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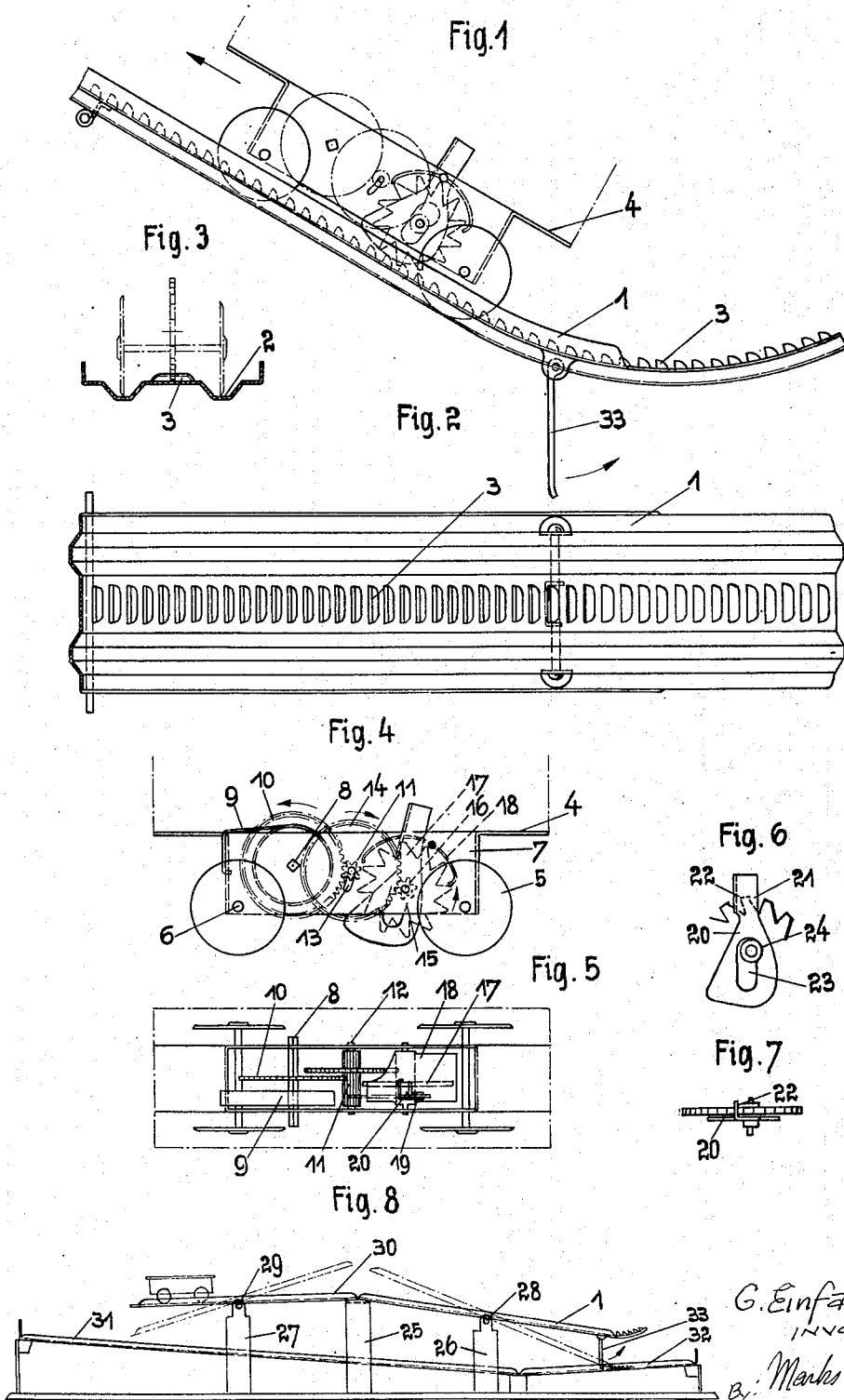
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1,997,512

