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M. ERNST

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TOY VEHICLE WITH SPRING-ACTUATED DRIVE

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2 Sheets-Sheet 1

Fig. 1

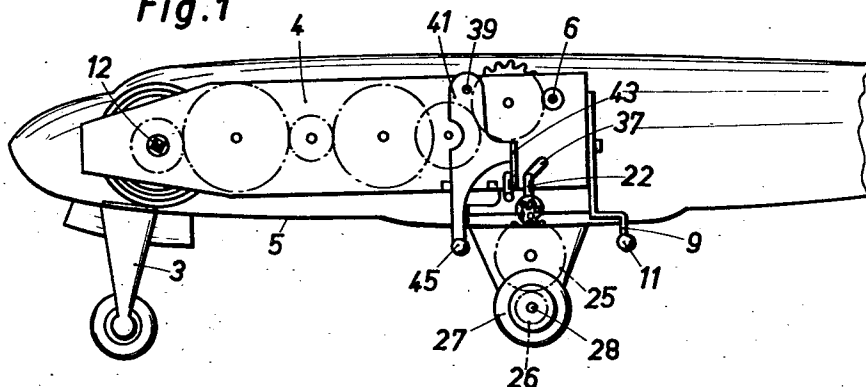
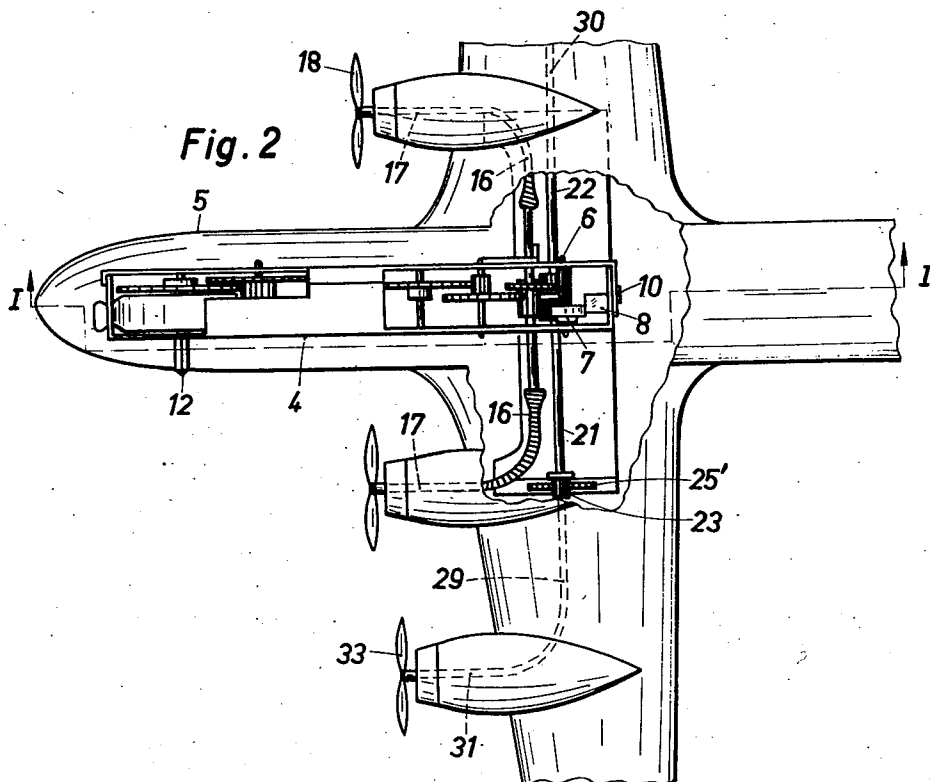


