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SKIPPING TOY

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FIG. 1.

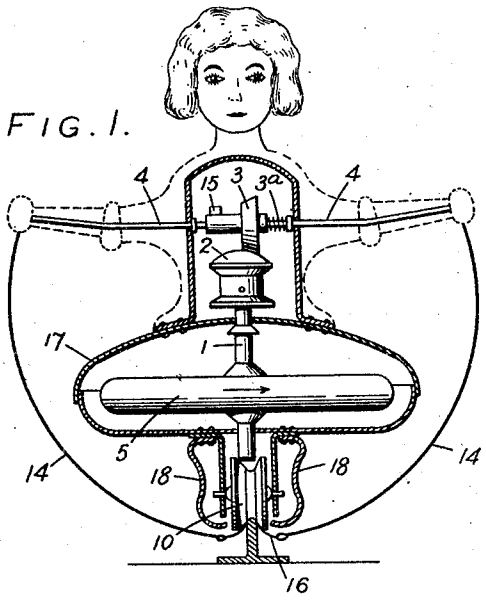



FIG. 2.

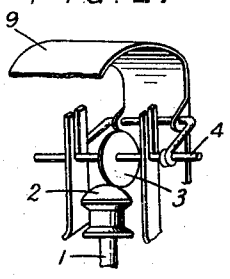



FIG. 3.

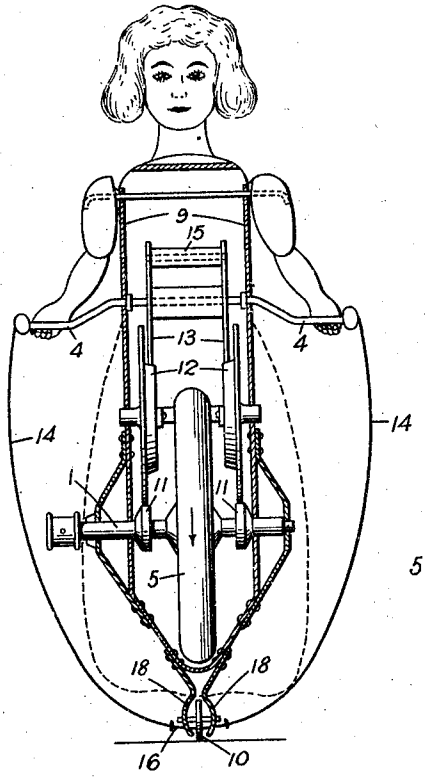
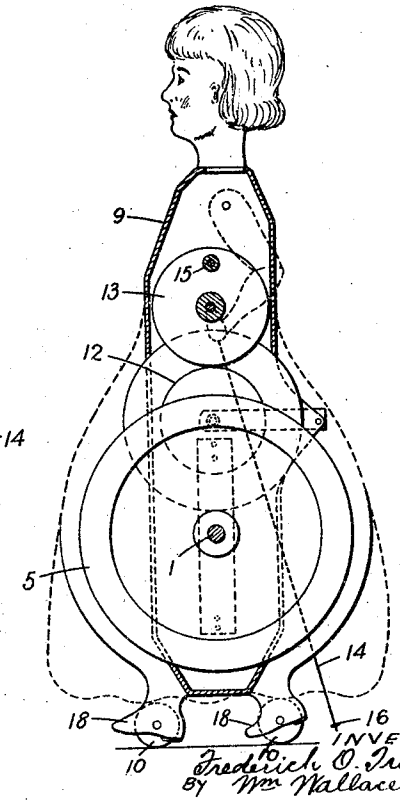



FIG. 4.

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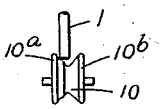

FIG. 5.

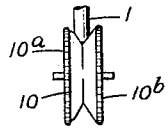

FIG. 6.

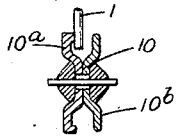

FIG. 7.

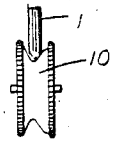

FIG. 8.

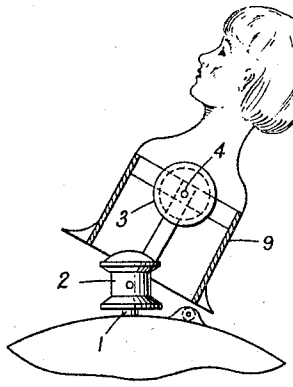

FIG. 9.

