Nov. 25, 1952 G. G. HUARD ET AL 2,619,194

RUBBER POWERED MOTOR FOR TOYS AND THE LIKE

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Fig.1.

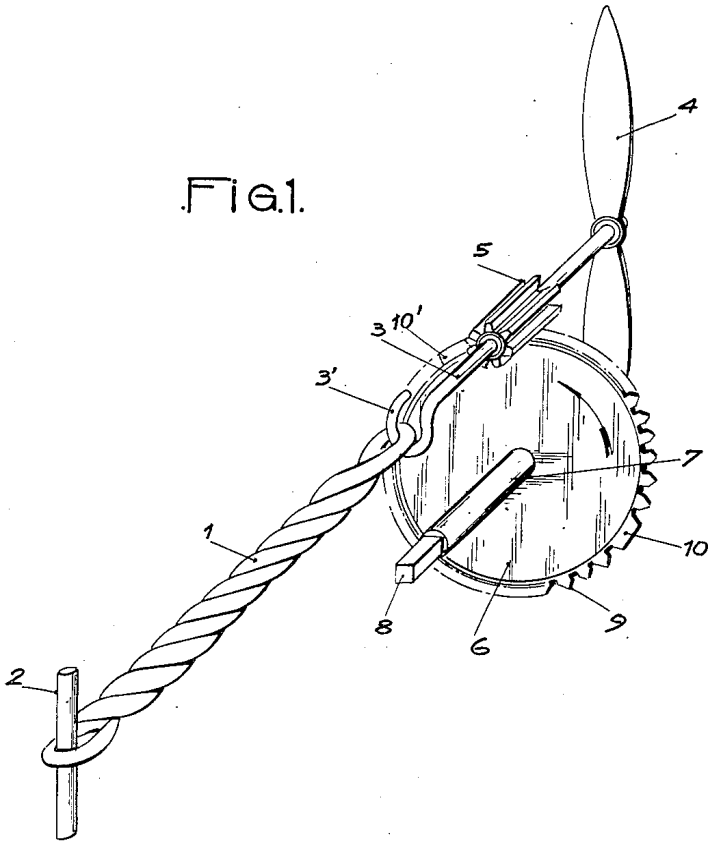


Fig.2.

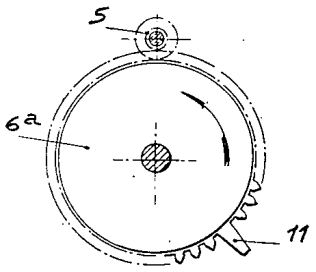
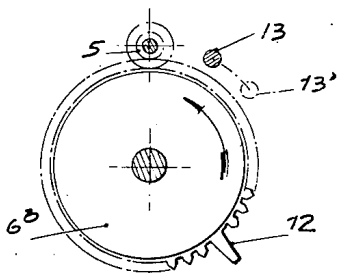


Fig.3.



Inventors:
GEORGES GÉRAUD HUARD
RAYMOND JEAN ERNEST ROGER
By: Richard L. Sampson
Attorney

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Fig. 4.

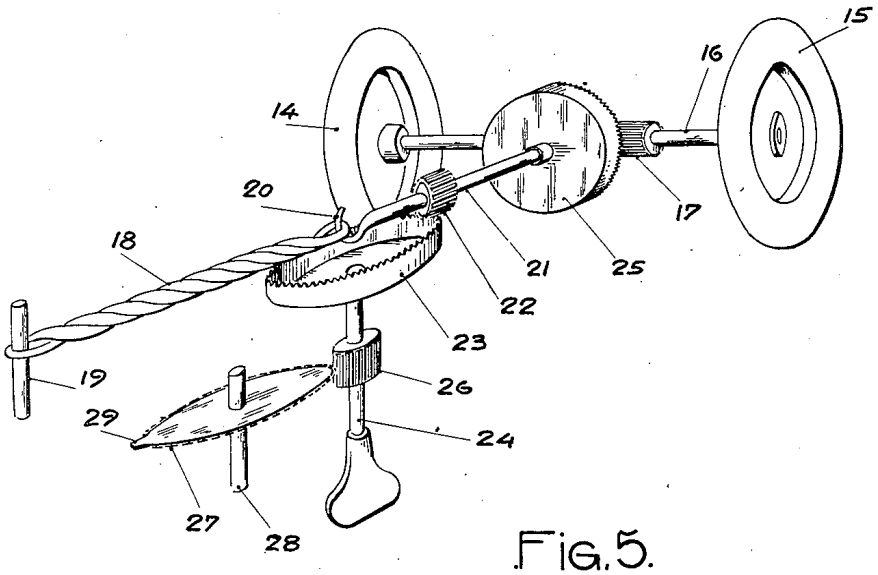
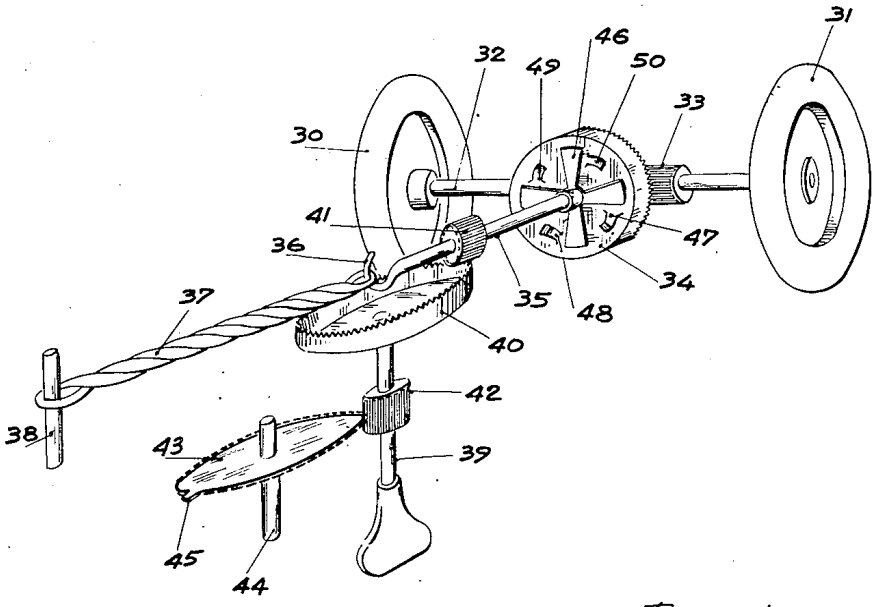


