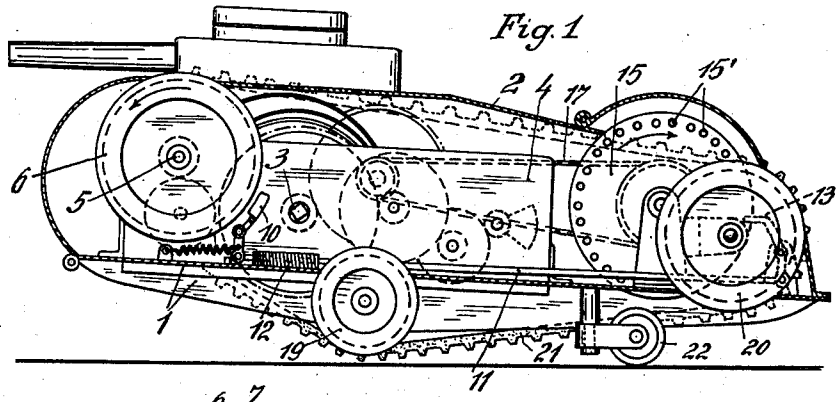
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TOY VEHICLE

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Fig. 1



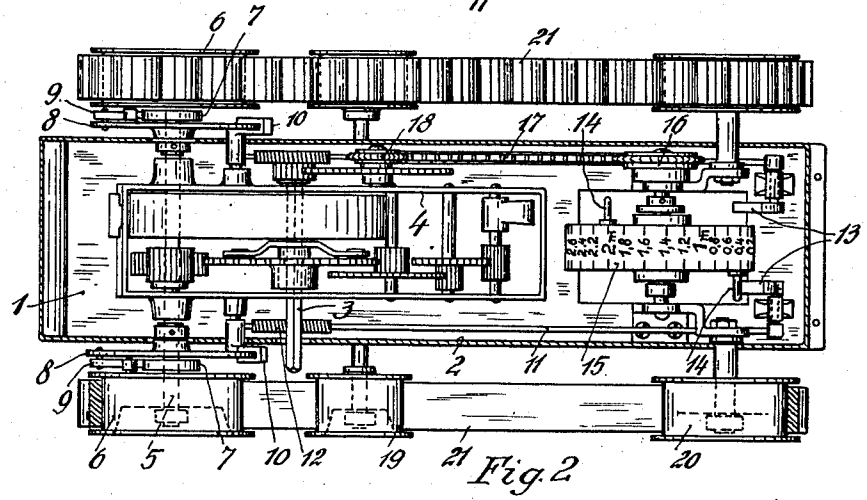


Fig. 2

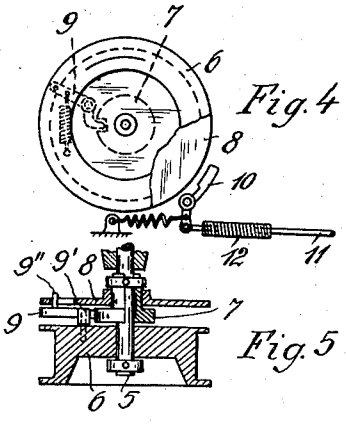


Fig. 4

Fig. 5

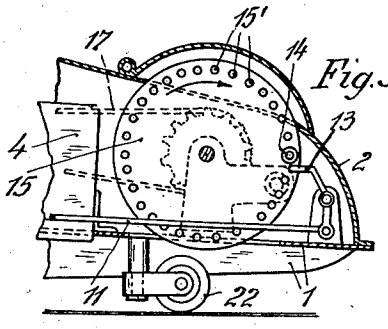


Fig. 3

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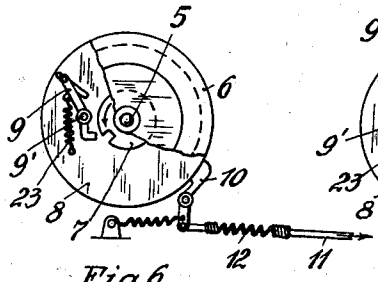


Fig. 6

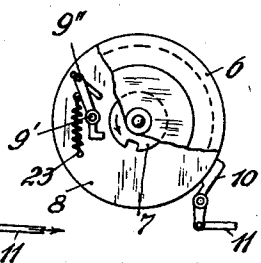


Fig. 7

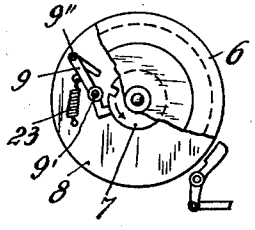


Fig. 8

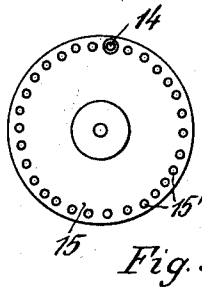


Fig. 9

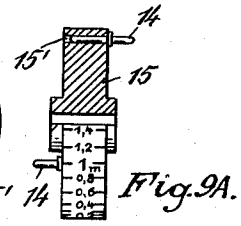


Fig. 9A.