TOY RAILWAY

Filed March 3, 1933

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

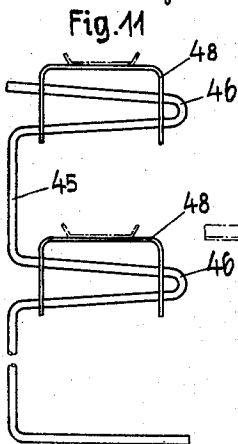
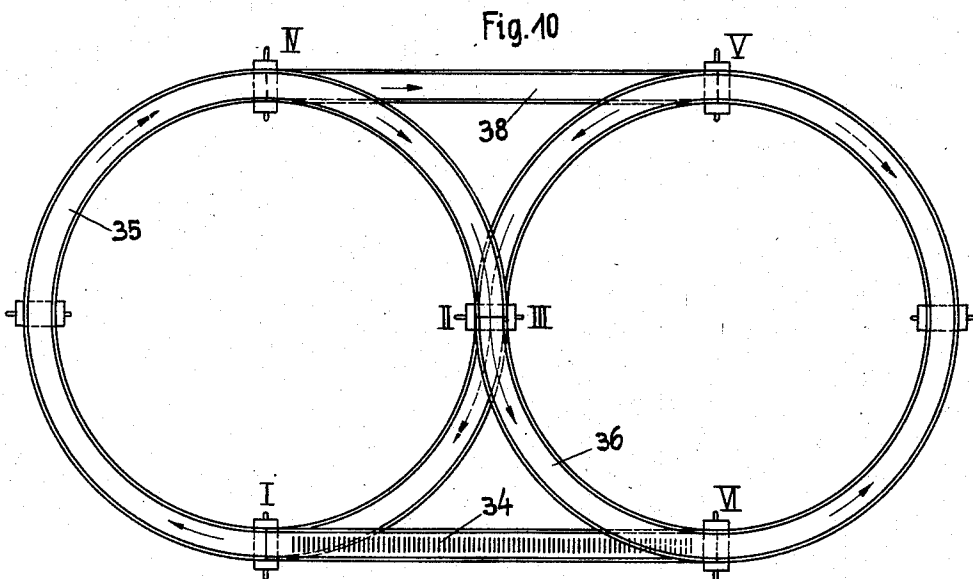
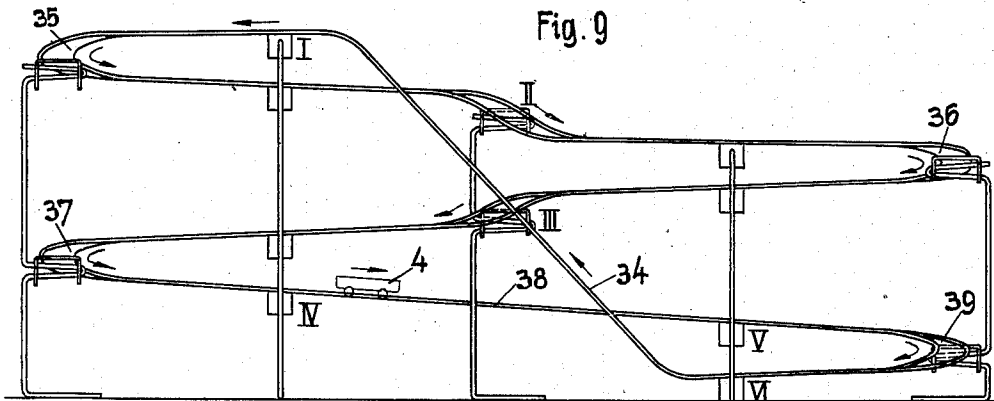


Fig. 12

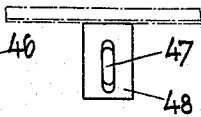


Fig. 14

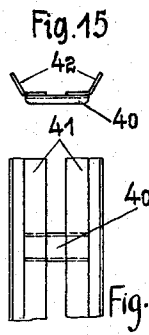
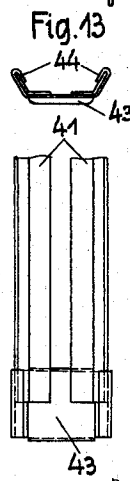


Fig. 16

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UNITED STATES PATENT OFFICE

1,997,512

TOY RAILWAY

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Application March 3, 1933, Serial No. 659,566
In Germany February 19, 1932

5 Claims. (Cl. 105-29)

This invention relates to a toy rack railway in which the driving mechanism of the vehicle is released on striking against a rack rail when ascending an incline and is automatically locked again when running over the same in descending. Such releasing and locking devices in co-operation with corresponding suitable constructions for the descending and climbing of the toy vehicle give a longer running time for the motor.

The particular advantage of the construction lies in the extremely simple construction of the running mechanism and the rack rail.

