Oct. 15, 1963 E. C. MORRIS ET AL 3,107,092

MOTOR DRIVEN JUMPING ROPES ROTATABLE IN OPPOSITE DIRECTIONS

Filed Dec. 12, 1960 2 Sheets-Sheet 1

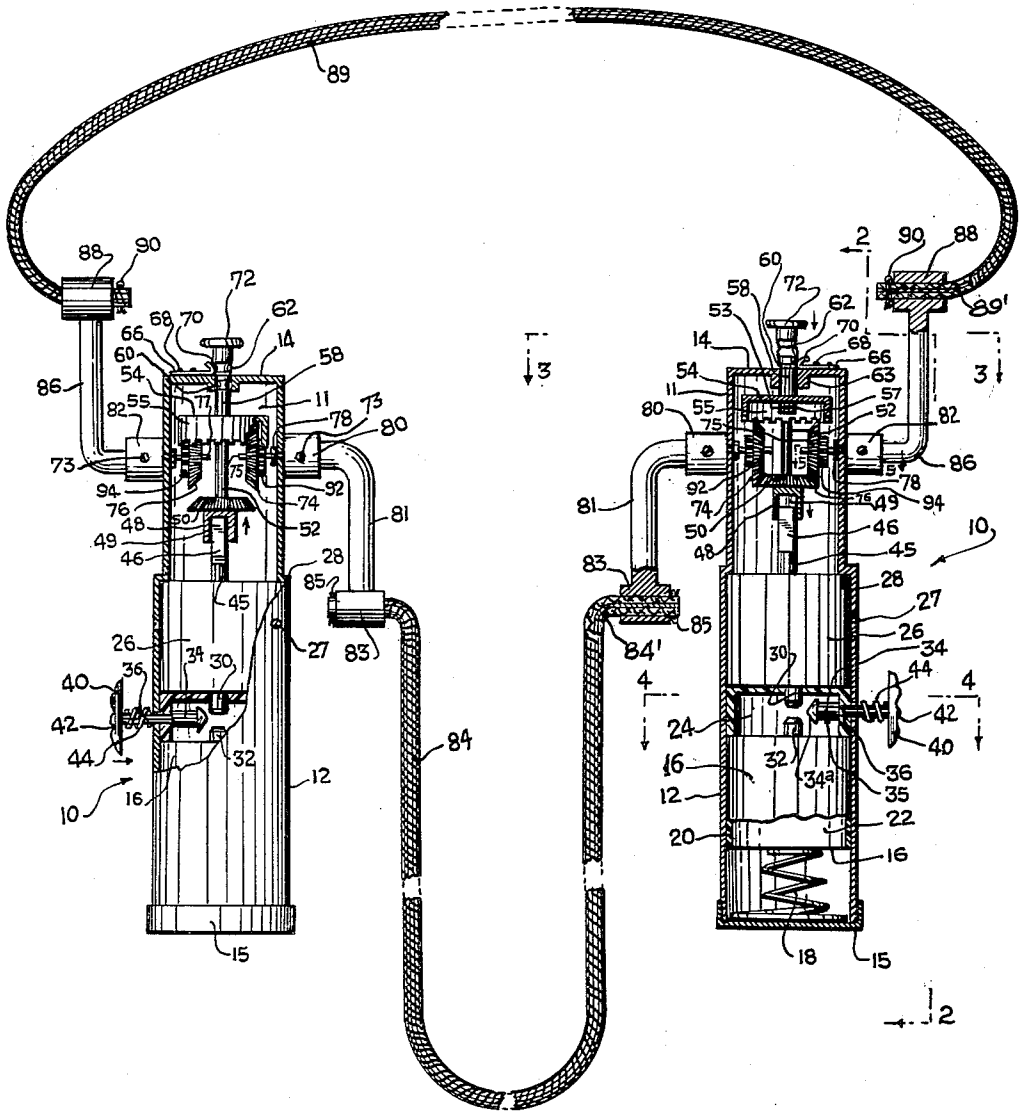


FIG. 1.

