figure 1, shown simulating a trotting gait;

Figure 3 is an enlarged side elevation of the actuating mechanism of Figure 1 shown simulating a gallop;

Figure 4 is an enlarged plan view of the actuating mechanism of Figure 1;

Figure 5 is an enlarged side view of the guide and cam mechanism of Figure 1; and

Figure 6 is an enlarged end view of the actuating mechanism of Figure 1.

Referring now to the drawings, and particularly to Figure 1 thereof, the numeral 10 indicates generallly an amusement device having a horse shaped body 11 and a supporting base 12. The supporting base 12 has stanchions 13 which pass through openings in the bottom of the body 11 and support a stationary platform 14 located inside of the body. A frame 15, also inside of the body 11, is mounted above the platform 14 on uprights 16. These uprights are pivotally connected to

the platform at a connection 17 near the forward part thereof, thus rendering the frame movable in relation to the platform. The horse body 11 is mounted on the frame on cross supports 18 and is therefore capable of being rocked forward and backward about the supporting base 12. An operating mechanism 19 is provided to actuate this rocking movement.

In this embodiment, the operating mechanism 19 is mounted inside of the horse body 11 on the platform 14. The mechanism comprises a drive motor 20, a set of reduction pulleys 21 and 22, and a final reduction pulley 23 attached to a rotating shaft 24 which drives two crank arms 25 secured to the ends thereof. The two crank arms 25 are pivotally connected at their outer ends 26 to one of the ends of two elongated links 27, which in turn are pivotally connected at their other ends 28 to the mid-portion of two actuating arms 29. The actuating arms 29 are substantially vertical in their neutral position and are pivotally attached at their upper ends to each side of the frame 15 at rearwardly positioned connections 30.

As shown in Figure 4, an axle 31 connects the lower ends of the actuating arms 29 and has two outer rollers 32 and a center roller 33 rotatably mounted thereon. The outer rollers 32 are positioned, one at each end of the axle, to run back and forth on track surfaces 34 on each side of the platform 14. In this particular embodiment, the track surfaces 34 are horizontal and consist principally of strips of durable non-metallic materiel attached to the upper surface of the platform. Such material is sufficiently pliable to make the action of the outer rollers 32 smooth and quiet.

A movable, inclined ramp 35 is disposed forwardly of the rearmost position of the center roller 33 (see Figures 3 and 4). The forward end of the ramp 35 has a rod 36 affixed thereto which is pivotally mounted on brackets 37. The rear or distal end 38 of the ramp is free to swing up and down about this pivotal mounting. The rod 36 has a lever arm 39 attached thereto, the lower end of which is connected to the platform 14 by a spring 40. The tension of the spring 40 acting through the lever arm 39 and the rod 36 holds the rear end 38 of the ramp in an upward position, out of engagement with the center roller 33 (see Figures 1 and 2).

Also attached to the lever arm 39 is a linkage 41 which connects to reins 42 on the body 11. The linkage 41 includes a flexible cable 43 which is attached to the lower end of the lever arm 39 and is directed by pulleys 43*a* into the horse's head, where it connects to the inside end of a bit member 44. The bit 44 is pivotally mounted in the horse's mouth and has reins 42 secured to its outside ends. When the reins are tightened they draw back on the outer ends of the bit 44. This moves the inner end of the bit forward which in turn pulls the lower end of the lever arm 39 forward by means of cable 43 and lowers the rear end 38 of the ramp 35 so that it may be engaged by the center roller 33 (see Figure 3).

In operation, the drive motor 20 rotates the two crank arms 25 through the reduction pulleys 21, 22 and 23. These crank arms 25 in turn drive the actuating arms 29 through links 27, pendulously about the pivotal connections 30. This causes the outer rollers 32, attached to the lower ends of the actuating arms 29, to travel back and forth along the track surfaces 34. Since the track surfaces are mounted on the stationary platform 14 and the upper ends of the actuating arms 29 are connected to the frame 15, this back and forth movement of the rollers forces the rearward portion of the frame 15 up and down at the pivotal connections 30. This up and down action causes the frame 15 to be rocked forward and backward about the pivotal connection 17 thus rock-

ing the horse body **11** with respect to its supporting base **12**.