Fig. 2



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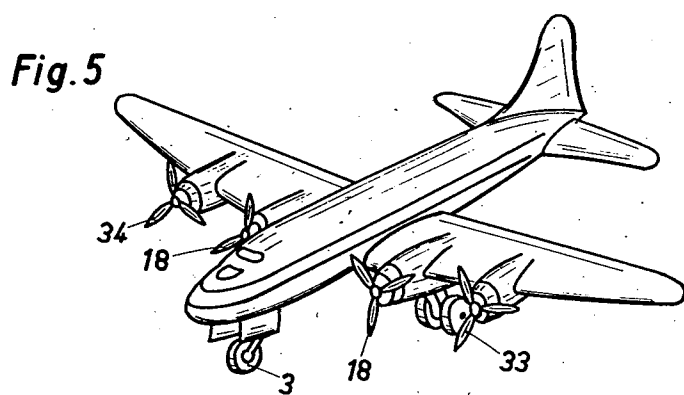
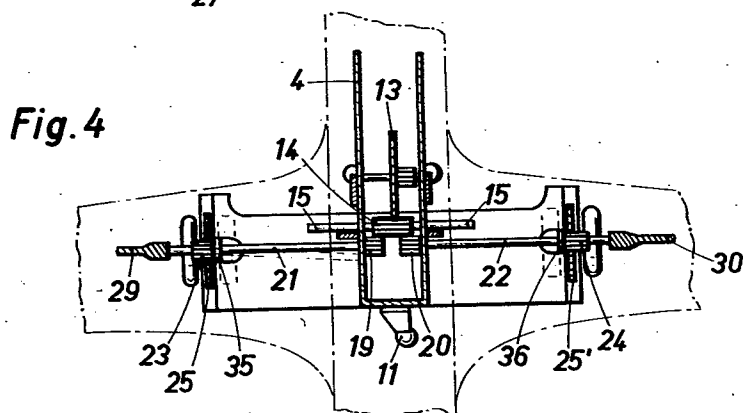
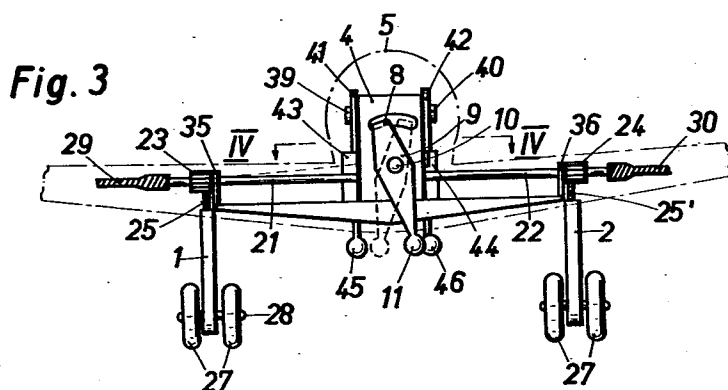
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TOY VEHICLE WITH SPRING-ACTUATED DRIVE

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2 Sheets-Sheet 2



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1

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TOY VEHICLE WITH SPRING-ACTUATED DRIVE

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7 Claims. (Cl. 46—208)

The present invention relates to a toy and, more particularly, to a toy which is driven by a spring-actuated drive and has two driven wheels the axes of rotation of which are transverse to the direction of movement of the wheels, and furthermore has a third front or rear wheel which is not driven by the drive.

Such three-wheel carriages are known for instance in connection with tricycles, three-wheel automobiles or with airplane models. The drawback of the heretofore known three-wheel toy vehicles consists in that, unless the third wheel can be steered, the toy vehicle can drive only in straight direction so that the child playing with such a three-wheel toy can turn on the toy only for idling or only for straight drive. This represents a particular drawback with toys representing an airplane, in which the two landing gears and two or four propellers are driven together by the spring-actuated drive.

It is, therefore, an object of the present invention to provide a toy vehicle which will overcome the above mentioned drawbacks.

It is another object of this invention to provide a toy vehicle, especially an airplane model which will allow selectively to adjust the vehicle for idling, straight forward drive or for driving along a curve toward either side.

It is a further object of this invention to provide a toy vehicle of the type set forth in the preceding paragraph which will make it possible to interrupt the drive of the running wheels individually or together.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings in which:

Fig. 1 represents a longitudinal section through the front portion of the fuselage of a four-motor passenger plane model with front wheel and a spring-actuated drive arranged in the nose of the plane, said section being taken along the line I—I of Fig. 2.

Fig. 2 is a top view of the plane shown in Fig. 1 with the top portion of the fuselage partly removed to show the inside of the toy plane.

Fig. 3 illustrates a rear view of the landing gear and the spring-actuated drive of the model shown in Figs. 1 and 2.

Fig. 4 shows the rear portion of the spring-actuated drive and a top view of the landing gear, the section shown in Fig. 4 being taken along the line IV—IV of Fig. 3.

Fig. 5 is a perspective view of the toy airplane according to Figs. 1 to 4.

General arrangement

According to the present invention the toy vehicle, especially the toy airplane, is provided with means which makes it possible selectively to connect or disconnect the driving wheels of the vehicle either individually or together with or from the driving mechanism for said wheels. In this way the vehicle can be caused to make a left or right turn in addition to driving straight forward.

The driving through a left or right curve may according

2

to the present invention be made possible by journalling the driving shafts of the carriages or wheels in a longitudinal slot in the landing gear or carriage while said shafts can selectively be drivingly connected with or disconnected from the drive by means of control levers preferably tiltably arranged in the carriage or landing gear.

