July 21, 1953 M. RICHTER 2,645,880

ANIMATED SKATING DEVICE

Filed Sept. 19, 1950 2 Sheets-Sheet 1

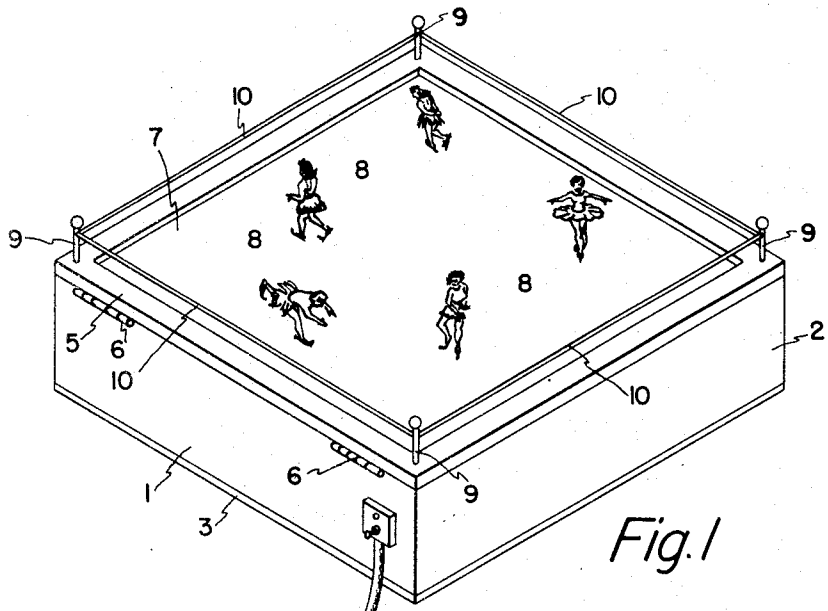


Fig. 1

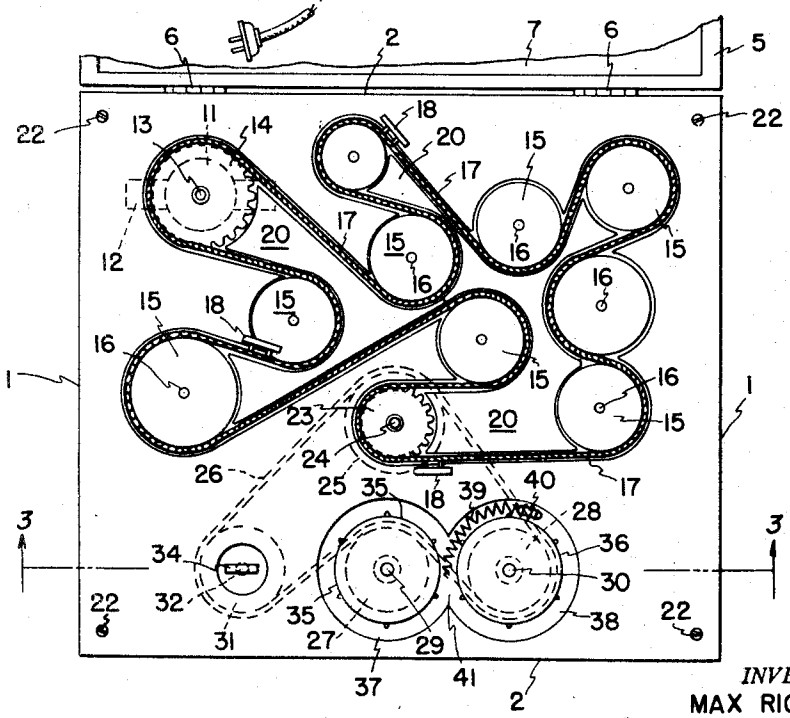


Fig. 2

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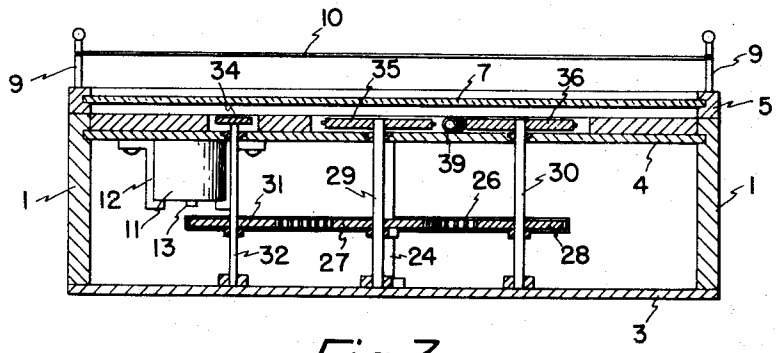


