Aug. 10, 1937. H. G. FISHER 2,089,885

ACTION TOY

Filed March 17, 1937

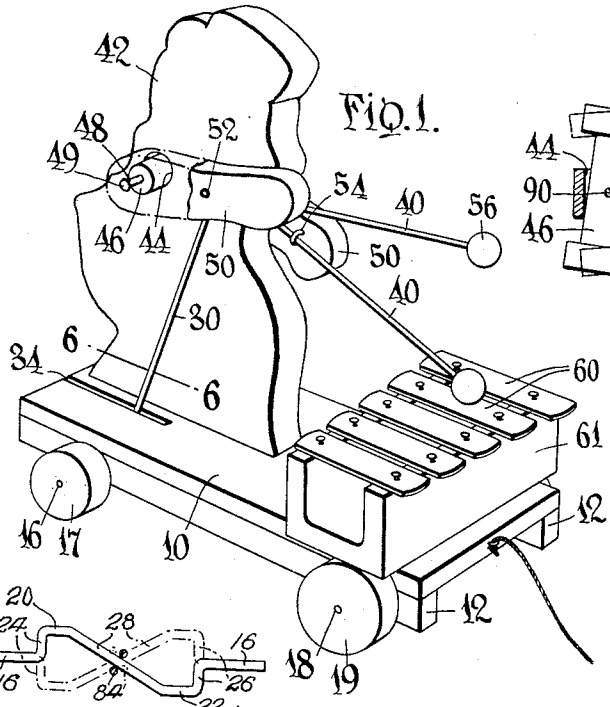


Fig. 1.

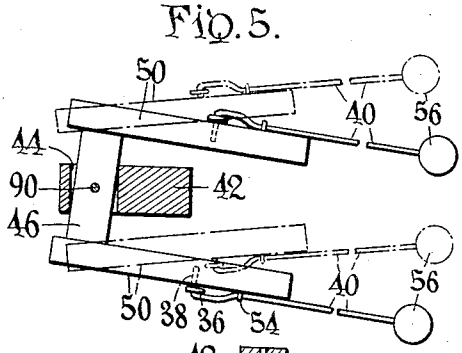


Fig. 5.

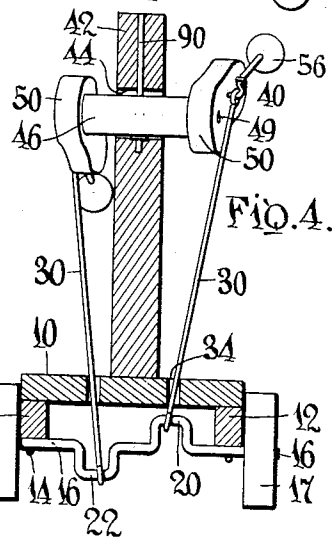


Fig. 4.

Fig. 7

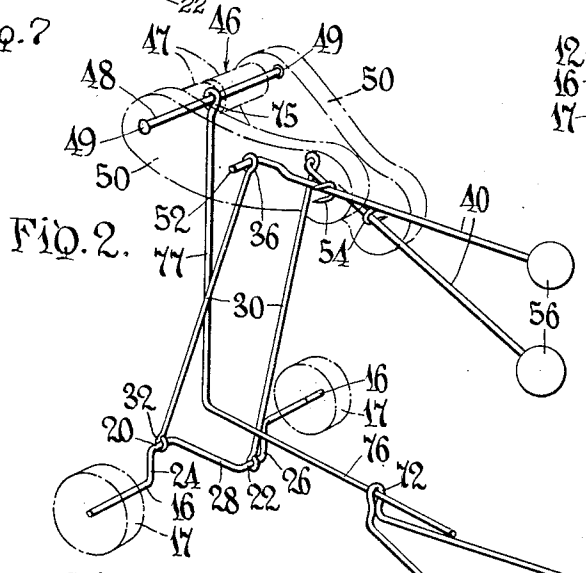


Fig. 2.