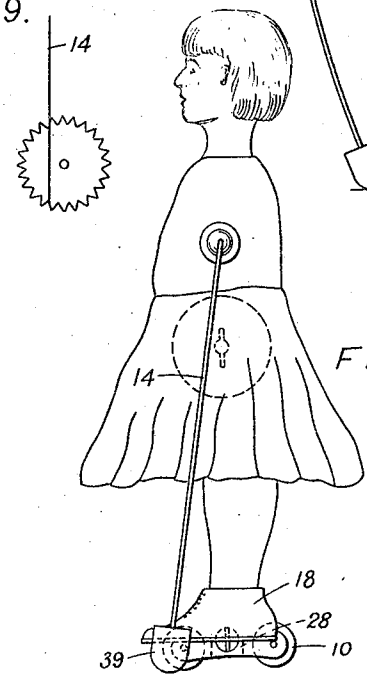

FIG. 11.

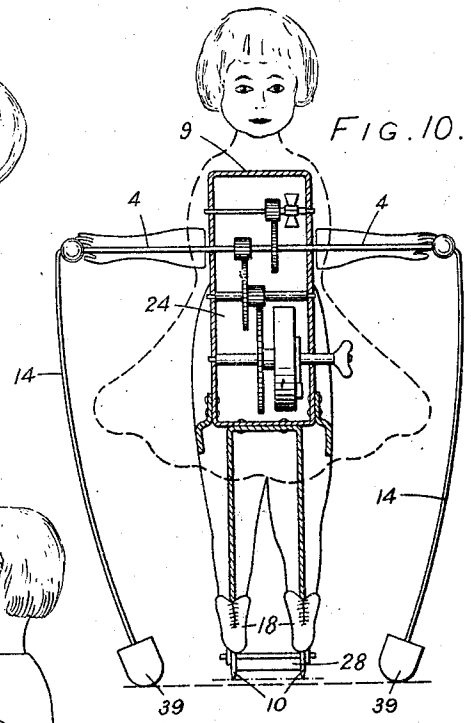

FIG. 10.

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FIG. 13.

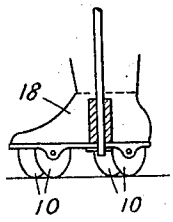



FIG. 34.

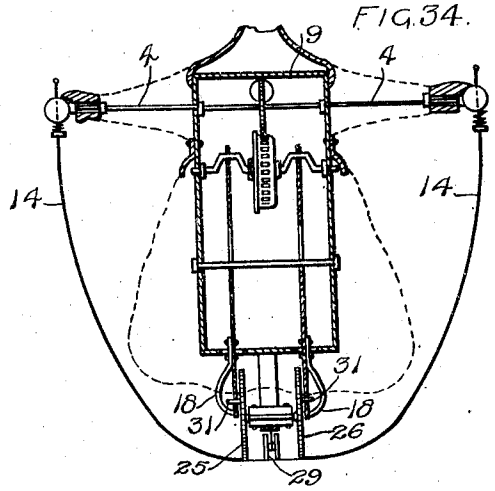



FIG. 12.

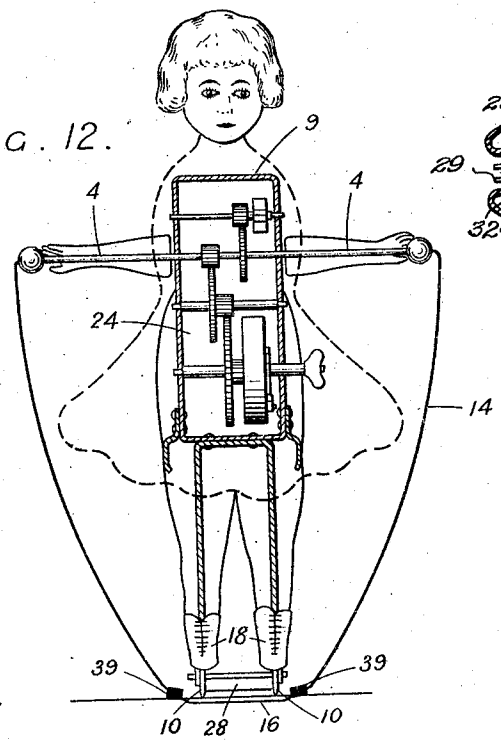



FIG. 35.

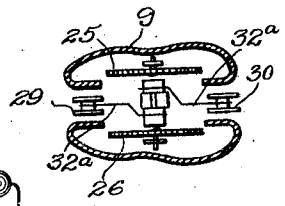
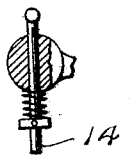



FIG. 36.



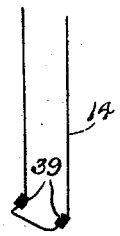




FIG. 14.

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FIG. 15.

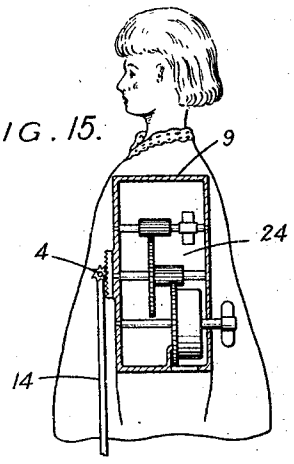



FIG. 16.