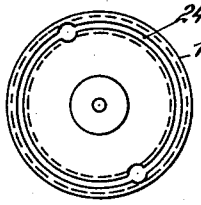


Fig. 10

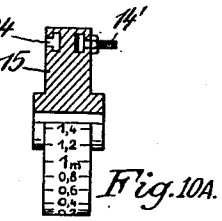


Fig. 10A.

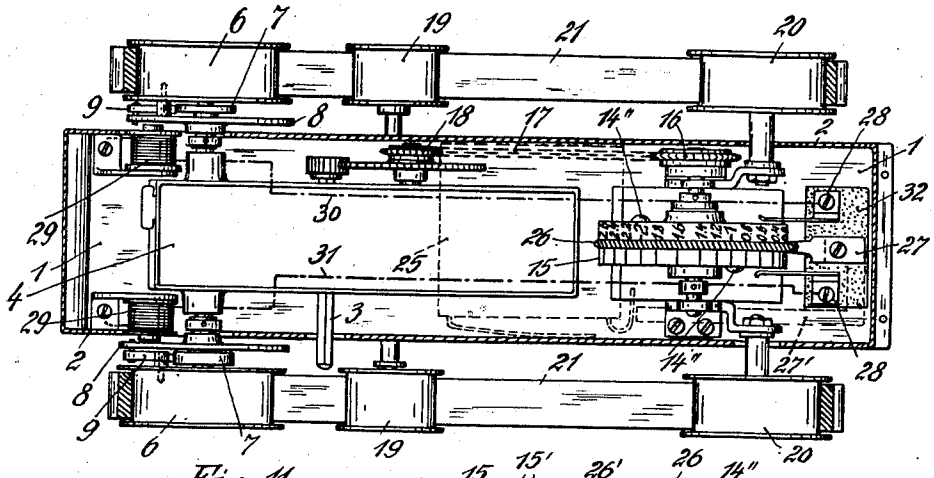


Fig. 11

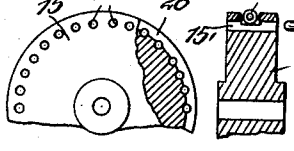


Fig. 12. Fig. 12A.

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Patented Feb. 9, 1937 2,070,465

UNITED STATES PATENT OFFICE

2,070,465

TOY VEHICLE

Ludwig Carl, Nuremberg, Germany, assignor to Ernst Horn, Nuremberg, Germany

Application July 2, 1936, Serial No. 88,681
In Germany January 10, 1936

9 Claims. (Cl. 46—213)

This invention relates to toy vehicles, and more particularly to toy vehicles that are driven by a clockwork, and consists essentially therein that the toy vehicle is equipped with an adjustable control device permitting a positive control of the entire path of motion of the toy prior to commencing its travel.

The travel of my new toy vehicle, thus will no more take place more or less incidentally, but in a manner which may exactly be fixed and predetermined by the adjustment of said control-device. Moreover, the novel control device provided on the toy vehicle can, for instance, be constructed to avoid obstacles that may arbitrarily be placed into the normal path of motion of the vehicle and to cause the latter to travel around such obstacles, or to follow any desired curved path in dependence from the previous adjustment of said device.

The novel control device, more especially, may be adjusted also in such a manner that the toy vehicle will return to its initial position after it has travelled through a definite path of motion of any desired curvature.

According to my invention, furthermore, the guiding or controlling of the travelling motion of the toy in the aforementioned manner may be effected by means of said control device either in a mechanical way by the aid of an actuating mechanism or the like, or in an electrical way by means of electrical circuits established by properly controlled contacts. In the one as well as in the other case, the toy vehicle will be guided fully automatically in a novel and surprising way to follow a path of motion of any desired configuration, thus simulating a vehicle guided and controlled by invisible means at a distance.