According to the invention the toy has for the running mechanism a pawl lying within range of the teeth of the rack rail, which pawl is mounted in a recess of a curved member having a guiding slot and within this guiding slot the pawl slides over the driving axle, on which axle is mounted a special toothed wheel for engaging in the teeth of the rack rail. In the teeth of this special toothed wheel a tongue on the pawl engages so that when the pawl is lifted by impinging against the teeth of the rack rail the motor can run down and when the pawl is dropped the motor is locked.

The toy is illustrated in the accompanying drawings, several examples of its use being shown. Fig. 1 shows the rack rail in longitudinal elevation.

Fig. 2 shows the same in plan, and Fig. 3 is a cross-section.

Fig. 4 shows the vehicle with driving mechanism in longitudinal elevation.

Fig. 5 shows the same in plan.

Figs. 6 and 7 show the ratchet device in elevation and in plan.

Figure 8 is a side elevation of the device;

Fig. 9 is a side elevation of a modified form of the device;

Fig. 10 is a plan of the modification shown in Fig. 9;

Figs. 11 and 12 show the spring supports used in this modification; and

Figs. 13 and 14 show in end elevation and plan respectively, a track and a rail section with its sleeper;

Figs. 15 and 16 are respectively an end elevation and a plan view of a rail section with a sleeper attached.

The rack rail 1, the ends of which may be rounded for adapting it to the connecting rails, has over its whole length teeth 2 arranged between the track channels 3, which teeth are formed not on a separate toothed rail but are formed in the rail surface. In order to obtain

the effect necessary for the toy illustrated in Fig. 8, the rail has hinged to it a folding bracket 33.

A vehicle suitable for climbing and ascending consists of a framework 4 with the superstructure of a coach. The running wheels 5 fitting in the track channels of the rails are mounted on the axles 6 which are mounted in the casing 7 of the running mechanism. The winding axle 8 carries in addition to the motor spring 9 a toothed wheel 10 which engages with the gear 11 of an intermediate axle 12 which is mounted in slots 13 in the sides of the casing 7 having the winding axle 8 as their centre of curvature and the intermediate wheel 14 of which engages in a gear 15 which is secured to the actual driving axle 16 which for driving the vehicle carries within range of the rack rail 1 a toothed wheel 17, the teeth of which coincide with those of the rack rail 1. Above the driving axle 16 is arranged a member 18 forming part of the means for regulating the running down of the motor. On the gear 15 of the driving axle and in a suitably profiled aperture 19 in the arched surface of said member there is slidably mounted a pawl 20 which at the bottom has a nose-like surface and at the top has a guiding shank 21 which is bent approximately at right angles to the actual locking tongue 22. The guiding slot 23 in the surface of the pawl approximately corresponds in its breadth to the diameter of the gear 15, and at the top forms a rounded and eccentrically placed aperture 24.

In Fig. 8 an example of the use of the device is shown which shows a collapsible rack railway with a system of rails placed one below the other in which the vehicle constantly climbs and descends. This toy is constructed of supporting members 25 and tilting supports 26 and 27. On the axle 28 connecting one pair of tilting supports a rack rail 1, as described above, is rotatably mounted, while on the axle 29 connecting the pair of supports 27 a smooth rail 30 is rotatably mounted but not balanced. Below this rotatable rail there is arranged a fixed rail 31 which is inclined in the opposite direction to the rail 30 and leads to the fixed rising rail 32. The winding of the motor 9, by turning the winding axle 8 in the direction opposite to that indicated in Fig. 4, results in a depression of the toothed wheel 14 and axle 12, mounted in the circumferential slot 13, so that the driving axle 16, which is acted on by the blocking pawl 20, is cut off from the motor. When the vehicle 4 is placed on the rail 30, which can swing about the pivots 28 on the support 27, the vehicle begins to run on account of the in-

clination of the rail and its own weight. After reaching the front end of the rail this end is depressed and the vehicle runs on to the rail 31 placed below and sloping in the opposite direction, which is directly connected to a rising rail 32. When it runs over the latter, the previously arranged hinged support 33 is turned by the vehicle in the direction of the arrow and thereby the rack rail 1 is brought into the position shown in broken lines in Fig. 8 in which it rests on the rising rail 32 by turning round the axle 28 on its supports 26.

In the meantime the vehicle has run back over this rail and impinges on the depressed rack rail 1 and its teeth 3. The motor 7, which is under spring tension, is thereby released, the lower slightly rounded edge of the pawl 20 striking against the teeth 3 and releasing the pawl slightly rotating it so that the pawl 20 is radially displaced on the drive 15 from the aperture 24 towards the guiding slot 23 which at the same time results in the movement of the pawl 20, see Fig. 1, caused by the continuous row of teeth 3. The locking tongue 22 is raised on the teeth of the wheel 17 so that the toothed wheel can turn under the influence of the spring tension. The swinging escapement member 18 regulates the uniform running down of the clockwork. In this way the toothed wheel 17 comes into engagement with the equally placed teeth 3 and the vehicle climbs in the manner of a rack railway up the inclined rail 1.