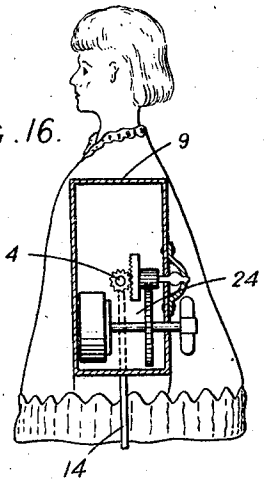



FIG. 17.

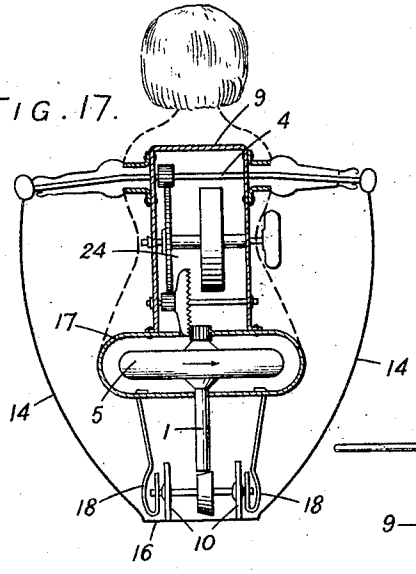
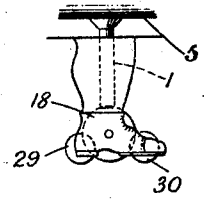



FIG. 18.



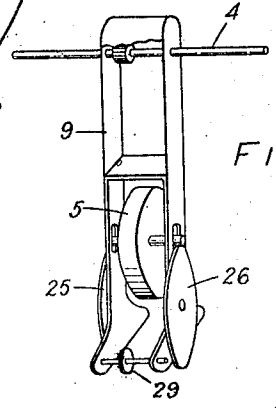




FIG. 19.

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FIG. 23.

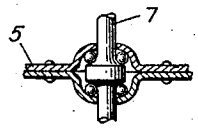



FIG. 24.

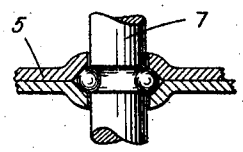



FIG. 20.

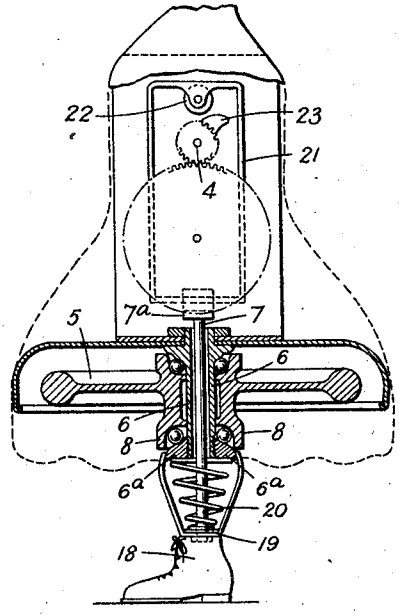
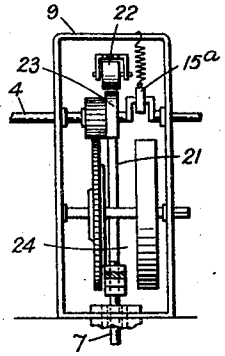



FIG. 21.



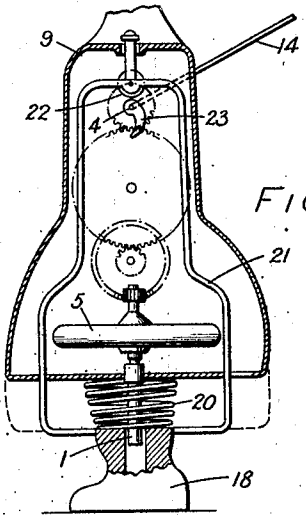




FIG. 22.

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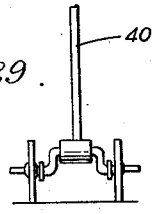
FIG. 25.


FIG. 29.



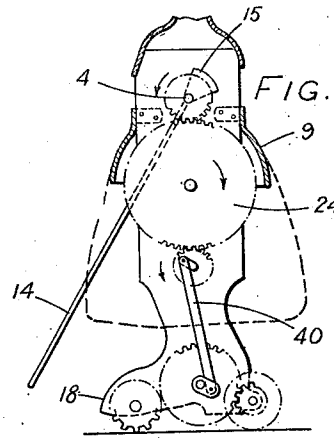




FIG. 26.