Since the maximum upward movement of the connections **30** is reached when the outer rollers **32** are at the center point of their back and forth travel, and maximum downward movement takes place at the forward and rearward end of this travel, the horse body **11** makes two rocking cycles per revolution of the crank arm **25**. This movement simulates a trotting gait.

If the reins **42** are pulled back, the distal end **38** of the ramp **35** is lowered as previously described (see Figure 3). This positions the ramp for engagement by the center roller **33** upon its next forward movement. When the actuating arms **29** are drawn forward beginning a new cycle of operation, the center roller **33** rolls up the ramp **35**, lifting the outer rollers **32** off of the track surfaces **34**. The ramp **35** is constructed to give the rearward pivotal connections **30** greater upward movement than effected by the trotting action, and to give the maximum upward movement at the forwardmost point of travel of the center roller. Thus, the movement of the center roller **33** on the ramp **35** gives a greater magnitude to the rocking action of the body **11** and reduces its frequency one-half; that is, one rocking cycle per revolution of the crank arm **25**. By this movement, the horse simulates a gallop.

When the reins are released, the ramp **35** is returned to its normal raised position out of engagement with the center roller **33** by the tension of spring **40** and the mechanism again causes the horse to simulate a trot.

As will be apparent from the above description of my mechanism, the contours of the ramp **35** and the track surfaces **34** may be modified to give a great variety of different actions to the horse. In this particular embodiment, the ramp **35** is inclined forwardly upward and reaches its highest point a short distance before the center roller **33** reaches its forwardmost point of travel. This gives a dwell effect to the gallop action at its point of maximum rise. Even small variations of this contour will bring about significant differences in the resulting action. It has been found however, that this particular contour gives a good simulation of a horse's gallop.

To prevent the ramp **35** from jamming on center with the center roller **33**, should the distal end **38** of the ramp be only partially lowered at the instant the center roller **33** engages it, a guide and cam arrangement is provided (see Figures 4 and 5). A blade-like guide **45** is attached to one side of the ramp at its distal end **38** with a sharp edge **46** of the guide extending beyond the leading edge **47** of the ramp. A triangular wedge-shaped cam **48** is attached to the axle **31** adjacent the center roller **33** with a sharp edge **49** directed toward the guide. The axle **31** does not rotate so that the cam **48** and its sharp edge **49** are held in the same position regardless of the movement of the actuating arms **29**. Since the guide **45** and the cam **48** present sharp edges to each other, it is impossible for them to jam when they meet. If the ramp is in a partially lowered position when the center roller **33** starts its forward movement, the guide **45** engages the cam **48** before the roller strikes the leading edge **47** of the ramp, and the ramp's distal end **38** is directed either upward or downward depending on which of the two cam surfaces joined at edge **49** is contacted by the guide edge **46**. Since the ramp **35** follows the guide **45**, it is positively positioned either upward or downward before the center roller **33** engages its leading edge **47**. If the ramp is down, the horse gallops, if up, he trots.

Means are also provided to insure that the rollers do not raise off of the track surfaces **34** or the ramp **35**. To keep the center roller **33** from raising off of the ramp during the galloping movement, a limiter **50** is provided over one outer roller **32***a* (see Figures 3 and 4). This limiter **50** is positioned to engage the outer roller **32***a* if the center roller **33** is raised from the ramp, thus restricting the upward movement of the rollers.

During the trotting movement, the under surface **51** of the ramp **35** is positioned just above the center roller **33** when the ramp is in its raised position, by a stop **52** which engages the lever arm **39**. Any upward movement of the outer rollers **32** from the track surfaces **34** is therefore restricted by the center roller's engagement of this under surface **51**.

Although the usual purpose of the mechanical horse such as this is for use as an amusement device, it will be readily apparent from the above description that this horse can also be used for exercising or for learning to ride horseback. The realistic trotting and galloping actions produced by my operating mechanism provide the same muscular workout as an actual horseback ride and serve as an excellent means for instructing someone to ride these gaits without the hazards presented by a live horse.

While the particular embodiment of my invention herein shown and described is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of a presently preferred form of my invention and that I do not mean to limit myself to the construction and design herein shown, other than as defined in the appended claims.