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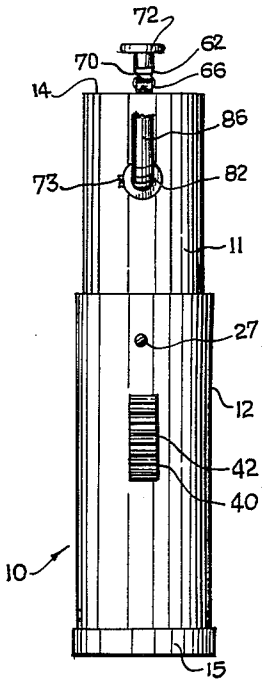


Fig. 2.

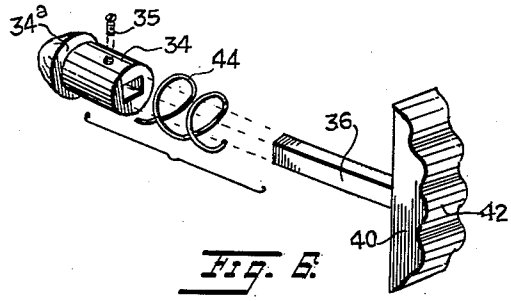


Fig. 6.

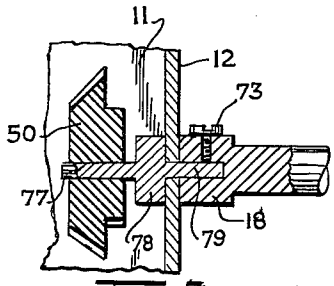


Fig. 5.

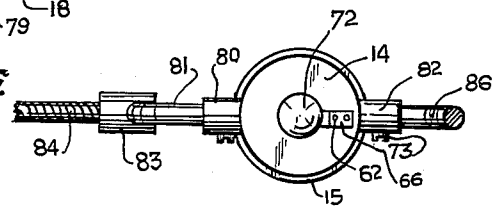


Fig. 3.

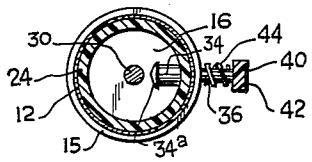


Fig. 4.

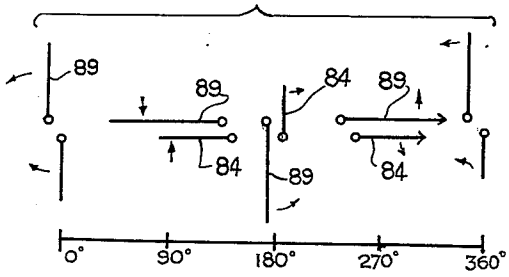


Fig. 8.

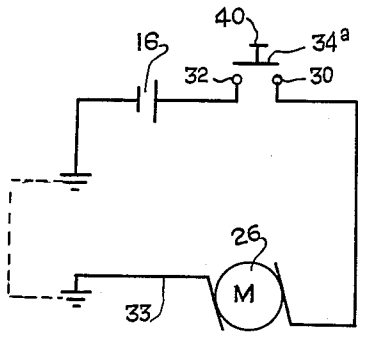


Fig. 7.

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MOTOR DRIVEN JUMPING ROPES ROTATABLE IN OPPOSITE DIRECTIONS

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2 Claims. (Cl. 272—75)

This invention relates to an exercising and amusement device and particularly concerns a novel automatic means for turning a rope or ropes in exercise and/or play.

According to the invention there is provided a pair of handles to which are connected one or more removable ropes. Either or both handles contain motors which turn the ropes while the person holding the handles jumps up as the ropes pass under his legs. The device may be used by children and adults for amusement and exercise. The device will have particular value to dancers and athletes to train them in quick skillful leg movements. It is possible to provide the handles with spring loaded hand grips so that predetermined pressure must be exerted by the wrists or hands to effect actuation of the motors which turn the ropes. The hand grips may be arranged to be replaceable or adjustable to different spring loading so that different hand pressures are required to operate the device. By use of such hand grips the muscles of the hands and arms may be exercised while the device is in use for rope jumping. It is preferred that the handles of the device contain batteries for operating the motors but external power supply means can be provided. When two ropes are provided, they can be arranged to turn in opposite directions. The speed of turning may be made adjustable.