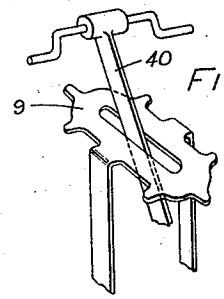



FIG. 27.

FIG. 28.

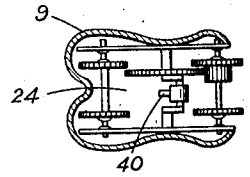



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FIG. 30.

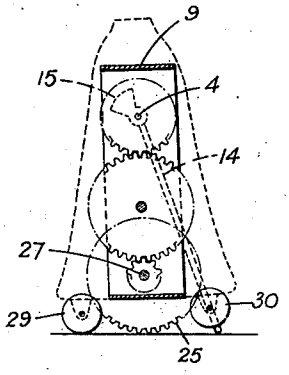



FIG. 31.

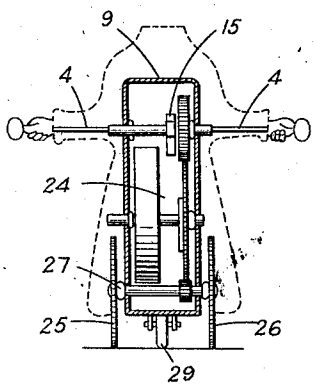



FIG. 33.

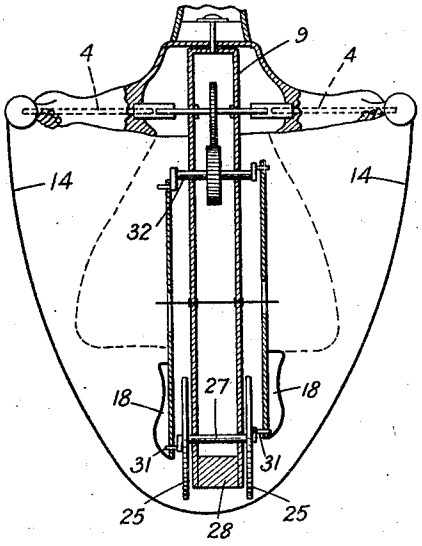
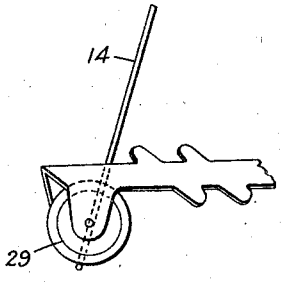



FIG. 32.

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# UNITED STATES PATENT OFFICE.

FREDERICK OTTO TRAUTMANN, OF LEICESTER, ENGLAND, ASSIGNOR TO WONDER TOYS, LIMITED, OF LEICESTER, ENGLAND, A COMPANY OF GREAT BRITAIN.

## SKIPPING TOY.

Application filed October 18, 1922, Serial No. 595,264, and in England November 23, 1921.

This invention relates to skipping toys and has for its object to construct a mechanical toy in the form of a doll or other figure which, when in operation, will maintain itself in an upright or other desired position and will simulate in a realistic manner the action of skipping.

The toy may in some cases be constructed to travel bodily while in operation, in other cases the travelling motion may be eliminated.

The invention consists of a mechanical doll or other figure having combined therewith a device to represent a skipping rope, means to maintain the doll or figure in an upright or other position while in operation, means to impart rotary or oscillating movement to the skipping rope device whereby the action of skipping is automatically simulated, and with or without means to cause or enable the toy to travel bodily.

It is also a feature of the invention that the toy may be constructed in such a manner that the doll or figure will operate with a vertical motion to simulate the action of jumping, which motion, combined with the rotation or oscillation of the rope device produces lifelike effects.

In some cases the skipping rope device consists of a complete loop over which the doll or figure rides or jumps. In other cases the rope device may have a gap in it to pass the base of the toy.

The toy is self-supporting on its own base and for the purpose of maintaining it in an upright or other position, gravity, gyroscopic or other means such as a three or four point contact support may be adopted.

The toy may be caused to travel by gravity or it may be driven by a suitable motor such as a gyroscopic or momentum wheel, spring or clockwork, electric or other means. When the toy is mechanically propelled motion may be transmitted to a supporting wheel or wheels or the action of the skipping rope device may be utilized to impart the travelling movement.

The necessary motion for rotating or oscillating the skipping rope device may be derived from the travelling or driving means either directly or indirectly or the said device may be motor driven and drive the travelling means. When the doll or figure is given a vertical movement to simulate jumping, this movement may be utilized to rotate or oscillate the rope device, or vice versa.

The invention is mainly, though not exclusively, applicable where the frame or body of the toy is found to represent a doll, animal or some similar figure. While the principal object is to actuate a member representing a skipping rope other parts may be actuated such for example as a sunshade or walking stick or one or more parts as the head and arms of the figure may be given an oscillating reciprocating movement.