Fig. 3

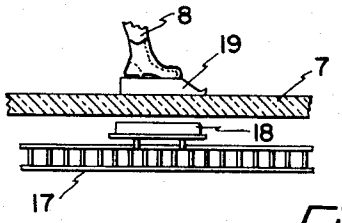


Fig. 4

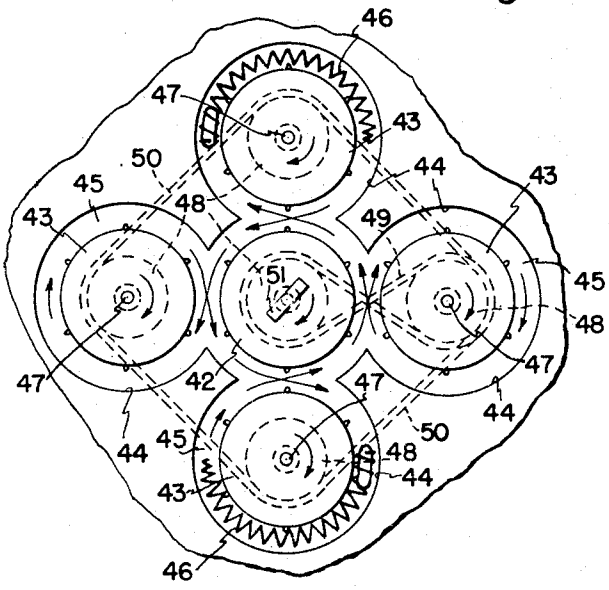


Fig. 5

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UNITED STATES PATENT OFFICE

2,645,880

ANIMATED SKATING DEVICE

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Application September 19, 1950, Serial No. 185,597

5 Claims. (Cl. 46—45)

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The object of the invention is to provide improvements in animated toys and such other devices as are represented by advertising displays, and more specifically in a type that may be driven by an electric motor, but in which there is no physical connection between the motor and the one or more animated figures, that are hereinafter referred to as automatons, this application being a continuation in part of Serial No. 160,677, filed May 8, 1950.

Another object is to provide in its broadest sense the combination of a plate of non-ferrous material such as glass, plastics, certain metals and the like, which do not form a shield or barrier against the free passage of magnetic force, with a magnet movable in a path close to and substantially parallel with one side surface of said plate, means to move said magnet in a predetermined path that crosses itself one or more times during a complete cycle, and an automaton upon the opposite surface of said plate, at least a portion of said automaton being magnetized or magnetizable, and which is caused to move in a parallel path and in accordance with the movement of said magnet, it being understood that instead of a single magnet being employed, two or even more such magnets may be present, if desired, without conflicting with and hindering one another in any way.

A further object is to provide in such a device a partition that is preferably parallel with the plane of said plate, a plurality of idlers carried by said partition, a belt or sprocket chain movable in a path defined by said idlers, motor-driven means to move said belt or chain, a magnet propelled by said belt or chain, filler blocks in the spaces between said idlers and the adjacent courses of said belt or chain, to nominally support said magnet in a fixed plane parallel with respect to said plate, a substantially figure 8 recess spaced from the path of said belt or chain, a spur disc rotatable within each of the enlarged portions of said recess, means to rotate said belt or chain and said spur discs in unison, a flexible element provided with a magnet and engageable by said discs alternately so as to be propelled in a path defined by the walls of said recess in a path that is shaped like a figure 8.

Still another object is to provide in such a device the combination of a plurality of shafts, at least two of which are provided with spur gears or discs, and two of said gears or discs being revolvable within and spaced from the curved sides of a substantially figure 8 recess,

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the larger end portions of which are connected by a restricted cross-path passageway, and one or more flexible elements engageable by said gears or discs and adapted to be propelled through the passageway defined by and between the sides of said recess and said gears or discs, a magnet carried by each such element, a non-ferrous plate spaced above the path of said magnet, and an automaton carried by said plate and having either a magnetized or magnetizable portion adapted to be propelled by said magnet in following a path that is parallel with while spaced from said first-mentioned path.

And a still further object is to provide such a device in which one of said shafts is itself provided with a magnet, that while being rotated is operative to spin another automaton independently of said first-mentioned automatons, the shaft that supports said spinnable automaton being either one of said first-mentioned shafts within the area of the figure 8, or outside of said recess and spaced from such figure, and also, if desired, a sound producing mechanism adapted to be actuated at will by and from one of said shafts, it being understood that reference to a figure 8 recess is by no means intended to limit the invention to an exact figure 8, but is considered in a generic way as including all shapes and forms of crossed paths, such as those hereinafter illustrated and described.