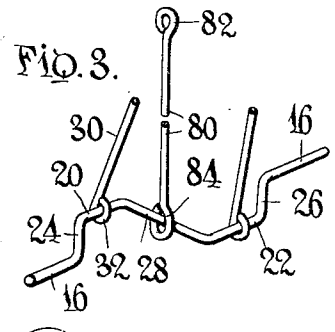


Fig. 3.

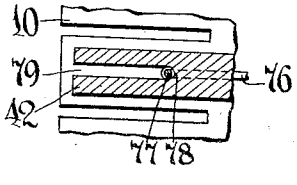


Fig. 6.

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ACTION TOY

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11 Claims. (Cl. 46—99)

This invention relates to toys and more particularly to toys provided with mechanically actuated members.

One object of the invention is to provide an improved toy embodying a simplified mechanism for imparting compound movement to an element thereof.

Another object of the invention is to provide a toy in which movable limbs and axle means are so arranged and connected that rotational axle motion can be translated into various phases of limb motion.

Another object of the invention is to provide a toy having separate phases of limb movement in various cyclic relation one to the other.

One embodiment of the invention is exemplified in a toy including a frame which is mounted upon wheels and axles adapted to be rotated by any suitable means or by drawing the toy across a surface, such as a floor. The axles are rigidly connected to the wheels and are provided with crank portions for the actuation of limbs or other movable elements which are supported upon the frame.

A movable limb element is pivotally mounted in extending relation upon a supporting member, and this limb supporting member is pivotally mounted upon the toy frame for limited oscillatory movement about an axis transverse to the pivotal axis of the limb, and thus the limb can be subjected to compound movements.

The several phases of the limb movement may be provided either in synchronized cyclic relation by linkage connecting it to crank portions of a common axle, or the movement of the limb may be provided in discordant cyclic relation by connecting it through link members to crank portions of axles which rotate at different speeds.

In the drawing:

Fig. 1 is a perspective view of a toy in which the invention is incorporated;

Fig. 2 is a perspective, on a larger scale, of the working elements of the toy;

Fig. 3 is a fragmentary view showing in detail another form of construction of working elements of the toy;

Fig. 4 is a view, partly in elevation and partly in section, of another form of toy structure;

Fig. 5 is a plan of limb elements shown in Fig. 4 and including a section of supporting structure;

Fig. 6 is a fragmentary section taken substantially along the line VI—VI of Fig. 1, and

Fig. 7 is a diagrammatic plan of the structure shown in Fig. 3.

In practicing the invention, a platform or frame 10 is provided with depending flanges 12 and bearing members 14 that can be in the form of staples, or the like, for rotatably supporting a pair of spaced axles 16 and 18 transversely of the frame 10. Wheels 17 are rigidly secured to opposite ends of axle 16, and wheels 19 are likewise secured to the axle 18. An intermediate portion of the axle 16 is provided with offset sections 20 and 22 which are parallel to and disposed upon opposite sides of the axis of rotation of the wheels 17. The offset sections 20 and 22 are joined with the body of the axle by means of substantially radial sections 24 and 26 and an intermediate inclined section 28.

A pair of link members 30, which can be in the form of wires, are each provided at their lower end portions with eyes or loops 32 embracing the offset sections 20 and 22 in rotatable relation, and the link members extend upwardly through guiding slots 34 formed longitudinally in the frame 10. The upper ends of the links 30 are formed with eyes 36 that rotatably embrace inturned finger portions 38 of arms 40 of a toy figure 42. The figure 42 is rigidly supported upon the frame 10 and is provided with a cradle or recess 44 therethrough for loosely receiving a shaft 46 in cradled relation therein. The shaft 46 includes a pair of cylindrical thimbles 47, and a pin 48 which extends axially therethrough and beyond the opposite thimble ends to provide a pair of bearing portions upon which are pivotally mounted a pair of limbs 50. The end portions of the pin 48 are provided with heads 49 to retain the limbs against lateral displacement from the pin 48 without interfering with their pivotal movement thereon.