I claim:

1. An operating mechanism for a mechanical horse comprising: a body member pivotally mounted on a base member; an actuating arm attached to said body member for imparting pivotal movement thereto with respect to said base member, said actuating arm having a track roller and a ramp roller rotatably connected to a free end thereof; driving means for moving said free end and rollers to and fro along a first path when unconstrained; a track mounted on one of said members, and defining a second path different from said first path, said track being disposed to engage said track roller and constrain said free end to said second path whereby to translate said to and fro action into a first oscillating motion of said actuating arm to move said body pivotally about said base; a ramp positioned and mounted on one of said members for movement into and out of engagement with said ramp roller; reins mounted on said body for controlling said ramp movement; said ramp, defining a third path different from said first and second paths and when disposed in engagement with said ramp roller constraining said free end to said third path whereby to translate said to and fro action into a second oscillating motion of said actuating arm to move said body pivotally about said base which supplants said first oscillating motion and has a different magnitude and frequency than said first oscillating motion; and limiting means for preventing disengagement of said rollers from said track and ramp.

2. An operating mechanism for a mechanical horse comprising: a body pivotally mounted on a base; reins mounted on said body; a pivotally mounted actuating arm having a track roller and a ramp roller rotatably connected thereto; means connecting said actuating arm to said body; driving means connected to said actuating arm for imparting a pendulous motion to a free end thereof; a generally horizontal track on said base defining a substantially linear path and disposed to engage said track roller and thereby through said actuating arm translate said pendulous motion of said free end into a first rocking action of said actuating arm to move said body pivotally about said base; an inclined ramp positioned and mounted on said base for movement into and out of engagement with said ramp roller, said movement being controllable by manipulation of said reins and operable during operation of said mechanism; said ramp defining a path so contoured that when engaging said ramp roller said ramp disengages said track roller from said track and translates said pendulous motion into a second rocking

action of said actuating arm to move said body pivotally about said base, which second rocking action supplants said first rocking action and has greater magnitude but less frequency than said first rocking action; and means for positively positioning said ramp into and out of engagement with said ramp roller.

3. An operating mechanism for a mechanical horse comprising: a horse-shaped body pivotally mounted on a supporting base; a pivotally mounted elongated actuator for moving said body with respect to said base, said actuator having a track roller and a ramp roller rotatably connected to a free end thereof; means connecting said actuator to said body; a track disposed for engagement by said track roller; a ramp positioned and mounted for movement into and out of engagement with said ramp roller; reins mounted on said body and linkage connected to said ramp for controlling the movement of said ramp into and out of engagement with said ramp roller; driving means connected to said actuator for imparting a to and fro motion to said free end, said to and fro motion causing said track roller to travel on said track, when said ramp is positioned out of engagement with said ramp roller, thereby imparting to said body, through said actuator and connecting means, a first reciprocating action for moving said body with respect to said base, and when said ramp is positioned in engagement with said ramp roller, said to and fro motion causing said ramp roller to travel on said ramp thereby imparting to said body in like manner, instead of said first action, a second reciprocating action for moving said body with respect to said base, having greater magnitude than said first action, but only half the frequency; limiting means for restricting the movement of said rollers away from said track and ramp; a wedge-shaped cam connected to said free end of said actuator adjacent said ramp roller having a sharp leading edge directed toward said ramp; and a guide mounted on said ramp, having a sharp edge directed toward said cam; said cam and guide being adapted to positively position said ramp into and out of engagement with said ramp roller when said ramp roller initially moves toward engagement with said ramp, thus preventing said ramp from being in a partially engaged position when initially contacted by said ramp roller and thereby jamming the mechanism.