A person playing with the novel toy vehicle may exactly and positively pre-determine the path of motion of the vehicle in such a manner that, for instance, the toy will follow a path of motion around several obstacles and arrive at a definite point which will particularly enhance the interest and enjoyment of playing with the toy. Besides, the adjustment of said control device that predetermines the path of motion of the vehicle, will permit the latter to travel also on a relatively small running surface without causing premature interruption in the travelling motion, for instance hitting against an obstacle, or any undesired deflection from the pre-determined path of motion.

The novel control and adjusting device may be used in connection with toy vehicles of all kinds and presents especial advantages and effects in connection with so-called battle toy vehicles, for instance, in the form of tanks or the like, the motion pre-determined by said device being in no way disturbed, when using caterpillar bands as driving members, such as is usual with toys of the last-mentioned kind.

In the accompanying drawings which form part of this specification I have represented two forms of construction of my novel toy, either construction comprising a control and adjusting device determining the path of motion of the toy, it being assumed in either case that the toy vehicle is of the form of a tank.

The first form of construction of the toy is shown in Fig. 1 in a side-view with the body of the toy in longitudinal section, while Fig. 2 is a top-view taken on Fig. 1, in which the toy casing is represented as being cut-away to present the interior driving mechanism of the toy and the novel controlling and adjusting device therefor. Fig. 3 is a partial side-view showing the rear part of the toy together with a disk forming part of said controlling and adjusting device, Figs. 4 and 5 show a driving wheel for the toy in a side-view and cross-section, respectively, Figs. 6, 7, and 8 are side-views of said driving wheel in several operating positions, Fig. 9 is a side and front-view, the latter partly in section, of said disk forming part of said controlling and adjusting device, while Fig. 10 is likewise a side-view and front-view, partly in section, of a modified construction of said disk. The second form of construction of my new toy is shown in Figs. 11 and 12, the former figure being a top-view of the toy similar to Fig. 2, with the toy casing cut-away and the latter figure being a partial side-view and section showing the control disk forming part of the construction shown in Fig. 11.

In either form of construction the toy vehicle comprises a base-plate 1, a casing 2, enclosing the driving mechanism as well as said controlling and adjusting device, and a clockwork 4 mounted on said base-plate 1. The clockwork is provided with a winding stem 3 and serves to drive the axle 5 for the driving wheels 6. To the axle 5, near either end thereof, are fixedly connected two disks 7, each having a detent in the form of a notch, engaging with a pawl 9 in the form of a double-armed lever pivoted, as shown at 9', to either driving wheel 6 loosely carried on said axle 5. The latter further carries the brake and coupling disks 8. Either of said disks 7 is positioned intermediate one of the driving wheels 6 and one of the brake and coupling disks 8. Positive rotation is imparted to said driving wheels 6 and said disks 8 from said disks 7 by the intermediary of said pawls 9, the lateral guide-pin 9'' thereon engaging with a radial slot in the brake or coupling disk 8 as shown in Fig. 5. Either pawl 9 is under action of a spring 23 fixed at one end thereof to said pawl, said springs forcing the front bent end of the pawls 9 into said detent notch on either catch disk 7, the other end of either spring 23 being fixed to said driving wheel 6, as shown in Figs. 4, 6, 7, and 8.

A brake member 10 serves to brake either disk

8, said member 10 being actuated by a rod 11, a resilient portion or spring 12 being preferably inserted into said rod to permit an elongation or contraction in longitudinal direction thereof.

The rear end of said rod 11 is connected, as shown in Fig. 3, to one end of a double-armed swinging lever 13, the other end of the latter extending into the path of rotation of pins 14 which may be inserted into a control disk 15 on either side thereof. This disk 15 is provided with a greater number of bores or sockets 15' for the reception of said pins 14 and with a graduation on its periphery, the whole of said graduation corresponding to the entire path of motion through which the toy will travel during a full run of the driving work. The control disk 15 is positively driven by means of sprocket-wheels 16 and 18 interconnected by a chain 17 from the spring-operated driving work 4 at a reduced velocity, the rotation of said disk 15 being always in proportion to the path of motion along which the vehicle is travelling at a time, that is to say, if the toy has travelled, for instance, through a distance of one meter, the control disk 15 will have been rotated from the numeral zero to the numeral one of said graduation.

Travel of the toy is effected by means of a pair of caterpillar bands 21 laid around upper and under idle guide-wheels 19, 20 and the driving wheels 6, 6, motion being imparted to said caterpillar bands by said driving wheels.

In order to prevent the turning and steering motion imparted to the toy against being disturbed by an excessive contact of said caterpillar bands with the running surface, the toy is equipped with a rear steering or guide-wheel 22 acting simultaneously as a rear support for the toy, so that said caterpillar bands will be in contact with the running surface only at the place of said under idle guide-wheels 19.

