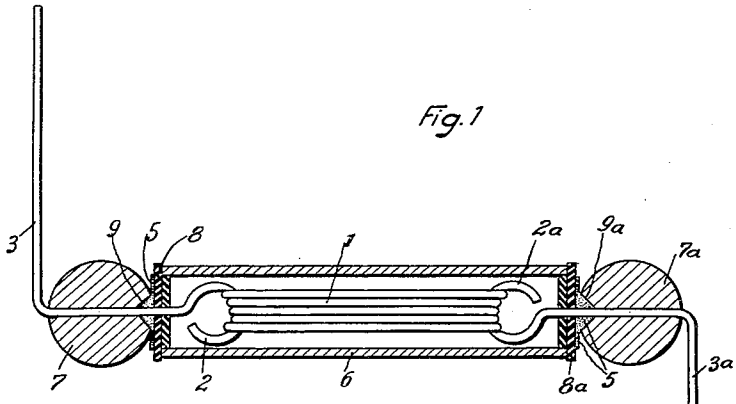
Oct. 16, 1956 E. RÜDIGER 2,766,849

DRIVING MECHANISM

Filed Oct. 25, 1954

Fig. 1



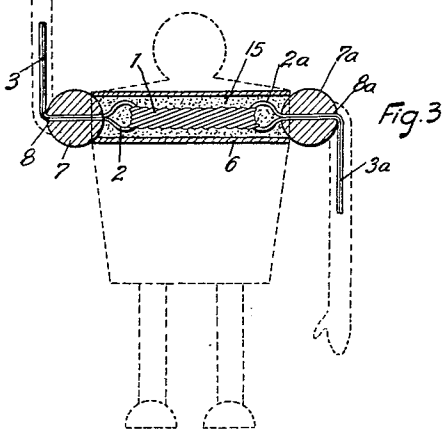
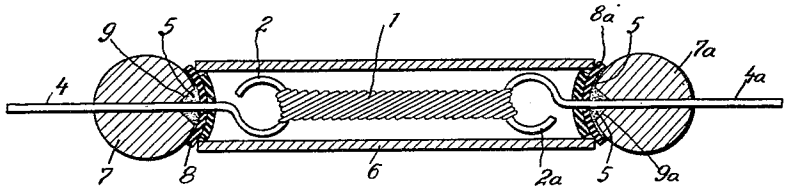


Fig. 3

Fig. 2



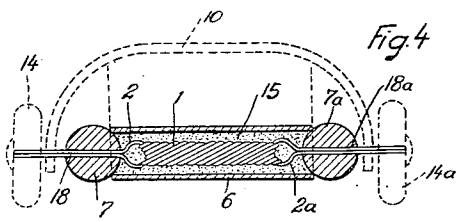


Fig. 4

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DRIVING MECHANISM

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4 Claims. (Cl. 185—37)

The present invention relates to a driving mechanism for toys in which a plurality of rubber cords connect a pair of relatively rotatable elements and are adapted by a relative winding up rotation of such elements to be twisted and to subsequently impart an unwinding rotation to the elements in the opposite direction.

It is the primary object of the present invention to provide a driving mechanism of this type in which the unwinding rotation of the elements is braked and retarded to such an extent that a very slow motion of extended duration will ensue, as is desirable in the operation of dolls, low velocity toy tanks or toy tractors, toy cranes or the like.

It is a further object of the present invention to provide a driving mechanism of the character indicated in which the twisted rubber cords are permitted to relax completely thus ensuring operation over an extended period of time. Other objects of the invention are to provide a driving mechanism which may be easily wound up and will then operate at a slow speed over an extended period of time, such mechanism being simple, inexpensive and reliable in operation.

Other objects of my invention will appear from a detailed description of a number of preferred embodiments thereof which are shown in the accompanying drawings, it being understood that such detailed description serves the purpose of illustrating the invention rather than that of restricting the same. In the drawings,

Fig. 1 is a longitudinal section of the driving mechanism in relaxed or unwound condition.

Fig. 2 is a longitudinal section taken through a somewhat modified driving mechanism in the condition in which the rubber cords have been wound up,

Fig. 3 is a longitudinal section of a modified driving mechanism in wound up condition, such mechanism being suitable for the operation of the arms of a doll indicated in dotted lines, and

Fig. 4 is a longitudinal section of a driving mechanism similar to that of Fig. 3 for the operation of wheels of a toy, such wheels and a portion of the toy being shown in dotted lines.

The rubber driving mechanism is constituted by rubber cords **1**, Figs. 1 and 2, which are hooked up in wire loops **2**, **2***a* of rotatable arms **3**, **3***a*, Fig. 1, which may be the arms of a doll, or in wire loops **2**, **2***a* of shafts **4**, **4***a*, which may be the driving shafts of wheels of a toy. On the arms **3**, **3***a* or the shafts **4**, **4***a* balls **7**, **7***a* are fixed which engage rubber washers **8**, **8***a* serving as bearings, such rubber washers constituting end covers of a sleeve **6**. A sticky material **5** is disposed between the balls **7**, **7***a* and the rubber washers **8**, **8***a*. Preferably, the balls **7**, **7***a* are provided with cavities **9**, **9***a* for accommodating a supply of such sticky material of a permanent character.