4. An operating mechanism for a mechanical horse comprising: a horse-shaped body pivotally mounted on a supporting base; a frame pivotally supported about a platform on an upright connected forwardly on said platform; means connecting said frame and platform to said base and body in such a manner that said body is rocked about said base when said frame is rocked about said platform; an actuating arm secured, at a proximal end, rearwardly on said frame by a pivotal connection, for rocking said frame about said platform; a track roller rotatably connected at a distal end of said actuating arm; a track surface on said platform positioned for engagement by said track roller; a ramp roller rotatably connected to said distal end of said actuating arm adjacent said track roller; an incline dramp mounted and positioned for movement into and out of engagement with said ramp roller; reins mounted on said body and linkage connected to said ramp for controlling the movement of said ramp into and out of engagement with said ramp roller; driving means connected to a center portion of said actuating arm for imparting a pendulous motion to said actuating arm about said pivotal connection, said pendulous motion causing said track roller to travel back and forth on said track surface, when said ramp is positioned out of engagement with said ramp roller, thereby imparting to said frame, through said actuating arm and pivotal connection, a first reciprocating up and down action for rocking said frame about said platform, and when said ramp is positioned in engagement with said ramp roller, said pendulous motion causing said ramp roller to travel back and forth on said ramp thereby imparting to said frame, instead of said first action, a second reciprocating up and down action for rocking said frame about said platform, having greater magnitude than said first action but only half the frequency; said ramp having an under surface adapted to engage said ramp roller, when said ramp is positioned out of engagement with said ramp roller, for restricting the upward movement of said track roller from said track surface; a limiter positioned for engagement with said track roller when said ramp is positioned in engagement with said ramp roller for restricting the upward movement of said ramp roller from said ramp; and means for positively positioning said ramp into and out of engagement with said ramp roller.

5. An operating mechanism for a mechanical horse having a body comprising: a frame secured to the inside of said body; a supporting base having a platform supported thereon and positioned inside of said body; said frame being pivotally supported above said platform on uprights connected forwardly on said platform; an actuating arm having a proximal end secured rearwardly on said frame by a pivotal connection, for rocking said frame about said platform; an outer roller rotatably connected at a distal end of said actuating arm; a track surface on said platform positioned for engagement by said outer roller; a center roller rotatably connected at said distal end of said actuating arm adjacent said outer roller; an inclined ramp mounted and positioned for movement into and out of engagement with said center roller; reins mounted on said body and connected by linkage to said ramp for controlling the movement of said ramp into and out of engagement with said center roller; driving means connected to a center portion of said actuating arm for imparting a pendulous motion to said actuating arm about said pivotal connection, said pendulous motion causing said outer roller to travel back and forth on said track surface, when said ramp is positioned out of engagement with said center roller thereby imparting to said frame through said actuating arm and pivotal connection, a first reciprocating up and down action for rocking said frame about said platform, and, when said ramp is positioned in engagement with said center roller, said pendulous motion causing said center roller to travel back and forth on said ramp thereby imparting to said frame in a like manner, instead of said first action, a second reciprocating up and down action, for rocking said frame about said platform, having greater magnitude than said first action but only half the frequency; said ramp having an under surface adapted to engage said center roller when said ramp is positioned out of engagement with said center roller, for restricting the upward movement of said outer roller from said track surface; a limiter positioned for engagement with said outer roller, when said ramp is positioned in engagement with said center roller, for restricting the upward movement of said center roller from said ramp; a wedge-shaped cam connected at said distal end of said actuating arm adjacent said center roller having a sharp leading edge directed toward said ramp; and a guide mounted on said ramp and extending rearward of the rearmost edge of said ramp, having a sharp edge directed towards said cam; said cam and guide being adapted to positively position said ramp into and out of engagement with said center roller when said center roller initially moves toward engagement with said ramp, thus preventing said ramp from being in a partially engaged position when initially contacted by said center roller, and thereby jamming the mechanism.

6. In a mechanical horse, an operating mechanism comprising: a base frame member; a body frame member movably mounted on said frame member; an actuating member movably mounted one one of said frame members and disposed to engage the other of said frame members; said actuating member having at least a portion thereof capable of reciprocating movement in a generally horizontal direction along a certain fixed path when

unconstrained; drive means for moving said actuating member as aforesaid; a first surface mounted on one of said members and having a different vertical contour than said fixed path of said actuating member for engaging another of said members when said actuating member is moved as aforesaid and constraining said actuating member to translate said movement into a first up and down movement of said body frame member whereby to move said body frame member with respect to said base frame member; a second surface mounted on one of said members and having a different vertical contour than said fixed path of said actuating member and said contour of said first surface; and reversible control means moving said second surface into engagement with another of said members when said actuating member is moved as aforesaid to supplant said first surface and constrain said actuating member to translate said movement into a second up and down movement of said body frame member whereby to move said body frame member with respect to said base frame member, said second vertical movement having a different magnitude and frequency than said first vertical movement.