To enable this invention to be more clearly understood, reference will be made in the following further description to the accompanying drawings, wherein:—

Figure 1 is a front elevation of a skipping doll comprising my invention constructed to travel along a wire by gyroscopic action, the skipping rope, or an attachment thereto, travelling between the wheel on the toy and the said wire.

Figure 2 is a detail view of Figure 1 showing a method of ensuring a light, even and sure contact between the disc and the curved top of the capstan of the gyroscope.

Figure 3 shows a front elevation of a gyroscopic doll adapted to be driven intermittently along the ground by the action of the skipping rope or attachment thereto, catching the travelling wheels.

Figure 4 shows a side elevation of Figure 3.

Figures 5, 6, 7 and 8 show alternative methods of driving the rope travelling wheel from the gyroscope spindle.

Figure 9 shows a method of attaching the bust of the doll to the body so that the gyroscope may become easily accessible for winding purposes, and also a method of easily passing the bow of the skipping rope under the travelling wheels, said wheels having serrations around their periphery.

Figure 10 shows a clockwork operated doll, the rope being broken at the bow, and beads of rubber or the like being pressed on the free ends of the rope, in order to drive the doll intermittently by the contact of said beads with the ground.

Figure 11 is a side elevation of Figure 10.

Figure 12 shows a clockwork operated doll, travel being imparted intermittently

to same by beads of rubber on the rope, the rope in this case passing under the travel wheels.

Figure 13 is a detail view of Figure 12 showing method of attaching travel wheels to feet of doll.

Figure 14 is another detail view of Figure 12 showing construction of the bow of the skipping rope.

Figure 15 shows a method of driving the skipping rope by means of a clockwork motor.

Figure 16 shows an alternative method wherein the horizontal shaft for the skipping rope is disposed centrally.

Figure 17 is a rear view of a clockwork driven doll with a momentum or flywheel combined therewith to drive the travelling wheels.

Figure 18 is a detail side view of the lower part of Figure 17 showing additional wheels to give stability to the doll.

Figure 19 shows the framework of a doll driven by gravity with a momentum wheel provided for stability and provision made for the insertion of a motor if required.

Figure 20 is a sectional side elevation of a motor driven doll adapted to jump as the skipping rope approaches the feet, and fitted with a gyro wheel to ensure normal stability.

Figure 21 is a front elevation of the motor employed in Figure 20 showing the cam employed for imparting the jumping movement to the doll.

Figure 22 shows an alternative method of constructing a jumping doll.

Figures 23 and 24 show alternative methods of forming a ball race for the gyro wheel shown in Figure 20.

Figure 25 shows a method of securing the head of the doll to the body.

Figure 26 shows a motor driven travelling skipping doll provided with a four point contact to ensure normal stability, the travelling wheels being grooved or serrated around their periphery in order to easily pass the rope.

Figures 27, 28 and 29 are detail views of Figure 26 showing respectively the framework for the legs and feet and the connecting rod, a plan view of the doll, and an alternative method of driving the travelling wheels showing the back wheels driven direct by the connecting rod.

Figure 30 shows a motor driven travelling skipping doll provided with a four point contact wheel base, showing the two main wheels placed apart to give lateral stability and two smaller wheels to give backward and forward stability, the two main wheels being grooved or serrated to easily pass the rope.

Figure 31 is a front elevation of Figure 30.

Figure 32 is a detail view of Figure 30 showing the rope about to pass under the front wheel.

Figure 33 shows a gravity driven travelling skipping doll furnished with a horizontal crank-shaft, the cranks thereon being diametrically opposed, a two point contact wheel base, furnished with eccentric pins also diametrically opposed, and legs and feet mounted on said cranks and eccentric pins which gives a vertical movement to each leg and foot alternately to give the doll the appearance of running, the wheel base being weighted to ensure normal stability.

Figure 34 shows a gravity driven travelling skipping doll in which the legs and feet move vertically simultaneously.

Figure 35 is a plan view of Figure 34 showing the method of springing the front and rear wheels thereof in order to facilitate the passing of the skipping rope thereunder.

Figure 36 shows the method of fastening the skipping rope to the hands or the horizontal shaft of the doll in order to give self-adjustment to said rope.

Throughout the drawings like parts are designated by the same reference characters in the several figures where they appear.

According to one manner of carrying out the invention a rotary element suitably mounted in or on the frame or body of the toy is driven by or from a momentum wheel or its spindle in such a manner that it runs at a slower speed than said wheel. This element is used to actuate the movable part of the figure.

For instance, the body or frame of the toy may carry a horizontal rotary spindle which extends through the arms of the doll and has attached to its outer extremities the ends of a **U** shaped wire or equivalent member the bow of which is large enough to pass under the supporting wheel of the toy when the spindle is rotated. Rotation may be imparted to the spindle by friction gear, bevel gear, worm gear or other suitable means from the spindle of the gyroscopic wheel or a driving member thereon.