The limbs 50 are provided with recesses 52 to receive the fingers 38 of the arms 40 in pivotal relation; and guide members 54, each of which may be in the form of a staple having a span or width substantially greater than the width of each arm 40, retain the arms 40 in slide fitting relation against the limbs 50 and permit limited pivotal movement of the arms 40 relative to the limbs 50. The end portions of the arms 40 may be provided with hammers 56 for striking objects such as a group of musical bars 60. A block support 61 is secured upon the frame 10 and the bars 60 are suitably mounted thereon in the conventional manner.

An intermediate portion of the axle 18 is provided with an offset crank section 65 which is embraced in rotatable relation by an eye 67 formed on the outer end portion of one leg of a yoke member 70. The yoke 70 is substantially

V shaped and is provided with a saddle portion 72 at its apex and an eye 74 at the end of the other leg portion for embracing the body portion of the axle 18 in rotatable relation.

An intermediate portion of the pin 48 receives between the inner opposed ends of the thimbles 47 in rigidly embracing relation an eye 75 formed on the upper end of an L-shaped crank member 77 which extends downwardly through a slotted portion 79 of the figure 42 and thence through a recess 78 in the frame 10. The lower portion of the crank member 77 is provided with a crank arm 76 which engages in slide fitting relation the saddle 72 of the yoke 70.

When the toy is rolled across a floor or other supporting surface the wheels 17 rotate the axle 16 and the offset sections 20 and 22 operate the links 30 to impart opposite upward and downward oscillating motions to the limbs 50 about their pivotal connections to the pin 48. The oscillating motion of the limbs 50 cause the hammers 56 to strike against the bars 60. The guide members 54 provide limited lost-motion connections between the limbs and the arms to prevent binding of the operating mechanism when the hammers 56 contact the bars 60 at the end of the striking stroke. In this arrangement the hammers are allowed a limited amount of free recoil from the bars to prevent damping of the musical tones.

The wheel 19 rotates the axle 18, and the offset portion 65 produces a sidewise reciprocatory motion of the saddle end of the yoke 70 which in turn imparts oscillatory rotative movements to the crank 77 about its vertical axis. Thus the movable elements of the toy are pivoted upwardly and downwardly and at the same time are subjected to lateral oscillatory movement.

Fig. 3 illustrates a form of construction in which the crank member 77 is replaced by an actuating member 80 having an eye 82 formed at its upper end similar to the eye 75 for rigidly embracing the shaft 46, and an elongated loop 84 at its lower end for embracing an intermediate portion of the inclined section 28 of the axle 16. As the axle 16 rotates the inclined section 28 describes a path of substantially diabolo contour and causes the actuating member 80 to be oscillated about its longitudinal axis. As shown in Fig. 7 the actuating member 80 is caused to oscillate through predetermined angles about its vertical axis between the full and dotted line positions indicated in this figure. The axis of rotation of the shaft 16 passes substantially through the center of the loop 84 and hence the member 80 is not actuated longitudinally. The elongated shape of the loop 84 permits minor movement of the axle section 28 relative to the longitudinal axis of the member 80. Thus in this construction rotation of the axle 16 provides oscillation of the movable members of the toy upwardly and downwardly and at the same time, laterally.

Figs. 4 and 5 illustrate another form of the invention in which the movable elements of the toy are oscillated in compound phases of movement by use of a minimum number of actuating parts. In this form of the invention the spacing between the offset sections 20 and 22 of the axle 16 and the length of the shaft 46, which determines the spacing of the limbs 50, are so proportioned that the link members 30 are disposed at a substantial angle from the vertical, whereby rotation of the offset sections 20 and 22 about the axis of rotation of the axle 16 produces resultant forces having substantial horizontal components upon the limbs 50. A pin 90 pivotally supports the shaft 46 on the figure 42. The horizontal components of the forces so imposed upon the limbs 50 are directed transversely of the major axis of the toy and in a line disposed forwardly of the pivot point 90. Since the offset sections 20 and 22 are arranged on opposite sides of the axis of the axle 16, rotation of the axle causes the links 30 to reciprocate in opposite directions, and the horizontal components of the forces transmitted through the links cooperate to produce positive turning movements of the shaft and limb assembly about the pivot pin 90. Thus the shaft and limb assembly oscillates laterally as illustrated in Fig. 5, in addition to the upward and downward oscillation of the limbs resulting from the reciprocation of the links 30.