With the objects thus broadly stated, the invention comprises further details of construction and operation, which are hereinafter fully brought out in the following description, when read in conjunction with the accompanying drawings, in which Fig. 1 is a perspective view showing one embodiment of the invention; Fig. 2 is a plan view of the same partially broken away to show the internal mechanism of the subject matter of the invention in combination with the mechanism of said co-pending application; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is an enlarged fragmentary detail showing the relationship of one of the magnets to a portion of one of the automatons; and Fig. 5 represents an arrangement consisting of five spur discs within their respective surrounding guide walls, and together defining a tortuous automaton path that includes numerous crossings or so-called figure 8 relationships.

Referring to the drawings, the device in its preferred embodiment is shown as comprising a casing composed of side and end walls 1 and 2, spanned at their lower edges by a bottom wall 3, and at a substantial distance below the level

of their uppermost edges by a partition 4. Above and resting upon the upper edges of said side and end walls is a hollow frame 5, which in effect normally comprises a continuation of said side and end walls, and which is maintained against lateral movement by any suitable means, as for example a plurality of dowels or by means of hinges 6, that permit said frame to be lifted angularly upwardly in order to expose the interior of the casing for examination, repair and replacement of the various parts of the mechanism hereinafter referred to.

Spanning the otherwise open area surrounded by said frame is an exhibition platform or plate 7 of non-ferrous material, such for example as glass, plastic, or even some metals and alloys of the same, said plate comprising a direct support for, and offering a minimum of resistance to, the passage of automatons supported thereby, such for example as are represented by the skating dolls 8, it being understood that instead of skating dolls, any suitable form or type of automatons may be substituted therefor. If desired, said frame may be provided at least at its corners with upright posts 9, between which either rigid wires or taut cords 10 may be strung, and while serving to represent a fence or other form of guard, function to prevent the automatons from falling from the platform 7, if shaken or jarred from the propelling magnets hereinafter described.

Supported by and depending from the partition 4 is a suitable motor 11, carried by a bracket 12 and having an upwardly extending shaft 13 that projects through said partition, and carries upon its upper end a driving sprocket 14. Also carried by and upon the upper face of said partition is a plurality of idlers 15, directly supported by independent shafts or studs 16 secured to said partition. About said idlers and said sprocket is arranged a sprocket chain (or belt) 17 in a circuitous path, that if desired may simulate the regular and rhythmic to and fro motions of a waltz movement.

One or more magnets 18 is secured in any suitable manner to spaced portions of said chain, and is thus positioned to move with said chain in a plane that is but slightly spaced from and beneath the under surface of said platform 7, upon which rests the dolls or other form of automatons 8 by means of iron or steel, and preferably permanently magnetized, elements such as the skates 19. In this way, movement of the sprocket chain and the individual magnets carried thereby causes duplicate movements of the automatons, as the non-ferrous plate 7, while serving as a firm support for said automatons does not act as a barrier to the free passage of the lines of magnetic force, that characteristically emanate from said magnets in accordance with well known laws.

Functionally said magnets and automatons would operate in the absence of filler blocks, but particularly in view of the fact said magnets extend laterally from the propelling chain, it has been found desirable to provide various shapes of blocks 20, that in appearance and effect provide grooves within which said chain moves, but which in reality merely fill the intervening spaces loosely, and at the same time provide supports for said magnets throughout the path of said chain. Since only the outermost block is secured in fixed position as by means of screws 22, the inner filler blocks may be merely laid loosely in place, as they are of light weight and when necessary may slide slightly in order to adjust themselves to any irregularities of the idlers, chain, etc. This in general comprises the structure disclosed in said original, co-pending patent application.

As for the additions to the original disclosure, in place of one of the idlers there is substituted a sprocket wheel 23 carried by a shaft 24, said sprocket wheel being in mesh with the chain 17. This last-mentioned shaft also carries a second sprocket wheel 25 in engagement with a chain 26, that passes around and in mesh with sprocket wheels 27 and 28, carried respectively by a pair of spaced shafts 29 and 30, said chain also meshing with a separate such wheel 31, carried by a shaft 32 that upon its upper free end carries a permanent magnet 34, above the upper surface of the partition 4 but beneath the plate 7.

The upper portions of the shafts 29 and 30 also extend above said partition and are respectively provided with spur discs or gears 35 and 36, which may comprise ordinary gears of the proper number of teeth, or may be specially designed, but which in either case conform to the spacing of the convolutions of the flexible springlike element 46. These two last-mentioned discs revolve in the enlarged end portions 37 and 38 of a figure 8 recess, the sides of which are radially spaced from said discs sufficient to provide a reversely curved path of the general shape of a figure 8, within which is adapted to move axially one or more flexible elements, each of which consists of a spirally wound wire or similar member 39 to one end of which is secured a permanent magnet 40, while said enlarged recess portions are in communication through a restricted path-crossing connection portion 41.