It is therefore a principal object of the invention to provide a motor driven rope turning device for use in rope jumping exercise.

It is a further object to provide an exercising device including a plurality of ropes and motor means for turning the ropes in opposite directions at controllable speeds.

Anohter object is to provide a pair of handles to which a plurality of ropes are removably connected, with motors mounted in the handles for turning the ropes, the motors being controllable in speed, with hand grips arranged for turning the motors on and off.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is an elevational view of the device with portions broken away to show internal construction.

FIGS. 2, 3 and 4 are sectional views taken on lines 2—2, 3—3 and 4—4, respectively, of FIG. 1.

FIG. 5 is a sectional view on an enlarged scale taken on line 5—5 of FIG. 2.

FIG. 6 is an exploded perspective view of portions of the hand grip and associated parts.

FIG. 7 is a diagram of an electrical circuit employed in the device.

FIG. 8 is a diagram employed in explaining the mode of operation of the device.

In FIGS. 1–5 of the drawings, there is shown a pair of

handles 10. Each handle includes tubular casing 12 having a closed end 14 and an open opposite end. The open end is externally threaded and is closed by a removable screw cap 15. Within the casing is a cylindrical battery 16 biased upwardly away from the cap by a coil spring 18. The battery has an outer insulation sleeve 20 insulating it from the metal body of the casing, and a metal casing 22 electrically contacted by the spring 18. An inverted cup-shaped insulation member 24 is disposed on the battery and serves as a spacer between the battery and a cylindrical motor 26 is held by screws 27 in axial alignment with the battery. The motor seats on an annular shoulder 28 formed intermediate the ends of the casing. An axial electrical contact 30 depends from the motor and is spaced from a centrally disposed electrical terminal 32 of the battery. The contact 30 and terminal 32 can be electrically connected by a switch element 34 carried on the end of an insulated shaft 36. Shaft 36 extends radially outward of the casing through registering holes in member 24 and casing 12. This shaft 36 is rectangular in cross section as best shown in FIG. 6. A setscrew 35 holds element 34 on the shaft.

Shaft 36 is connected to a hand grip 40 outside the casing. This hand grip has an outer corrugated or grooved side 42 for engagement by the fingers of the person to use the device. A coil spring 44 on shaft 36 loads the hand grip and biases it outwardly of the casing. Element 34 has a tapered or conical end 34a to effect direct electrical connection by mechanical contact with spaced tapered ends of contact 30 and terminal 32 when the hand grip is pressed inwardly toward the casing. When the hand grip is so pressed an electrical circuit is closed to energize the motor.

Referring to FIG. 7 it will be noted that motor 26 is disposed in series with battery 16, contact 30 and terminal 32. The hand grip member 40 serves as a switch whose contact end 34a can close the electrical circuit. The return circuit 33 of the motor is completed via its own metal case which is grounded to casing 12.

The motor 26 has an axial shaft 45 which terminates in an end 46 having a flattened or rectangular cross section. The end of the shaft slidably receives a cup 48 having a rectangular bore 49. Cup 48 depends from one side of a bevel gear 50 as clearly shown in FIG. 1. Bevel gear 50 is part of a speed change gear transmission disposed in the narrower end 11 of the casing. The transmission assembly includes an axial shaft 52 carrying the bevel gear 50 at its lower end. At its upper end shaft 52 carries a flange gear 54 having depending teeth on its annular skirt 55. The diameter of gear 54 is greater than the maximum diameter of gear 50. Shaft 52 is secured by screw 53 to a depending boss 57 formed at the underside of gear 54. Extending axially upwardly from and integral with gear 54 is a shaft 58 having two spaced annular grooves 60, 62 located on the outer portion of the shaft outside the closed top or end 14 of the casing. Shaft 58 is slidably disposed in a cylindrical nipple 63 underneath the end 14 of the casing. A leaf spring 66 is secured by screws or rivets 68 to the outer side of casing end 14. It has a curved or upwardly bent end 70 engageable in either one of the grooves 60 or 62. A knob 72 is provided at the outer end of shaft 58 to facilitate retraction and extension of the shaft.