Fig. 5.



Inventors:
GEORGES GÉRAUD HUARD
RAYMOND JEAN ERNEST ROGER
By: Maxwell E. Spanner
Attorney

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RUBBER POWERED MOTOR FOR TOYS AND THE LIKE

Georges Geraud Huard, Paris, and Raymond Jean Ernest Roger, Suresnes, France

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3 Claims. (Cl. 185—43)

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This invention relates to rubber powered motors comprised of say one or a plurality of rubber wires or strips which are subjected to a twisting action when the motor is being wound up, their release providing the propulsive energy of or operating the toy or other device to which the motor is applied. The primary drawback of this type of motor is that no limiting device is provided whereby if the motor is wound up too far, as for instance by a child, the elastic or rubber element may break up.

The object of the present invention is to overcome the aforesaid drawback. It is characterized by a rubber powered motor of the type described above, in which one of the toothed elements of the winding mechanism or a special toothed member meshing with one of said elements carries a toothless portion, stud or other suitable means adapted to resist any meshing when it engages the cooperating member, thus establishing a limit to the winding action and preventing efficiently any exaggerated winding up of the elastic element to its breaking-down point.

According to one embodiment of the invention, the winding limiting member is located on the toothed element, when the latter is at rest, in a position diametrally opposite to the cooperating toothed element, whereby the mechanism may be wound up in both directions, thus enabling a reversal of the direction of movement of the propelled object.

According to a further embodiment, a reducing gear is interposed between the motor and the winding limiting member so as to extend the duration of operation, a freewheel arrangement being also provided between the driving shaft and the driven shaft for holding the latter stationary when winding up.

Further objects and advantages of our invention will be apparent from the description and claims.

In the drawing, in which embodiments of our invention is illustrated:

Fig. 1 is a perspective view of a first embodiment.

Figs. 2 and 3 are top views of modifications thereof, and

Figs. 4 and 5 are perspective views of further embodiments.

Referring now to Fig. 1, the form selected for purpose of illustration includes an elastic element 1, which may comprise one or several wires or strips, secured at one end to a fixed part 2 of the toy, and at its other end to the rotary shaft 3 by the intermediary, say, of a hook 3'. The shaft

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3, which in the example illustrated drives a toy-aircraft propeller 4, carries a pinion 5 meshing with the winding toothed disc 6 fast on another shaft 7 having a square-shaped end 8 for engaging a winding key thereon. The teeth 9 of the toothed disc 6 are interrupted at 10 to provide a smooth portion which, when the mechanism is at rest, will be adjacent to the pinion 5, for instance at 10'.

Thus, when shaft 7 is rotated in the direction of the arrow by means of a winding key, disc 6 will rotate and drive, through its teeth 9, pinion 5 for a predetermined number of revolutions and said pinion 5, fast with shaft 3, will impart a twisting action to rubber element 1. When the toothless portion 10 engages the teeth of pinion 5, the latter is prevented from meshing further on with disc 6 which is therefore stopped, thus preventing any further twisting of element 1. Therefore, the elastic element 1 is always subjected to the same predetermined number of turns when wound up, this number being calculated in view of eliminating any breaking of the element.

According to a modification shown in Fig. 2, instead of a toothless portion 10, disc 6 is provided with a protruding tooth 11 which will also engage pinion 5 to limit the rotary movement of disc 6a.

In a further embodiment illustrated in Fig. 3, the disc 6b carries a finger 12 adapted to abut a stop member 13 positioned on a fixed part of the toy, instead of abutting pinion 5. This stop member may be adjustable, for example by forming it as a plug element adapted to be inserted into one of a series of holes, e. g. to position it as shown at 13'.

Another type of embodiment is exemplified in Fig. 4 wherein the motor according to the invention is applied to a toy-vehicle having a set of driving wheels 14, 15 fast with an axle 16 carrying a driven pinion 17. The rubber element 18, which consists of a twisted strip, is fastened at one end to a fixed portion 19 of the toy and hooked at its other end to a hook 20 integral with the shaft 21 journalled in a suitable bearing (not shown). Fast with this shaft is a pinion 22 meshing with a cup-shaped, toothed-flange 23 secured in turn to the winding shaft 24. The driven shaft 21 further carries a cup-shaped, toothed-flange 25 meshing with pinion 17 of axle 16.

A pinion 26, fast on shaft 24, meshes with a toothed disc 27 integral with a spindle 28. This toothed disc is provided with a stud 29 adapted to engage pinion 26 for locking the winding mech-

anism in the same manner as in the previous examples. In this case, the mechanism **23, 22, 21, 25, 17** forms a reducing gear. When at rest, stud **29** is stopped in a position diametrally opposite to pinion **26**, the arrangement thus permitting the motor to be wound up in both directions, the toy being also adapted to run in both directions.

Referring now to Fig. 5, it will be seen that a modification is provided wherein the motor is similarly intended for driving a set of wheels **30, 31** mounted on a power axle **32** on which a pinion **33** is fastened in meshing engagement with a cup-shaped, toothed-flanged member **34** journalled for free rotation on the shaft **35** carrying the hook **36** whereto the rubber element **37** is hooked, the other end of the rubber element being secured to the usual fixed portion **38**. The winding shaft **39** drives the shaft **35** through another cup-shaped, toothed-flanged element **40** and a pinion **41** while a further pinion **42**, fast with the winding shaft **39**, engages a toothed disc **43** integral with the shaft **44** and having a twist-limiting stud **45** thereon. In this embodiment, shaft **35** is connected with toothed-flanged cup **34** through the intermediary of a freewheel device. In the case shown, shaft **35** drives a star-shaped member **46** having four resilient arms adapted to engage, in the rotational direction, the edges of lugs **47, 48, 49, 50** punched and bent out from the bottom wall of cup **34**. In the reverse rotational direction, the resilient arms of the star member **46** will pass over the lugs without driving the cup, thus permitting to hold the wheels **31** in a fixed position when the device is being wound up.

As will be apparent from Figs. 4, 5, studs **29** and **45** may be replaced by a toothless portion **10** as shown in Fig. 1 for engagement with a special adjustable abutment **13** according to Fig. 3.

Thus, in all circumstances, the rubber-powered motor according to the invention ensures a positive limitation of the number of twisting turns applied thereto; with the reducing gear provided in the winding device of Figs. 4 and 5 a great number of revolutions may be reached while increasing the duration of operation and the interest in the toy. By positioning the winding-limiting tooth **29** in a manner whereby it will have a position at rest diametrally opposite to the meshing point of pinion **26**, the motor may thus be wound up in both rotational directions and the toy may also operate in both directions of movement. Finally, the freewheel arrangement provided in Fig. 5 will hold the set of wheels independent from and during the winding operation.

Obviously the rubber motor according to the invention may be used for driving not only a set of wheels or a propeller, but also any other propelling member of a toy or other article.

Further modifications will be apparent to those skilled in the art and it is desired, therefore, that the invention be limited only by the prior art and the scope of the appended claims.

We claim:

1. A rubber powered motor for toys and the like comprising a fixed element, a rotatable driving shaft, an elastic member stretched between said fixed element and said driving shaft, and winding mechanism operatively connected to said driving shaft for twisting said elastic member including a rotatable pinion and a relatively large meshing rotatable gear wheel, a non-meshing portion on the periphery of said gear wheel engaging against the teeth on said pinion and stopping the winding mechanism after a predetermined number of revolutions of said pinion.

2. A rubber powered motor for toys and the like comprising a fixed member, a rotatable driving shaft, an elongated elastic member stretched between said fixed member and an end of said driving shaft, a pinion fixed upon said driving shaft, and winding mechanism including a rotatable winding shaft extending parallel to said driving shaft and a relatively large gear wheel fixed on said winding shaft and meshing with said pinion, a toothless portion being formed on the periphery of said gear wheel engaging against the teeth of said pinion after a predetermined number of revolutions of said winding shaft to thereby limit the twisting of said elastic member.

3. A rubber powered motor for toys and the like comprising a fixed element, a rotatable driving shaft, an elastic member stretched between said fixed element and said driving shaft, and winding mechanism operatively connected to said driving shaft for twisting said elastic member including a rotatable pinion and a relatively large meshing rotatable gear wheel, a projection formed on the periphery of said gear wheel engaging against the teeth of said pinion and stopping the winding mechanism after a predetermined number of revolutions of said pinion.

GEORGES GERAUD HUARD.
RAYMOND JEAN ERNEST ROGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
268,273	Paillard	Nov. 28, 1882
424,418	Hitt	Mar. 25, 1890
687,897	Neagle	Dec. 3, 1901
1,203,840	Bailey	Nov. 7, 1916
1,315,606	Lonergan	Sept. 9, 1919
1,803,929	Zaidan	May 5, 1931