Said figure 8 recess is spanned and closed by the plate 7, upon which are supported as many automatons as may be desired, each of which is provided with a magnetized or magnetizable base portion 19, as hereinbefore described, and which base portions are propelled by and in accordance with the movement of the revolving magnet 34 in the one case to represent a whirling skater, and by the travelling magnet 40 in another case to represent a so-called figure-skater, these being in addition to, or in lieu of, but in any case independent of the presence and movement of the one or more automatons propelled by the magnets 18 carried by said sprocket chain. It should also be noted that either or both of the shafts 29 and 30 may be provided with revolving magnets similar and in addition to, or in lieu of, the magnet 34 carried by the shaft 32.

Referring to Fig. 5, there is here shown a construction that primarily illustrates the fact that within the scope of the invention more than the two spur discs of Fig. 2 may be employed to provide for intricate forms of movement involving the multiple crossing and recrossing of a single path. In this case there are five spur discs, comprising a central such disc 42 and four circumferentially spaced discs 43 of similar design, within a recess 44 that to an extent simulates a four-leaf clover, and which provides a circuitous path 45 through which one or more flexible elements 46 and their respective magnets wend their way, as indicated by the several arrows. Each of said discs is carried by a shaft 47, which shafts are provided with sprocket wheels 48, connected by chains 49 and 50 in well known manner, in order to provide the movements indicated by said arrows, while any one or more of said shafts may be additionally provided with a magnet 51,

that serves as a means for whirling an automaton about a fixed axis, as in the case of the magnet 34 in Fig. 2, while other automatons move in the to-and-fro path indicated by said arrows above the recess 44.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:

1. The combination of a plane element having a substantially figure 8 recess in its upper surface comprising relatively large end portions and a restricted connecting passageway, with a pair of spaced parallel shafts extending through said element and into the opposite end portions of said recess, a spur disc carried by each of said shafts in said recess, an elongated transversely flexible element provided with a magnet and alternately engageable by the respective discs, whereby said element is propelled in the path defined by and between the walls of the end portions of said recess, first around one of its end portions, then automatically by virtue of its resilient tendency to maintain a rectilinear shape through said connecting passageway, and then around the other end portion, means connecting said shafts for unified rotation, means to drive said shafts, a non-ferrous plate above said discs and said magnet, and an automaton carried by said plate and provided with a magnetically responsive portion adapted to be propelled by and in a path parallel with that of said element.

2. The combination of a plurality of spaced parallel shafts, a spur disc carried by each of a pair of said shafts, a generally figure-eight recess the larger end portions of which contain said discs with a restricted passageway connecting said end portions, an elongated transversely flexible element provided with a magnet and engageable with said discs alternately, said discs cooperating with the walls of said recess to propel said element first around one of the end portions of said recess, then automatically by virtue of its resilient tendency to maintain a rectilinear shape through said passageway, and then around the other end portion of said passageway, a third shaft, a separate diametrically enlarged magnet carried by the upper free end of said third shaft, means connecting and operative to drive all of said shafts in simultaneous rotation, a non-ferrous plate above said discs and said magnets, and a plurality of automatons carried by said plate and provided with magnetically responsive portions, adapted to be moved upon said plate spaced from yet in accordance with said magnets.

3. The combination of a pair of spaced parallel shafts, a spur disc carried by each of said shafts, a wall spaced radially from said discs and having the general shape of a figure 8, an elongated, transversely flexible element provided with a magnet engageable by the spurs of said discs alternately as it follows the path defined by and between said discs and the adjacent portions of said wall, said element being in engagement with said wall and at least one of said discs at all times, means connecting said shafts for unified rotation, means to drive said shafts, and a magnetically responsive automaton free to follow said magnet through the path defined by said wall.

4. The combination of a pair of spaced parallel shafts, a spur disc carried by each of said shafts, a wall spaced radially from said discs and having the general shape of a figure 8, an elongated, transversely flexible element provided with a magnet and maintained by said wall in engagement with at least one of said discs at all times, said element being of sufficient length to bridge the gap between said spur discs, means connecting said shafts for unified rotation, means to drive said shafts, a non-ferrous plate parallel with the plane of said discs, and an automaton having a magnetically responsive portion carried by said plate and actuatable by said magnet to follow the path defined by said wall.

5. The combination of a pair of spaced parallel shafts, a spur disc carried by each of said shafts, a wall spaced radially from said discs and having the general shape of a figure 8, an elongated, transversely flexible element provided with a magnet and maintained by said wall in engagement with at least one of said discs at all times, a third shaft provided upon its upper free end with a diametrically enlarged magnet, means connecting said shafts for unified rotation, means to drive said shafts, a non-ferrous plate parallel with said discs and adjacent to all of said magnets, and automatons having magnetically responsive portions carried by said plate and operative in one case to follow the path defined by said wall, and in the other case being revolvable about a relatively fixed axis adjacent to said shaft.

MAX RICHTER.

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