Thus it will be apparent, that in all of the structures shown in the drawing the limbs of the toy are subjected to upward and downward movement in combination with lateral movement for the purpose of flourishing the arms in connection with their striking action. In certain classes of toys it is desirable to alter the cyclic relation of the several phases of limb movement. For example, in a toy such as is illustrated in Figs. 1 and 2, the strikers are caused to move back and forth over a wide range of musical bars, or the like, striking the bars in various combinations and order of repetition, by providing a structure in which the wheels 17 are larger or smaller in diameter than the wheels 19. This provides a discordant cyclic relation between the two phases of limb movement and provides a toy capable of producing musical notes in combinations which can be varied within a relatively wide range.

Although only illustrative structure has been shown and described in detail, it will be apparent to those skilled in the art that the invention is not so limited, but that various changes can be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In an action toy, a frame, a limb supporting member pivotally mounted upon said frame, a limb pivotally mounted upon said limb supporting member, a shaft provided with a crank portion and a portion inclined from the axis of shaft rotation, a link connecting said inclined section and said limb supporting member whereby rotation of said shaft imparts axial oscillatory movements to said link and pivotal oscillatory movements to said limb supporting member in a predetermined plane, and a link connecting said crank portion and said limb at a point spaced from its point of connection to said limb supporting member, whereby said limb is coincidentally subjected to oscillatory movements in directions transverse to said predetermined plane of limb supporting member movement, upon rotation of said axle.

2. In an action toy, a frame, a limb supporting member mounted upon said frame for pivotal movement relative to said frame in a predetermined plane, a plurality of limbs mounted upon said limb supporting member for independent pivotal movements in directions transverse to said predetermined plane, a shaft provided with crank portions and a portion inclined from the axis of shaft rotation, a link connecting said inclined section and said limb supporting member whereby rotation of said shaft imparts axial oscillatory movements to said link and pivotal oscillatory

movements to said limb supporting member in said predetermined plane, and links connecting separately said crank portions and said limb members for oscillatory actuation of said limb members about their pivotal connections to said limb supporting member in directions transverse to said predetermined plane of limb supporting member movement, upon rotation of said axle.

3. In an action toy, a frame, a limb supporting member mounted upon said frame for pivotal movement relative to said frame in a predetermined plane, a plurality of limbs mounted upon said limb supporting member for independent pivotal movements in directions transverse to said predetermined plane, a shaft provided with a plurality of crank portions angularly displaced about the axis of said shaft crank portions and a portion inclined from the axis of shaft rotation, a link connecting said inclined section and said limb supporting member whereby rotation of said shaft imparts axial oscillatory movements to said link and pivotal oscillatory movements to said limb supporting member in said predetermined plane, and links connecting separately said crank portions and said limb members for oscillatory actuation of said limb members about their pivotal connections to said limb supporting member in directions transverse to said predetermined plane of limb supporting member movement, upon rotation of said axle.

4. In an action toy, a frame, a limb supporting member pivotally mounted upon said frame, a limb pivotally mounted upon said limb supporting member, a shaft provided with a crank portion, linkage connecting said crank portion and said limb supporting member whereby rotation of said shaft imparts pivotal oscillatory movements to said limb supporting member in a predetermined plane, a second shaft provided with a crank portion, linkage connecting said crank portion of said second shaft with said limb for oscillation of said limb about its pivotal connection to said limb supporting member upon rotation of said second shaft, and means for rotating said first and second mentioned shafts simultaneously at different speeds.