Instead of the bores or sockets 15' which serve for the reception of the pins 14, the control disk 15 may also be provided on either side with a circular groove or slot 24 as shown in Fig. 10, said groove or slot serving for the reception of threaded pins 14', which may be inserted through an enlargement of said groove or slot and kept fixed in the latter at any desired point of the graduation on the periphery of the disk 15. The mode of operation of this mechanical control device so far described is as follows:

Prior to placing the toy vehicle onto a running surface for travel thereon, the pins 14 are inserted into the control disk 15 on one or both sides thereof, and more particularly at those marks of the graduation which indicate the respective distance at which the toy is to be given a turning motion towards the left or right. If, for instance, the pin 14 on the left-hand side of the disk 15 comes first into action, said pin will actuate the double-armed lever or pawl 13 by imparting rocking motion thereto, thus exerting a pull onto the rod 11 causing the brake member 10 to be pressed against the periphery of the brake and coupling disk 8. The disk 8 will now be kept at standstill, the shaft 5 and the disk 7 at first still continuing to rotate the driving wheel 6 somewhat further. In this case the pawl 9 on the driving disk 8 will be carried with the latter, the guide pin 9'' in the radial slot of the disk 8 now sliding in inward direction rocking said pawl and disengaging it from the notch on the disk 7, thus uncoupling the latter from the driving wheel 6 and interrupting the drive for the latter.

Fig. 4 shows the coupling in condition still driving, while Fig. 6 shows the coupling at the moment in which braking and uncoupling takes place, and Fig. 7 the intermediary position of said coupling leading to the uncoupled position indicated in Fig. 8. The pawl 9, after being disengaged from the notch on the disk 7 upon releasing of the brake 10 by action of the equalizing tension of the spring 23, will slide on the smooth periphery of said disk 7, so that the latter will rotate idle. The driving wheels 6 and the coupling disks 8 are now disconnected from the driving work 4 and will not be positively rotated, before the disk 7 has completed a full revolution and the pawl has come again in engagement with the notch on said disk. The drive for the left-hand caterpillar band 21 is now interrupted for a proper time, and as the right-hand caterpillar band 21 continues to rotate, a turning motion will be imparted to the toy round the guide-wheel 19 in left-hand direction and at an angle of 90° to the former direction. After completed turning motion of the toy the coupling for the left-hand driving wheel 6 is again established, with the result that the toy continues to move in a new direction. If now the pin 14 on the right-hand side of the control disk comes into action, the play will be repeated also on this side of the drive and the toy will be given a turning motion in right-hand direction through an angle of 90°.

In accordance with the pins at a time inserted into the control disk a turning motion will be given to the toy towards the left or towards the right away from its straight direction of travel to thereupon move again in straight direction. In every case, the person playing with the toy will be able to previously positively determine and fix at will the path of motion along which the toy is to travel.

In the example of the toy shown in Fig. 11, the general construction and mode of operation is in agreement with Fig. 1, there being a difference only therein that in the former case the forward travelling as well as the lateral turning motion of the toy is controlled by mechanical means, while in the latter case both of said motions are controlled electrically. According to Figs. 11 and 12, the control disk 15 is equipped with a set of contacts 26 arranged counter-sunk in a groove 26' extending around the periphery of the disk. This set of contacts 26 may, for instance, be of the form of a helical spring bandage engaging with bores 15' on the disk 15, thereby coming in contact with the contact pin 14'' inserted thereinto to control the path of motion of the toy. During rotation of the disk 15 two lateral contact springs 28 shown in Fig. 11 come in contact with the heads of the contact pins 14'' when inserted into a bore 15' of the disk 15. A further spring 27 is in sliding engagement with said spring bandage 26, said spring 27 being connected by way of a contact strip 27' thereon with the one pole of a dry battery provided in known manner on the base-plate 1 of the toy, while the other pole of the dry battery 25 is connected with the toy-body. The springs 28 and 27 are mounted on the base-plate 1, a plate 32 of insulating material being inserted therebetween.

According to Fig. 11 furthermore, there are provided at the front part of the toy two magnet coils 29, the cores thereof acting against the coupling disks 8. The magnet coils 29 are connected on the one hand by means of the leads

30 and 31 to the contacts 28 and on the other hand to the toy body, so that there will be established on either operating side of the disk 15 an electrical circuit which is closed by way of the contact pins 14'' and the contact springs 28. In this case, one of the magnet-coils 29 will be energized to stop the coupling disk 8 for initiating the process of uncoupling as had above been described in connection with the mechanical control, said process of uncoupling now causing a turning motion of the toy through an angle of 90°.