At the left portion of FIG. 1 shaft 58 is shown in a

retracted position so that spring end 70 is engaged in groove 62. At the right portion of FIG. 1, shaft 58 is extended and engaged in groove 60. In either position of the shaft 58 it will rotate when shaft 45 of the motor rotates. It will be apparent that cup 48 slides axially but maintains engagement with shaft 45 when the shaft 58 is retracted and extended. In the extended position of shaft 58, bevel gear 50 engages two spaced, opposed bevel gears 74 and 76. These gears are carried on shafts 75, 77 respectively journaled at diametrally opposed sides of the casing. Shafts 75, 77 are integral with flanges 78 inside the casing. Flanges 78 have shaft extensions 79 outside the casing detachably secured by screws 73 in cylindrical cups 80, 82 outside the casing; see FIGS. 1 and 5. Cups 80, 82 are axially aligned with each other diametrally of the narrow portion 11 of the casing. Elbow 81 is integral with cup 80 and has an enlarged cylindrical end 83 to which is removably secured one end of a rope 84. The rope may be stiffened by a central wire core 84'. A cotter pin 85 or equivalent means may hold the end of the rope in end 83 of the elbow. Another elbow 86 is integral with cup 82. Elbow 86 terminates in a cylindrical end 88 detachably receiving one end of another rope 89. Pin 90 holds the end of rope 89 in the end 88 of elbow 86. It will be clear from FIG. 1 that opposite ends of the ropes 84 and 89 are thus detachably secured to cylindrical ends of elbows 81 and 86, respectively, of both handles 10. Rope 89 may also be stiffened by a central wire core 89'.

The bevel gears 74 and 76 are formed with outer spur gear portions 92, 94 of reduced diameters disposed to be engaged by the teeth of flange gear 54 when the shaft 58 is retracted as shown at the left-hand portion of FIG. 1. When shaft 58 is extended gear 54 is out of engagement with spur gears 92, 94 while gears 74, 76 are engaged by gears 50 in both handles of the device. Both shafts 58 should be extended or retracted at the same time for proper operation of the device.

Ropes 84 and 89 are arranged so that they rotate in opposite directions. Furthermore, they are arranged so that they are spaced 180° in their cycles of rotation. Thus, as shown in FIG. 1 and indicated in FIG. 7, when one rope is disposed in a vertical plane and extending downward, the other rope is disposed in the same plane and extending upwardly, and vice versa. Rope 84 is shorter than rope 89 and rotates between the handles while rope 89 rotates outside the handles. The user jumps first over the bight of one rope and then over the bight of the other rope as the ropes rotate when driven by the motors.

Referring to FIG. 7, it will be clear that when rope 84 is vertical and extending downwardly rope 89 is vertical and extending upwardly at the 0° position of a typical cycle of operation. A quarter of a cycle later at 90°, both ropes are horizontal and parallel but moving in opposite vertical directions. Rope 84 moves up while rope 89 moves down. At 180° in the cycle, both ropes are vertical again but rope 89 is down while rope 84 is up. At 270° in the cycle, the ropes are horizontal and parallel again with rope 89 moving up and rope 84 moving down. At 360°, the cycle is completed and the rope positions are the same as in the 0° position.

When shafts 58 are retracted, the ropes rotate faster than they do when the shafts are extended because gear 54 causes more rotations of gears 90, 92 for each revolution of shaft 45, than are caused by gears 50 when engaged with gears 74, 76.