The invention is applicable to all three-wheel toy vehicles in which the running wheels arranged side by side are driven by a spring-actuated drive. The invention is particularly appealing to children when it is applied to a two or four-motor airplane model in which the propeller as well as the wheels of the landing gear are driven by a spring-actuated drive.

Structural arrangement

Referring now to the drawings in detail, the toy shown therein represents a four-motor passenger plane which has a retractable landing gear 1 and 2 below the wings and is additionally provided with a front landing gear 3 below the cockpit. The frame 4 for the drive mechanism is mounted in the nose 5 of the plane so that the center of gravity of the plane is located between the landing gears 1, 2 and 3. The rear portion of the spring-actuated drive comprises in a manner known per se an eccentric fly-wheel mass 7 which is rotatable about the shaft 6 and serves as a takeoff brake. The fly-wheel mass 7 is engaged by a bent ear 8 of a two-arm lever 9 which is tiltably about the axis 10 in the frame 4. The end of the lower arm of the two-arm lever 9 is provided with a handle 11 which protrudes from the lower side of the airplane model. Said handle may for instance be of synthetic material. By shifting the lever 9, the drive may be connected or disconnected with or from the running wheels respectively. For winding up the drive, there is provided in a manner known per se a shaft 12 of square cross section.

As will be seen from Fig. 4, the gear 13 of the spring-actuated drive meshes with a pinion 14 which is rigidly connected with a shaft 15. Both ends of the shaft 15 protrude laterally beyond the frame 4 for the drive mechanism. The ends of the shaft 15 are connected through elastic shafts 16 with the shafts 17 of the two inner propellers 18 of the airplane model. The pinion 14 furthermore meshes with two further pinions 19 and 20 provided at the ends of the shafts 21 and 22. The shafts 21 and 22 are near the outer ends thereof provided with pinions 23 and 24 respectively. The pinions 23, 24 are through an intermediate gear 25, 25' (Fig. 1) respectively drivingly connected with a gear 26. Each of the gears 26 is rigidly connected with a shaft 28 carrying the running wheels 27. The shafts 21, 22 furthermore protrude beyond the pinions 23 and 24 and are respectively drivingly connected with the shafts 31 of the outer propellers 33 and 34 through elastic shafts 29 and 30 respectively. As will be seen from Fig. 4, the shafts 21 and 22 have their outer ends journalled in upwardly bent ears 35 and 36. The shafts 21 and 22 are journalled in longitudinal slots 37 (Fig. 1) in the frame 4 for the driving mechanism. Tiltably mounted on each side of the frame 4 about a pivot 39, 40 respectively are levers 41 and 42 respectively which are provided with abutment ears 43 and 44 and have their lower ends protruding from a slot in the fuselage. The protruding end is provided with a ball-shaped handle 45, 46 which may for instance be of synthetic material.

Operation

The operation of the toy shown in the drawings will be evident from the various figures. When the two control levers 41, 42 occupy their forwardly tilted positions, the two shafts 21 and 22 are due to the spring effect of the

elastic shaft portions 29 and 30 tilted into a position in which the two pinions 19 and 20 mesh with the pinion 14. Thus, when releasing the spring-actuated drive by means of the handle 11, both carriages or landing gears and all four propellers are driven so that the airplane model will drive along a straight path. When the left-shifting lever 41 is tilted backwards, the shaft 21 is displaced in the longitudinal slot 37 toward the rear and upwardly so that the pinion 19 disengages the pinion 14. Consequently only the right-hand carriage or landing gear is driven, and in addition to the two inner propellers 18 also the right outward propeller 34 is driven. Thus the airplane performs a drive through a left curve. If, on the other hand the right-hand shifting lever 42 is tilted toward the rear, a drive through a rightward curve is performed in an analogous manner while now the left-hand carriage or landing gear and the outermost left-hand propeller 33 are driven by the spring-actuated drive.

When both shifting levers 41 and 42 are tilted toward the rear, both landing gears or carriages are disconnected. The spring-actuated drive now runs idle while the airplane does not move forwardly and only the two inner propellers 18 rotate which are directly connected with the spring-actuated drive.