When the vehicle has reached the upper half, the rack rail sinks to the support 25 on account of the weight of the vehicle. The support 33 assumes an upright position and supports the rack rail while the vehicle 4 runs on to the rail 33 which has no teeth. As a result, the pawl 20, which has hitherto been raised by the teeth 3, falls automatically and the rotation of the wheel 17 is interrupted on account of the resulting engagement of the tongue 22 in its teeth. The impact of one of the teeth against the tongue also results in a small radial displacement of the pawl which is guided within the escapement member, which is sufficient to slide the pawl on the drive 15 from the slot 23 to the aperture 24, and thus ensure its vertical position. The vehicle continues to run under the influence of gravity until it again reaches the depressed toothed rail, after which it continues to ascend again until the motor is run down.

The body of the "figure 8" illustrated in this example consists of a rack rail adapted for overcoming the incline and a series of curved and straight rails and the standards for supporting the rails and the vehicle. After the rack rail 34, which is substantially as described above and runs at a suitable inclination, there follows a curved rail 35 extending from the rail joint I to the joint II over an angle of about 270°, which is connected to a curved rail of completely circular shape (360°) leading to the joint III. The curved rail 37 (270°) leading from here to the joint IV runs into a straight rail 38 which is connected at joint V to a semi-circular curved rail 39 which is connected with the lower end of the rack rail 34 at the joint VI.

The running down of the vehicle 4 provided with the above-described spring motor 7, is here also effected under the influence of weight and gradients automatically from the rail joint I

until it reaches the rack rail 34 behind the joint VI. Here in the same manner as in the example as illustrated in Fig. 8, the vehicle is unable to overcome the inclination of the rail by the raising of the pawl which releases the motor and by the engagement of the toothed wheel and the toothed rail. The running down and the continued climbing of the vehicle over the rack rail continues until the running mechanism or the clockwork motor is completely run down.

The rail strips 41 which in this example are connected by bridge members 40, have oblique walls 42 on each side for better guiding the vehicle. The end connection of these rails is effected by means of joint members 43 which have a rounded overlapping 44 with the ends of the strips for being pushed into the rail pieces.

For supporting the rail body, use is made of the resilient stands 45 which are curved over at the bottom to form a foot and which at the top have V-shaped clips 46, the limbs of which fit resiliently into the slots 47 of the supporting stirrups 48 which are rigidly connected with the rail members.

Of course, instead of the running mechanism described and illustrated, any other driving motor may be employed while retaining the above-described automatic engaging and disengaging mechanism. Thus, for example, it would also be possible to build into the vehicle an electric motor acting on a driving axle which when fed from the pocket lamp battery or the like would remain in circuit as long as the pawl was sliding over the teeth of a suitably insulated rack rail 1 or 34.

What I claim is:

1. A toy railway vehicle for use on a track having a toothed rail for at least a part of its length, driving means and automatic locking and releasing means therefor mounted on said vehicle, said means comprising a motor, a pawl adapted to come in contact with the teeth of the rail, a member having an aperture in which the pawl is mounted, a driving axle, a pinion thereon driven by the motor, the driving axle extending through a slot of the pawl, a toothed wheel keyed to said axle and adapted to engage in the teeth of the rail, a tongue on the pawl adapted to engage with the teeth of the wheel to lock said wheel when the pawl is in its lower position and to release said wheel when the pawl is lifted by impinging against the teeth of said rail.

2. A toy railway as claimed in claim 1, characterized by the feature that the guiding slot in the pawl has an eccentric part in which the driving axle engages when the pawl is depressed.

3. A toy railway as claimed in claim 1, in which the teeth are pressed out of the rail.

4. A toy railway as claimed in claim 1, and having tilting rails which, together with the toothed rail, are pivoted and a supporting member for the toothed rail which folds at the impact of the vehicle or when the vehicle runs over the tilting rail.

5. A toy railway as claimed in claim 1, having a plurality of straight and curved rail sections arranged to form a suitable figure in which said toothed rail leads to the highest point of the figure, and having from said highest point to the lowest point of the toothed rail a sufficient drop to convey said vehicle over said figure back to the toothed rail.

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