In a practical form of this subject matter the upper end of the gyroscopic spindle 1 is furnished with a capstan 2 or the like which drives a friction disc 3 mounted on the horizontal spindle 4, said friction disc being pressed into side contact with the capstan 2 by a light spring $3^a$, or alternatively the capstan may be magnetized to maintain driving contact with the disc. According to another arrangement the momentum wheel 5 is mounted to rotate upon a sleeve 6 by means of ball bearings as shown in Figure 20. The sleeve may be rotatable upon a fixed vertical rod or spindle 7, or it may be fixed and form a bearing for the said spindle

and a boss 8 on the gyro-wheel forms a ball race for the said ball bearings. The vertical rod or spindle 7 may constitute the central part of the frame 8. In the event of the sleeve being rotatable it may at its upper end drive the disc 3 on the horizontal spindle 4 and at its lower end be suitably formed to drive the supporting wheel 10. The momentum or gyro-wheel may be disposed either horizontally as in Figure 1 or vertically as in Figure 3 in which latter case rotary movement is imparted to the spindle 4 by means of two small friction wheels 11 situated on the gyro-wheel spindle 1 which frictionally drive the wheels 12, bosses on which latter drive the balanced wheels 13 which are securely fastened to the horizontal rod or spindle 4.

The U-shaped wire 14 representing a skipping rope may be counterweighted in a suitable manner (15, Figure 3) to balance it and facilitate rotation thereof. To facilitate passage of the carrying wheel 10 over the "rope" when travelling on a flat surface a cord 16 or similar section may be inserted at the central part thereof. A small section may be cut out of the bow's centre if desired when the toy is to travel on a wire or rail.

Where an oscillating or reciprocating movement of some part of the body or frame is required, the disc 3 or wheel driven by the spindle or sleeve of the momentum wheel 5, may actuate a crank, eccentric, cam or equivalent device as will be hereinafter described.

To facilitate the travel and mounting of the toy over the skipping "rope", the carrying wheel 10 may have a serrated, fluted or roughened periphery as shown in Figures 6, 8 and 9 or it may have a rubber tire and when the gyroscopic spindle or sleeve is magnetized as before mentioned, in order to obtain an efficient drive of the supporting wheel, the lower end of the spindle or sleeve is made conical and is disposed centrally and points downwards in a V groove in the wheel so as to rest upon both inside edges or flanges of the latter (Figures 5, 6, 7 and 8) one side of the wheel being made of magnetic and the other side of non-magnetic or anti-friction material.

In a convenient constructional form, the supporting wheel 10 is made in halves one side $10^a$ being iron while the opposite side $10^b$ is brass. The two halves are secured together by rivets or in any other suitable manner. The angle of the conical end of the spindle 1 is greater than that of the V groove of the wheel to ensure contact with the latter at the top inside of the groove only.

Another form of the improved toy embodies the feature of a mechanical arrangement which effects the associated movements of the rotation of the skipping rope and an upward bodily motion of the toy which enables it to jump over the rope during each revolution of the latter. In one embodiment of this subject matter the skipping and jumping mechanism is driven by a spring motor and a gyroscopic wheel is wound up and rotated by string. In another embodiment the skipping and jumping mechanism may be driven through a suitable reducing gear from the gyroscopic wheel. Or alternatively a spring motor may actuate both the skipping and jumping mechanism and the gyroscopic wheel.

The jumping mechanism embodies a spring attached at one end to the supporting member of the toy and at the other end to a part capable of movement in relation to said member, and driven means which first gradually move said part relatively to the member to compress the spring and then suddenly release said part whereupon the spring becomes active and moves said part in the reverse direction until on reaching the limits of its recoil or upon the movement of the part being arrested by the supporting member, the latter is lifted bodily.

The impetus imparted in an upward direction to the beforementioned part by the recoil of the spring is sufficient when suddenly transferred to the supporting member to cause tne toy to jump upwards from the surface upon which it has been placed.

Preferably the said part carries the momentum wheel and body or frame of the toy, and the supporting member consists of a central vertical rod or spindle upon which the part slides. The driven means for moving and releasing the slidable part may consist of a rotary cam or mutilated gear wheel operating in contact with a roller or teeth on the supporting member said cam or gear wheel being rotated in unison with the skipping rope so that simultaneously with the upward jump of the toy the rope will pass under the lower extremity of the supporting member.