It is, of course, understood that the present invention is, by no means, limited to the particular construction shown in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. A toy vehicle having two wheels arranged with their axes of rotation in at least approximate axial alignment with each other and substantially transverse to the driving direction of said vehicle, which comprises in combination: frame means carrying said wheels, spring-actuated driving means carried by said frame means for driving said wheels, a pair of substantially axially aligned rotatable shafts movable independently of each other and respectively drivingly connected to said wheels, each of said shafts having one end thereof displaceably journaled in said frame, first gear means rotatably connected to one of said shafts adjacent the displaceably journaled end thereof, second gear means rotatably connected to the other one of said shafts adjacent the displaceably journaled end thereof, said first and second gear means being arranged for selective engagement with or disengagement from said spring-actuated driving means in response to the movement of the respective adjacent displaceable shaft end from a first position into a second position and vice versa, and manually operable control means connected with said shafts and operable selectively to displace either one or both of said displaceably journaled ends of said shafts for relative displacement of said first and second gear means with regard to said spring-actuated driving means.

2. In a toy airplane having two wheels arranged with their axes of rotation in at least approximate axial alignment with each other and substantially transverse to the driving direction of said airplane and including four propellers arranged so that two of said propellers representing the inner propellers are closer to the fuselage than the other two propellers representing the outer propellers, the combination of: frame means carrying said wheels, spring-actuated driving means carried by said frame means for driving said wheels and said propellers, means continuously drivingly connecting said inner propellers with said spring-actuated driving means, a pair of substantially axially aligned rotatable shafts movable independently of each other and respectively drivingly connected to said wheels and said outer propellers so that one of said shafts is operable jointly to rotate one of said wheels and one of said outer propellers and the other one of said shafts is operable jointly to rotate the other one of said wheels and the other one of said outer propellers, each of said shafts having one end thereof displaceably journaled in said frame means, first gear means rotatably

connected to one of said shafts adjacent the displaceably journaled end thereof, second gear means rotatably connected to the other one of said shafts adjacent the displaceably journaled end thereof, said first and second gear means being arranged for selective engagement with or disengagement from said spring-actuated driving means in response to the movement of the respective adjacent displaceable shaft end from a first position into a second position and vice versa, manually operable control means connected with said shafts and respectively operable to move said displaceable shaft ends from said second position at which the respective gear means is in driving engagement with said spring-actuated driving means into said first position for disengagement of the respective gear means from said spring-actuated driving means, and means respectively connected with said shafts for continuously urging the displaceable end thereof to move the gear means pertaining thereto into engagement with said spring-actuated driving means.

3. A toy airplane according to claim 2, in which the displaceable ends of said shafts are journaled in slots, and in which said control means are formed by tiltable levers supported by said frame means.

4. In a toy vehicle having at least two wheels arranged with their axes of rotation in at least approximate axial alignment with each other and substantially transverse to the driving direction of said vehicle, the combination of: frame means carrying said wheels and provided with two slots, a pair of substantially axially aligned shafts having their inner ends respectively movably journaled in said slots and being respectively provided with first and second gear means drivingly connected to said wheels, spring-actuated driving means carried by said frame means and including main gear means for driving engagement with said first and second gear means, control means supported by said frame means and operable selectively to move the inner end of either one or both of said shafts in said slots so as to lift either one or both of said first and second gear means out of engagement with said main gear means and to hold the respective gear means pertaining to said shafts out of engagement with said main gear means, and additional control means protruding from the lower portion of the toy vehicle and supported by said frame means for selectively interrupting operation of said driving means.

5. A toy vehicle according to claim 4, in which the protruding ends of said first mentioned control means and of said additional control means are provided with knob means of synthetic material.

6. In a toy airplane having two wheels arranged with their axes of rotation in at least approximate alignment with each other and substantially transverse to the driving direction of said airplane, the combination of: frame means carrying said wheels, spring-actuated driving means carried by said frame means for driving said wheels, four propellers arranged so that two of said propellers representing the inner propellers are closer to the fuselage than the other two propellers representing the outer propellers, first shaft means directly connecting said inner propellers with said spring-actuated driving means, second shaft means arranged for drivingly connecting said outer propellers with said spring-actuated driving means, said second shaft means comprising two substantially axially aligned separate shafts respectively drivingly connected to said outer propellers and movable individually from a first position for driving connection with said driving means into a second position out of driving connection with said driving means and vice versa, means continuously urging said shafts into said first position, control means respectively connected with said separate shafts and operable selectively for moving either one or both of said shafts into said second position thereof, and a pair of power conveying means respectively connected to said separate shafts and respectively effecting driving connection between said shafts and said

5

wheels, one of said power conveying means establishing driving connection between one of said wheels and one of said shafts, and the other one of said power conveying means establishing driving connection between the other one of said wheels and the other one of said shafts. 5

7. An airplane according to claim 6, which is provided with a further wheel, and in which the spring-actuated driving means is arranged in the nose of the fuselage of said airplane, said further wheel being arranged below said nose.

10

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