The rubber driving mechanism functions as follows:

The driving mechanism is wound up by turning the arms **3**, **3***a*, Fig. 1, or the wheel shafts **4**, **4***a*, Fig. 2, in opposite directions whereby the rubber cords **1** are twisted. As a result, an axial tension is set up in the rubber cords

tending to pull the wire loops **2**, **2***a* towards each other whereby the washers **8**, **8***a* are drawn towards each other into the sleeve **6**, as shown in Fig. 2. This increases the friction of the balls **7**, **7***a* on the washers **8**, **8***a*, such friction producing a braking couple. Therefore, a high braking couple is produced when the driving mechanism has been wound up, such couple decreasing gradually as the rubber cords will unwind themselves. Therefore, the initially high stress of the twisted rubber cords **1** is efficiently braked by the friction of the rubber washers **8**, **8***a* on the rotating balls **7**, **7***a* and, as the stress of the twisted rubber cords **1** gradually decreases, such braking couple is gradually reduced until eventually the rubber cords will be completely relaxed. If the rubber washers **8**, **8***a* are provided with the sticky material **5**, which may be supplied from the cavities **9**, **9***a* of the balls **7**, **7***a*, the braking effect is rendered smooth and is so increased that it will take several hours until the twisted rubber cords **1** will have fully relaxed.

In the embodiments of my invention shown in Figs. 3 and 4 the driving mechanism comprises rubber cords **1** which are hooked up in loops **2** and **2***a* of rotatable arms **3**, **3***a* of a doll indicated in Fig. 3 in dotted lines. The rubber cords **1** are covered by or embedded in a sticky material **15** which is surrounded by a sleeve **6**. The ends of the sleeve constitute bearings in which balls **7**, **7***a* are rotatably mounted. The balls are provided with bores **8**, **8***a* through which the looped portions of the arms **3** and **3***a* extend. The sleeve **6** is rigidly connected with the body of the doll.

In the embodiment shown in Fig. 4 the loops **2** and **2***a* to which the rubber cords **1** are attached are provided at the inner ends of wire axles **18** and **18***a* which extend through and are fixed to the balls **7**, **7***a*. Wheels **14**, **14***a* shown in dotted lines are attached to the outer ends of the wire axles **18**, **18***a*. The body of the toy indicated in dotted lines at **10** is supported on the axles **18**, **18***a*. The sleeve **6** on which the balls **7**, **7***a* are journalled is filled with a sticky material **15**, as described with reference to Fig. 3. The sticky material adheres to the rotatable elements **7** and **7***a* and to the bearings constituted by the ends of the sleeve **6**.

The driving mechanism functions as follows:

The driving mechanism is wound up by opposite rotation of the arms **3**, **3***a*, Fig. 3, or of the wheels **14**, **14***a*, Fig. 4, whereby the rubber cords are twisted. When the rubber cords have been wound up and are permitted to unwind, they will do so with a very slow motion of extended duration, because the relative rotation of the various elements **1**, **2**, **2***a*, **6**, **7** and **7***a* is retarded by the adhesion thereto of the sticky material **5**. When the doll shown in Fig. 3 in dotted lines is placed on the table after the driving mechanism has been wound up, the arms **3**, **3***a* will slowly revolve and will cause the doll to perform somersaults and to twist its limbs in a funny manner. Depending on the retarding effect produced by the sticky material on the various elements, one of the arms **3**, **3***a* will temporarily stay in position, while the other arm revolves slowly and, after a while, the resting arm will suddenly start to move again.

The embodiment shown in Fig. 4 will function accordingly, the wheels performing a very slow and irregular rotation in opposite directions causing the vehicle to perform irregular motions.

The embodiments described are capable of numerous modifications. Thus, the vehicle **10** may be caused to ride in one direction only. To this end, one of the axles **18**, **18***a* must be fixed to the sleeve **6**, for instance by cementing its ball **7** or **7***a* to the sleeve **6**, and the respective wheel **14** or **14***a* must be rotatably journalled on the non-rotating wire axle **18**, or **18***a*, respectively.

If desired, the toy may be so constructed that the rubber cords extend in their longitudinal direction. In

this event, the driving power may be transferred from the unwinding rubber cords to the wheels by any suitable transmission.

From the foregoing description it will appear that my novel driving mechanism comprises a sleeve, such as **6**, the ends of the sleeve constituting bearings, elements, such as **3**, **3***a* or **18**, **18***a* mounted for rotation on the bearings, rubber cords, such as **1**, connecting said elements and extending through the sleeve **6** and adapted to be twisted by relative winding rotation and to subsequently impart an unwinding rotation to said elements **3**, **3***a* or **18**, **18***a* in the opposite direction, and braking means adapted to retard said unwinding rotation, said braking means being constituted by the sticky material **5**, or **15** respectively, adhering to said rotatable elements and to said bearings.

While the invention has been described in connection with several different embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains, and as fall within the scope of the invention or the limits of the appended claims.

What I claim is:

1. Driving mechanism comprising a pair of spaced relatively rotatable elements, a plurality of rubber cords connecting said rotatable elements and adapted to be twisted by relative rotation thereof, balls fixed to said rotatable elements, resilient rubber washers supporting said balls in spaced relationship and constituting bearings therefor, and a sticky material provided between each of said balls and the associated washer and adhering thereto.

2. Driving mechanism according to claim 1, in which said balls are provided with cavities adjacent to said washers, and said cavities accommodating a supply of sticky material adhering to both said balls and said washers.

3. A drive for toys comprising a sleeve, a rubber disc mounted at each end of the sleeve, a rotatable member projecting through each disc and having a ball thereon adjacent its rubber disc, the rotatable member and ball rotating together, and a sticky material provided between each rubber disc and the ball to act as a braking means to retard the rotation of the rotatable member and its ball.

4. A drive for toys according to claim 3, in which each ball has a central hollow part into which the sticky material projects.

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