A convenient constructional form of this subject matter is shown in Figures 20, 21 and 22. The main body or frame 9 of the toy has fixed on the lower part thereof a sleeve 6 having revolubly mounted on the exterior thereof (preferably by ball bearings, Figure 20) a freely rotatable momentum wheel 5 the casing or covering 17 of which may resemble the whole or part of the skirt of the figure. The sleeve 6 is slidable up and down upon a central vertical rod 7 which at its lower extremity is formed or provided with a foot or feet 18 upon which the toy is to stand. Situated between a collar or flange $6^a$ on the lower end of the sleeve 6 and a collar or flange 19 near the lower end of the central rod 7 is a compression spring

20 having its opposite ends suitably attached to the respective collars or flanges. The upper end of the central rod 7 projects into the hollow part of the body and is securely fastened to a frame 21 which latter carries a roller 22 with which the periphery of a snail cam 23 attached to a horizontal spindle 4 engages. This spindle passes right through the body and extended arms of the figure and carries the skipping "rope" 14 as hereinbefore described, the bow of said rope being large enough to pass under the feed of the doll.

The spindle is driven by suitable gearing actuated by a spring motor 24 of the usual clockwork type fixed within the body. Rotation of the spindle causes the skipping "rope" to revolve and the cam 23 on said spindle by acting against or under the roller 22 depresses the sleeve 6 and body 9 against the spring 20 until the nose of the cam passes the roller whereupon the sleeve is moved upwards on the central rod 7. The upward movement of the sleeve on the rod may be limited by the spring or by a collar or shoulder $7^a$ on the rod.

To prevent the spindle racing after release of the cam from the roller a suitable brake or resistance device $15^a$ may be provided.

An alternative construction is shown in Figure 22 in which the momentum wheel 5 is driven by the spring motor, and the lower end or base of the frame or body 9 acts as a collar or shoulder in place of the flange $6^a$ of the sleeve 6 as shown in Figure 22. The frame 21 carrying the roller 22 is fastened directly to the feet 18 thus eliminating the central rod 7 and the body rises and falls with the gyro-wheel and spindle 1.

In another form of the improved toy the doll or figure is mounted to run on a pair of wheels 25 and 26 arranged side by side on a suitable axis 27 to afford lateral support, the figure being maintained upright by a weight 28 disposed below the axis of the wheels.

A horizontal shaft 4 running through the arms of the doll carries the skipping rope as hereinbefore described, said shaft being rotated either by a momentum or gyro-wheel 5, by a spring motor 24, or from the supporting wheels 25 and 26 by means of gravity, and may be driven either by a train of gears or by an elastic band running round pulleys, said means being conveniently housed within the body or frame 9 of the toy.

In another form of the invention the doll or figure is mounted upon two pairs of wheels arranged one behind the other the wheels in each pair being spaced apart to give lateral stability to the toy. The wheels thus support the doll or figure on a four point contact. The axles of the running wheels are driven by a gear wheel meshing with pinions thereon the said gear wheel being actuated by a spring or other motor conveniently applied.

Instead of using two pairs of running wheels, one pair of wheels 25 and 26 laterally spaced apart may be used in combination with a single wheel disposed in front or rear of said pair and providing a three point contact, or we may use a pair of wheels 25 and 26 side by side spaced apart to give lateral stability and a pair of wheels 29 and 30 in alignment with each other between the first pair to give stability in a forward and backward direction on the principle of a four point contact.

In this latter form the two wheels 29 and 30 may be so disposed that they both just clear the floor as shown in Figures 30 and 32.

In traveling the front wheel 29 rides on the floor while the back wheel 30 rides free. Upon the rope reaching the wheel 29 it pases under same, and tilts the figure backwards on to the wheel 30, and the reverse operation occurs upon the rope passing under the back wheel 30, thus imparting to the figure a swaying or rocking motion during operation.

The doll or figure may have an up and down movement imparted to its nether limbs to simulate the action of running or walking. In order to bring this into effect the main wheels 25 and 26, which are preferably serrated or grooved, are fitted with eccentric pins 31 upon which the feet 18 of the figure are loosely mounted, the other or upper end of the leg being mounted upon a cranked horizontal shaft 32 geared to the skipping rope spindle 4. The cranks may be arranged to operate the legs and feet simultaneously as in Figure 34 or alternately as in Figure 33, and the smaller wheels 29 and 30 may be mounted on springs $32^a$ as shown in Figure 35 in order to facilitate the passing of the skipping rope thereunder.

The doll may be driven by a spring or electric motor by means of a momentum or gyro-wheel, by gravity, or it may be driven intermittently by means of the skipping rope. For instance, in the forms shown in Figs. 10, 11 and 12, travelling movement is imparted to the doll by the skipping rope device which is driven by a clockwork motor and makes contact with the ground at each revolution. To increase the propelling effect of the skipping rope device beads 39 may be inserted thereon for making contact with the ground, said beads being preferably made of rubber or the like.