In operation of the device, the user will hold the handles 10 axially horizontal or vertical while pressing the hand grips 45. The retraction of shafts 36 of the hand grips closes the switches and actuates the motors 26 to drive the ropes. If desired, either rope 84 or 89 could be removed so only one rope is operative. The speed of rotation is controlled by the setting of shafts 58 to engage gears 54, 90, 92 or 50, 74, 76. The hand grips are removable from the casing so that stiffer or softer springs 44 can be substituted to adjust the pressure required to close the switch controls of the device. Thus, the user can exercise his hands and wrists when he presses and holds the hand grips to operate the motors. If a sufficiently powerful motor 26 and battery 16 are used, it may be possible to operate the device with a single motor and battery located in one casing. The other casing may then serve to store additional or spare batteries and to balance the weight of the two handles.

The device can be made in various sizes for exercise and play by children and adults. The invention makes it possible to rotate automatically a plurality of ropes in opposite directions. It is possible to connect the motors to an external source of power such as a battery pack carried by the person using the device.

It is to be understood that instead of the batteries 16, the motors 26 may be connected to an external power supply by means of the conventional electric plug arrangement.

While we have illustrated and described the preferred embodiment of our invention, it is to be understood that we do not limit ourselves to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:

1. A rope jumping device, comprising a pair of cylindrical handles, a motor disposed in each of the handles, a battery disposed in each handle in circuit with the motor therein, a manually operable switch carried by each handle in circuit with the motor and battery therein, said switch including a hand grip spring biased radially outward of the handle so that the circuit is normally open, a pair of ropes having opposite ends turnably connected to the respective handles, gear transmission means operatively connecting the motor in each handle to one end of each rope thereat for turning the ropes in opposite directions when the motor circuits are closed, the hand grips of the switches being removable for replacement with springs exerting different spring bias, the ropes being detachably connected to the handles, the gear transmission means including a slidable shaft, a first bevel gear and a flange gear carried by said slidable shaft, a pair of opposed bevel gears disposed for engagement with the first bevel gear in one position of said slidable shaft, and a pair of spur gears disposed for engagement with the flange gear in another position of said slidable shaft, elbow members disposed between the rope ends and the handles, and shafts each carrying one of the spur gears and one of the opposed bevel gears, the shafts being connected to the elbow members, said slidable shaft operatively connected with a shaft of the motor, whereby axial movement of the slidable shaft to either position changes the speed of rotation of the ropes.

2. A rope jumping device, comprising a pair of cylindrical handles, a motor disposed in each of the handles, a battery disposed in each handle in circuit with the motor therein, a manually operable switch carried by each handle in circuit with the motor and battery therein, said switch including a hand grip spring biased radially outward of the handle so that the circuit is normally open, a pair of ropes having opposite ends turnably connected to the respective handles, gear transmission means operatively connecting the motor in each handle to one end of each rope thereat for turning the ropes in opposite directions when the motor circuits are closed, the hand grips of the switches being removable for replacement with springs exerting different spring bias, the ropes being detachably connected to the handles, the gear transmission means including a slidable shaft, a first bevel gear and a flange gear carried by said slidable shaft, a pair of opposed bevel gears disposed for engagement with the

first bevel gear in one position of said slidable shaft, and a pair of spur gears disposed for engagement with the flange gear in another position of said slidable shaft, elbow members disposed between the rope ends and the handles, and shafts each carrying one of the spur gears and one of the opposed bevel gears, the shafts being connected to the elbow members, said slidable shaft operatively connected with a shaft of the motor, whereby axial movement of the slidable shaft to either position changes the speed of rotation of the ropes, said slidable shaft having a pair of spaced radial grooves, and leaf spring means engageable in one of the grooves in each position of said slidable shaft for holding certain of the gears engaged.

References Cited in the file of this patent

UNITED STATES PATENTS

1,893,173	Kreutzer	Jan. 3, 1933
2,739,490	Coles	Mar. 27, 1956
2,780,942	Babcock	Feb. 12, 1957
2,795,424	Fitzpatrick	June 11, 1957
2,942,881	Recalma	June 28, 1960
3,013,798	Willoughby	Dec. 19, 1961
3,064,971	Feinn	Nov. 20, 1962
3,064,972	Feinn	Nov. 20, 1962

FOREIGN PATENTS

408,300	France	Jan. 20, 1910