7. In an amusement device, an operating mechanism comprising: a first member; a second member movably mounted on said first member; an actuating arm pivotally connected to one of said members and having engaging means thereon; drive means for imparting a pendulous motion to said actuating arm; a first track means in said other member forming a path which departs from the path of said engaging means during normal unconstrained pendulous movement of said actuating arm, said first track means being engageable with said engaging means to constrain the pendulous movement of said actuating arm to conform the path of said engaging means to the path of said track whereby a first oscillating movement in a generally vertical direction is imparted to said actuating arm thereby moving said first member with respect to said second member; a second track means in said other member forming a path different from said first track means and said engaging means path during normal unconstrained movement; and reversible control means for moving said second track into enagement with said engaging means to supplant said first track means and constrain the pendulous movement of said actuating arm to the path of said second track means whereby a second oscillating movement in a generally vertical direction is imparted to said arm thereby moving said first member in a different manner.

8. An operating mechanism for a mechanical horse comprising: a base; a body movably mounted on said base; a pivotally mounted actuator for moving said body with respect to said base, said actuator having a roller rotatably mounted on a free end thereof; means connecting said actuator to said body; a track disposed for engagement by said roller; a ramp positioned and mounted for movement into and out of engagement with said roller; control means mounted on said body and connected to said ramp for moving said ramp as aforesaid; driving means connected to said actuator for imparting a to and fro motion to said free end, said to and fro motion causing said roller to travel on said track when said ramp is positioned out of engagement with said roller, thereby imparting to said actuator a first reciprocating action for moving said body with respect to said base, and when said ramp is positioned in engagement with said roller, said to and fro motion causing said roller to travel on said ramp, thereby imparting to said body in like manner, instead of said first action, a second reciprocating action for moving said body with respect to said base, said second reciprocating action differing from said first reciprocating action in both frequency and magnitude; and limiting means for preventing disengagement of said roller from said track and ramp.

9. An operating mechanism for a mechanical horse comprising: a base member; a body member pivotally connected to said base member and disposed thereabove; a pivotally mounted actuator disposed between said members and engaged therewith for pivoting said body with respect to said base, said actuator having engaging means mounted on a free end thereof; a track mounted on one of said members and disposed for engagement by said engaging means; a ramp having a different contour than said track mounted on one of said members and movable into and out of engagement with said engaging means; control means mounted on said body and connected to said ramp for moving said ramp as aforesaid; reciprocating driving means connected to said actuator for imparting a generally horizontal to and fro motion to said free end, said to and fro motion causing said engaging means to travel on said track when said ramp is positioned out of engagement with said engaging means, thereby imparting to said actuator a first generally vertical reciprocating action which pivots said body with respect to said base, and when said ramp is positioned in engagement with said engaging means, said to and fro motion causing said engaging means to travel on said ramp thereby imparting to said body, instead of said first action, a second generally vertical reciprocating action different from said first action for moving said body with respect to said base.

10. An operating mechanism for a mechanical horse comprising: a base frame member; a body frame member pivotally connected to said base frame member; an actuating member disposed between said frame members and in engagement therewith, said actuating member having at least a portion thereof capable of reciprocal movement along a first path which is fixed relative to one of said frame members; drive means connected to said actuating member for reciprocally moving said actuating member as aforesaid; first guide means on one of said members defining a second path different from said first path, said first guide means being disposed to engage said actuating member movable portion and constrain said portion to said second path whereby to translate said actuating member movement into a first pivotal movment of said body frame member with respect to said base frame member; a second guide means on one of said frame members movable into and out of engagement with said actuating member movable portion, said second guide means defining a third path different from said first and second paths and when disposed in engagement with said actuating member movable portion, constraining said portion to said third path whereby to translate said actuating member movement into a second pivotal member of said body frame member with respect to said base frame member, said second and third paths being so correlated that said second pivotal movement supplants said first pivotal movement and has a magnitude and frequency proportional thereto; and control means connected to said second guide means for moving said second guide means into and out of engagement with said actuating member movable portion.

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CERTIFICATE OF CORRECTION

Patent No. 2,915,311 December 1, 1959

Clyde N. Delano

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, line 59, for "incline dramp" read -- inclined ramp --; column 6, line 71, for "one one" read -- on one --.

Signed and sealed this 1st day of March 1960.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents