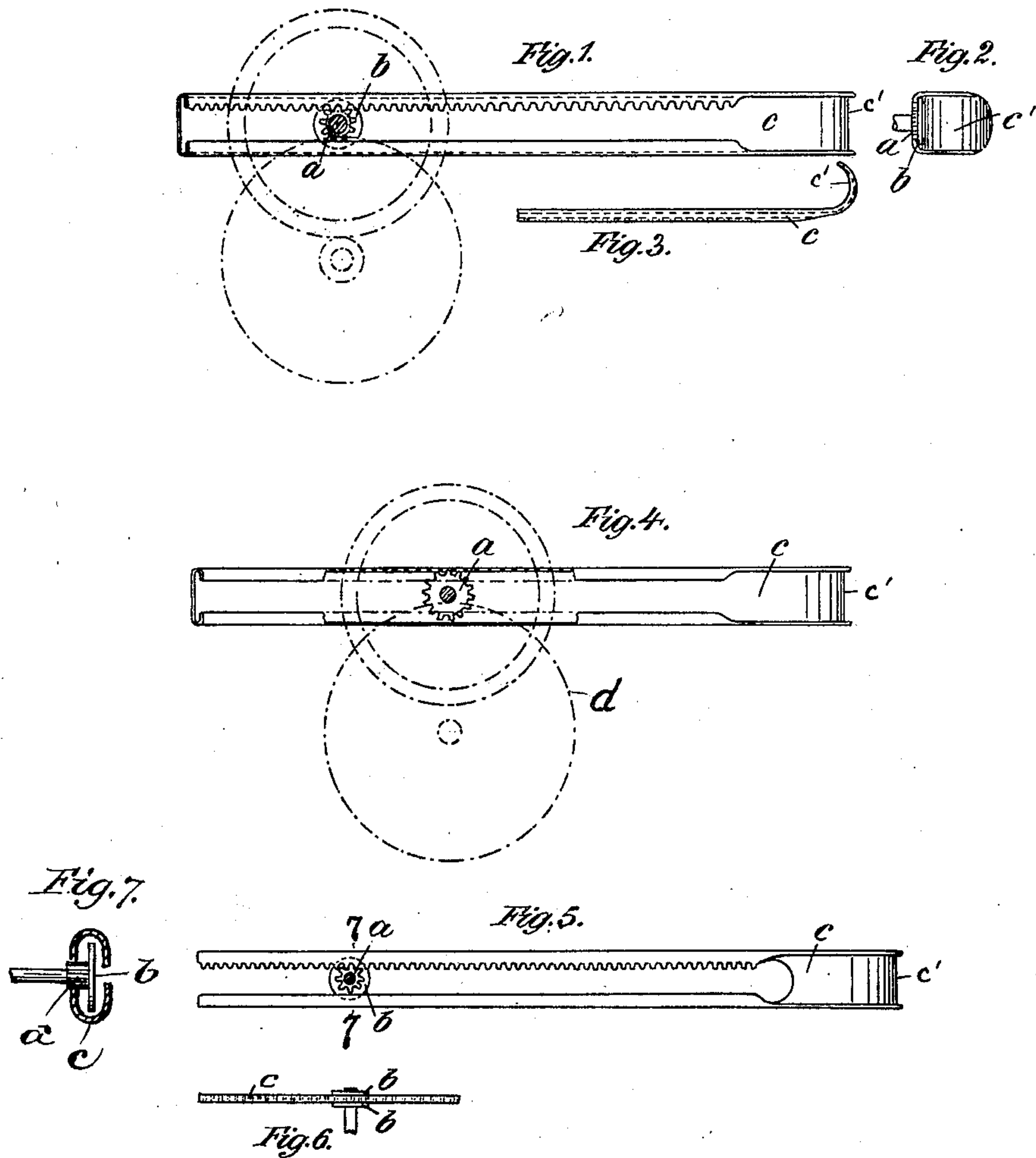


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PATENTED AUG. 14, 1906,

E. P. LEHMANN.
PINION ACTUATING DEVICE.
APPLICATION FILED SEPT. 20, 1902.



Attest:

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UNITED STATES PATENT OFFICE.

ERNST PAUL LEHMANN, OF BRANDENBURG-ON-THE-HAVEL, GERMANY.

PINION-ACTUATING DEVICE.

No. 828,614.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed September 20, 1902. Serial No. 124,190.

To all whom it may concern:

Be it known that I, ERNST PAUL LEHMANN, a subject of the King of Prussia, German Emperor, and a resident of No. 6 Plauerstrasse, Brandenburg-on-the-Havel, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Pinion-Actuating Devices, of which the following is a specification.

10 This invention relates to improvements in pinion-actuating devices for imparting rotary motion to axles or shafts of toys—such, for instance, as toy tops, walking figures, carriages, and the like—which usually are actuated by a thread or cord wound upon a drum carried by the shaft and rapidly drawn off of the same.

20 The improved device of this invention consists of a novel form of rack for engaging with the pinion on the axle or the shaft to be driven. Racks of this kind are known and have been employed before; but they are liable to slide off the pinion while being rapidly drawn along the same. To prevent such accident, guideways had to be provided, consisting either of a bridge arranged to turn upon the axle or shaft to be driven or of a species of fixed bearing-surface arranged in the casing or frame of the toy. The construction of toys frequently does not allow of arranging a guideway of such kind, and if it could be employed the cost of manufacturing the toy would be increased to such an extent as to be prohibitive.

35 The novelty of the device which constitutes this invention consists in the fact that the actuating device in and of itself presents means for guiding it relatively to the pinion and for preventing it from becoming disconnected therefrom when rapidly moved for the purpose of actuating the same.

45 With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a pinion-actuating device, as will be hereinafter fully described and claimed.

50 In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in front elevation of a pinion-actuating device constructed in accordance with the present invention, showing the same in operative engagement with the pinion. Fig. 2 is an end view of the device. Fig. 3 is a side view or portion of the

same. Fig. 4 is a view similar to Fig. 1 of a modified form of the invention. Fig. 5 is a similar view of another modified form thereof. Fig. 6 is an edge view of a portion of a still further modified form. Fig. 7 is a vertical sectional view taken on the lines 7 7, Fig. 5, and looking in the direction of the arrow thereon.

Referring to the drawings and to Figs. 1, 2, and 3 thereof, *a* designates a pinion that is mounted upon an axle or shaft to which rotary motion is to be imparted for a certain period of time. The shaft and pinion *a* form a part of a toy of any kind, and the shaft may carry a fly-wheel *d*, as indicated by dotted lines in Figs. 1 and 4, and motion may be transmitted from the shaft to a wheel *e* by frictional contact, the fly-wheel *d* serving to continue the rotary motion imparted to the pinion *a* and its shaft for quite an extended period. The shaft may obviously transmit motion to any other parts of a toy through suitable means, or it may form the axis of a toy rigidly secured to it—such, for instance, as to that of a toy top.

A disk or wheel *b* is secured to the end of the axle or shaft in close relation to the pinion *a*.

The pinion-actuating device *c* consists of a strip or length of rigid sheet metal having both of its longitudinal edges bent over toward the central line of the stock, as clearly shown in Figs. 1 and 2, forming thereby two parallel opposed members, one of which, as will hereinafter appear, constitutes a pinion-driving rack and the other a pinion-guide. In thus bending the edges of the strip grooves or guides are formed between the members and the main portion of the stock, in which the disk or wheel *b* rolls, the disk being entered between the two members adjacent to the bent handle *c'* and as the device is actuated passes out at the opposite end thereof, the edges of the members being cut away adjacent to the handle to form a flared entrance-throat to facilitate the positioning of the device relatively to the pinion.

The edge of one of the members, in this instance the upper one, is toothed, as clearly shown in Fig. 1, to constitute a rack that engages the pinion, while the disk *b* rolls between the two guideways. By this means the rack is positively held against becoming disconnected from the pinion when the device is actuated, whereby positive driving of the pinion is secured. When the device has

been rapidly moved along the pinion, the latter will continue to turn till frictional resistance has exhausted the driving power applied.

The modification of the device illustrated in Fig. 4 resides in the fact that instead of providing the edge of one of the members with teeth recesses or indentations are formed in the bend of the guideway or groove of one of the members. In this form of the invention the pinion *a* requires no disk or wheel for guiding the device, as the said pinion of itself serves as a guide and is held against disconnection from the device by the opposed members, as will be readily understood by reference to the figure above referred to. Furthermore, the pinion in this form of the invention will be positively held in engagement with the recesses or indentations, so that slipping will positively be precluded.

The device illustrated in Figs. 1 to 4 can only be employed if the pinion is placed at or closely adjacent to the end of the shaft or axle to be driven. If, however, the pinion is fixed to an intermediate portion of the shaft or axle, the form of the invention shown in Fig. 5 is employed, in which the same is longitudinally bifurcated. The bifurcation may be produced by simply cutting away the stock between the two members from the point adjacent to the entrance-throat outward throughout the entire length of the device, and one of the members thus provided is toothed in the same manner as that shown in Fig. 1, and the other serves to support and guide the device in contact with the pinion, as clearly shown, in Fig. 5. In this modification the bending over of the support to form the grooves or guideways is not absolutely essential; but it will generally be preferred, as is herein shown, thus to construct it. When the edges are not bent over, the pinion *a* will be provided with two disks, one on each side, as shown in Fig. 6, the said disks serving to guide the device in the same manner as the grooves or guides.

Instead of providing the device with a rack, as shown in Figs. 1 and 5, or with recesses or indentations, as shown in Fig. 4, the working surfaces may be made rough for transmitting motion by friction, and a correspondingly rough surface may be given to the pinion or roller to be rotated.

The operation of the device is as follows: Supposing the pinion *a* to be located at one end of the shaft to which rotary motion is to be imparted, the apparatus is applied by placing it at right angles to the shaft and by causing the pinion *a* or the pinion *a* and the wheel *b*, if such wheel be employed, to engage into the guideway formed by the bent edges of the rigid strip *c*. Now by pulling the device from the left to the right of Figs. 1 and 4

the rack by engaging the pinion *a* will rotate the same, and when it is free from the device by passing out at the open end thereof opposite the handle the pinion will continue its rotary motion until frictional resistance causes it to stop. It will be seen that by drawing the device more or less rapidly along the pinion *a* the resultant rotation will be more or less rapid and will continue for a more or less continued period of time.

For pinions *a* not located at the end of the shaft to be driven, but at any intermediate part of the same, the device shown in Fig. 5 will be employed or a device constructed similar to Figs. 1 and 4, but with an open slot through the length of the stock extending approximate to the handle, and thus throughout the entire length of the rack. The device in this case will be shifted, with its bifurcated or slotted portion, upon the shaft to be driven, and the pinion *a* is engaged with the rack near the handle. Drawing the device from the right, as before described, will rotate the pinion and the shaft, and when the device has been freed from contact with the pinion the latter will continue to turn.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A pinion-actuating device comprising a stock embodying a pinion-driving rack, the edges of the stock being opposed to each other to effect guiding of a pinion.

2. A pinion-actuating device comprising a stock provided at one end with a handle and having its edges intumed to oppose each other and to form a pinion-entrance throat adjacent to the handle, one of which edges constitutes a pinion-driving rack and the other a pinion-guide.

3. A pinion-actuating device comprising a stock having its edges intumed to oppose each other, one of which edges constitutes a pinion-driving rack and the other a pinion-guide.

4. A pinion-actuating device comprising a stock provided at one end with a handle and having its edges intumed to oppose each other, one of which edges constitutes a pinion-driving rack and the other a pinion-guide.

5. A pinion-actuating device comprising a stock having a handle at one end, the edges of the stock being intumed to oppose each other, one of the edges constituting a pinion-driving rack and the other a pinion-guide open at both ends.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ERNST PAUL LEHMANN.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.