5. In a pull toy, a frame, a pair of wheeled axles supporting said frame for rolling contact with a floor or similar surface, a limb supporting member pivotally mounted upon said frame, a limb pivotally mounted upon said limb supporting member, a crank portion on one of said axles, means connecting said crank portion to said limb supporting member for imparting oscillative rotation of said limb supporting member about its pivotal support on said frame upon rotation of said axle, a crank portion formed on the other of said axles, and means connecting said second mentioned crank portion to said limb for imparting oscillatory movements to said limb about its pivotal connection to said limb supporting member upon rotation of said second mentioned axle, the wheels of one of said axles being of diameter different from that of the wheels of the other of said axles.

6. In an action toy, a frame, a limb supporting member pivotally mounted upon said frame, a limb pivotally mounted upon said limb supporting member, a shaft provided with a crank portion, linkage connecting said crank portion and said limb supporting member comprising a frame member having a pair of arms extending from a saddle portion and terminating in loop portions, one of said loop portions engaging an axial portion of said shaft, and the other loop portion engaging the shaft crank member, an actuating member including an angular extension adapted to engage said saddle in slide fitting relation, the body of said actuating member engaging said limb supporting member and adapted to be rotated axially by lateral oscillation of the saddle portion upon rotation of said shaft, whereby rotation of said shaft imparts pivotal oscillatory movements to said limb supporting member in a predetermined plane, a second shaft provided with a crank portion, linkage connecting said crank portion of said second shaft with said limb for oscillation of said limb about its pivotal connection to said limb supporting member upon rotation of said second shaft, and means for rotating said shafts simultaneously at different speeds.

7. In a toy, a frame, a member movably mounted upon said frame and having a section disposed in extending relation therefrom for intermittent contact with an element of said toy, said section having a pivotal connection to said member, said section and member having a lost motion connection at a location spaced from said pivotal connection for maintaining said section in contiguous relation to said movable member and permitting limited pivotal movement of said section relative to said movable member, and means for actuating said movable member.

8. In a toy, a frame, a member movably mounted upon said frame and having a section disposed in extending relation therefrom for intermittent contact with an element of said toy, said section having a pivotal connection to said member, said section and member having a lost motion connection at a location spaced from said pivotal connection for maintaining said section in contiguous relation to said movable member and permitting limited pivotal movement of said section relative to said movable member, and a member connected to said pivotal connection for actuating said movable member.

9. In a toy, a support, a stationary figure mounted on said support, a limb supporting member supported solely by said stationary figure and pivotally mounted thereon for oscillating in a predetermined path, a limb pivotally mounted on said limb supporting member for oscillating in directions transversely to said path, means carried by said support for oscillating said limb supporting member in its predetermined path and simultaneously actuating said limb relative to said limb supporting member.

10. A toy comprising a figured support, an arm carrier mounted upon said support for oscillation about a substantially upright axis, an arm having a pivotal connection securing it upon said carrier at a location spaced from the substantially upright axis, an actuating link articulated to said arm at a location spaced from said pivotal connection and being inclined laterally away from said arm, means for actuating said link longitudinally whereby movement thereof lengthwise in one direction imparts a pivotal movement of the arm about said pivotal connection and at the same time imparts lateral movement to said arm about the substantially upright axis of the arm carrier.

11. A toy comprising a figured support, an arm carrier mounted upon said support for oscillation about a substantially upright axis, an arm having a pivotal connection securing it upon said carrier at a location spaced from the substantially upright axis, said pivotal connection having its axis extending substantially laterally of the upright axis to provide upward and downward movement of said arm, a rotatable member having a crank

portion, an actuating link having opposed portions articulated to said arm at a location spaced from said pivotal connection and to said crank portion and being inclined laterally away from said arm, whereby longitudinal movement imparted to the link by the rotatable crank portion imparts a pivotal movement to said arm about said pivotal connection and at the same time imparts lateral movement of said arm about the substantially upright axis.

HERMAN G. FISHER.