In cases where the bow or like device representing the skipping rope passes underneath the running wheels of the toy it may be furnished at the extremity of the bow with an inserted section of rubber, cord, or

some other suitable material 16 which will facilitate the passage of the wheels thereover.

In cases where the supporting wheels are grooved to run along a cord or wire the skipping rope is cut open at the bow to form a gap to pass said supporting wheels.

The carrying wheels may be driven by gears from the motor or the like or by means of a connecting rod 40 as shown in Figures 26–29.

As previously mentioned herein, the rotation of the rope device may be utilized to impart a vertical movement to the doll to simulate jumping. This is readily effected by making the rope device long enough to strike the ground so that its impact lifts the doll bodily. In such case, the rope device may be made either with stiff sides or in the form of a complete wire bow, such as that shown in Fig. 33 and while in this view, the rope device is shown operated by gravity actuated gearing, yet it is within the purview of the invention to substitute a motor driven gearing for the said gravity actuated gearing, a small amount of clearance being provided between the inside of the wire bow and the wheels upon which the doll stands. The wheels, may, however, be omitted in which case the doll stands upon its own feet in the same manner as the forms shown in Figs. 20 and 22.

The skipping rope device, during rotation, strikes the ground just in front of the doll's feet, its impact with the surface upon which the doll stands lifting the doll so that the skipping rope device passes thereunder. The doll is thus caused to jump over the loop and the contact of the latter with the ground impels the doll forward. As during operation, the doll maintains its own equilibrium and stands upon its own foot base, the result is that the action of skipping is simulated in a realistic manner. The foot base upon which the doll stands, whether provided with wheels or not, is preferably formed to provide a four point contact with the ground.

While I have described in the foregoing specification the construction of parts and operation preferred, I am aware that numerous changes of construction and operation may be made without departing from the spirit and scope of the invention, and I therefore do not wish it to be understood as limiting myself by the positive terms employed in connection with the description excepting such as the state of the art may require.

What I claim then is:—

1. A mechanical toy consisting of a figure adapted to be self supporting in operation on its own base and having combined therewith a device representing a skipping rope rotatable about the figure and having stiff side portions slightly longer than the distance from the axis of the skipping rope device to the lower end of the figure, and means located within the figure to effect movement of said device about the figure whereby the action of skipping is automatically simulated.

2. A mechanical toy consisting of a figure having combined therewith a device to represent a skipping rope rotatable about the figure and having stiff side portions slightly longer than the distance from the axis of the skipping rope device to the lower end of the figure, supporting means to maintain the figure in an upright position while in operation, and means located within the figure to impart rotary movement to the skipping rope device whereby the supporting means are caused to pass over the said device so that the action of skipping is automatically simulated.

3. A mechanical toy consisting of a figure provided with a rotary mechanically driven member representing a skipping rope and rotatable about the figure and having stiff side portions slightly longer than the distance from the axis of said member to the lower end of the figure, which member by impact with the surface upon which the figure maintains its own equilibrium lifts the figure so that the member passes thereunder thereby simulating the action of skipping, and means carried by the figure in the skipping movements thereof for rotating the said member.

4. A mechanical toy consisting of a figure provided with a rotary mechanically driven member representing a skipping rope rotatable about the figure and having stiff side portions slightly longer than the distance from the axis of the member to the lower end of the figure which member by impact with the surface upon which the figure maintains its own equilibrium imparts to the figure a simultaneous lifting and progressive movement thereby simulating the action of skipping, and means carried by the figure in the lifting and progressive movement thereof for rotating the member.

5. A mechanical toy consisting of a figure provided at the foot with means to rest upon the supporting surface upon which the figure is placed, a mechanically driven member representing a skipping rope and rotatable about the figure and having stiff side portions slightly longer than the distance of the axis of the member from the lower end of the figure, said member being rotatable about the figure and acting by impact upon the said supporting surface to lift the figure and cause it to jump over the member and thus simulate the action of skipping, and means located within the figure for rotating the said member.

6. A mechanical toy consisting of a figure

having combined therewith a body frame, a horizontal rotary spindle passing through said frame, a U-shaped member representing a skipping rope and having its ends attached to the horizontal rotary spindle, said member having stiff side portions slightly longer than the distance of the horizontal spindle from the lower end of the figure, a motor located within the figure and gearing to impart rotation to said spindle.

7. A mechanical toy consisting of a figure provided at the foot with means to rest upon a supporting surface for supporting the figure in an upright position during operation, a substantially U-shaped member representing a skipping rope and rotatable completely about the figure and having stiff side portions slightly longer than the distance from the axis of the member to the lower end of the figure, a motor enclosed within the figure and gearing connecting the motor with said member, the latter acting as an impact device to lift the figure bodily and simulate the action of skipping.

In testimony whereof I have signed my name to this specification.

FREDERICK OTTO TRAUTMANN.