While I have described herein and shown in the accompanying drawings two modes of construction of my new toy, I desire of being understood that many changes may be made in the general construction of the toy as well as in the steering and controlling devices therefor, without departing from the principle of my invention or sacrificing any of its advantages. For instance, the toy may also be controlled and steered from the control mechanism partly in a mechanical and partly in an electrical way without departing from the general principles of my invention.

I claim:

1. A toy vehicle comprising a driving mechanism for normally imparting forward motion to said vehicle, a control device associated with said driving mechanism to convert said forward motion into a turning motion, an adjusting means for said control device, means by which the control device may be operated when predetermined distances have been traveled by the vehicle, and means for determining the location of the said adjusting means to cause the aforesaid operations according to the distance traveled by the vehicle.

2. A toy vehicle comprising driving mechanism for normally imparting forward motion to said vehicle, a control device associated with said driving mechanism to convert said forward motion into a turning motion, adjusting means for said control device, said adjusting means adapted to bring about said turning motion in a predetermined manner and in which said control device comprises a control disk with a graduation thereon, said adjusting means comprising pins adapted to be exchangeably inserted into bores of said control disk, in accordance with said graduation.

3. A toy vehicle as specified by claim 2, in which said driving mechanism includes a pair of driving wheels, said control disk and said pins adapted to control a coupling device for temporarily uncoupling one of said driving wheels from said driving mechanism to maintain one of said driving wheels in action for bringing about said turning motion around the other of said driving wheels.

4. A toy vehicle as specified by claim 2, in which said driving mechanism includes a pair of driving wheels, said control disk and said pins adapted to control a coupling device for temporarily uncoupling one of said driving wheels from said driving mechanism to maintain one of said driving wheels in action for bringing about said turning motion around the other of said driving wheels, said control device including a control rod to control a coupling between said driving wheels and said driving mechanism, said rod including a resilient member inserted thereinto.

5. A toy vehicle as specified by claim 2, said driving mechanism including a pair of driving wheels loosely mounted on an axle forming part of said driving means mechanism, a disk fast on said axle, a pawl pivoted to said disk, said pawl being controlled by said control device and said adjusting means, said pawl being further under action of a coupling disk associated with a braking member controlled by said disk.

6. A toy vehicle as specified by claim 2, having the form of a tank and including caterpillar bands associated with said driving mechanism, guide-wheels for said caterpillar bands, and a rear guide-wheel for supporting said vehicle in a manner to lift the rear part thereof from its running surface and to cause said caterpillar bands to be in contact with the running surface essentially only at that place on which it is carried round a guide-wheel.

7. A toy vehicle as specified by claim 2, said driving means including a pair of driving wheels, said control device including a control disk with a graduation thereon and pins adapted to be inserted exchangeably into said disk at places marked by said graduation, said disk being associated with electrical contact means adapted to control said driving wheels to couple and uncouple one of said wheels to and from said driving mechanism for imparting a turning motion around the other wheel to said vehicle at a point of its travel pre-determined by the position of said pins or pin on said control disk and indicated by said graduation.

8. A toy vehicle as specified by claim 2, said driving means including a pair of driving wheels, said control device including a control disk with a graduation thereon and pins adapted to be inserted exchangeably into said disk at places marked by said graduation, said disk being associated with electrical contact means adapted to control said driving wheels to couple and uncouple one of said wheels to and from said driving mechanism for imparting a turning motion around the other wheel to said vehicle at a point of its travel pre-determined by the position of said pins or pin on said control disk and indicated by said graduation, said electrical contact means including contact springs in circuit with said control disk, magnet-coils adapted to be energized in dependence from the position of said pins or pin on said disk, an iron core in either of said magnet-coils, said iron cores co-operating with coupling disks interposed between said driving mechanism and said driving wheels to temporarily put said latter disks to standstill and to effect coupling or uncoupling of the one or other of said driving wheels to and from said driving mechanism to impart said turning motion to said toy vehicle.

9. A toy vehicle as specified by claim 2, in which the driving mechanism comprises a clockwork-driven main driving axle, a pair of driving wheels loose on said axle, said vehicle including further a coupling mechanism interposed between said driving axle and each of said driving wheels, said coupling mechanism being controlled by said control device to couple or uncouple one or the other of said driving wheels to and from said driving axle in dependence from said adjusting means to bring about said turning motion around the driving wheel at a time uncoupled from said axle.

LUDWIG CARL.