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(54) **CONSTRUCTION TOY WITH REMOTE CONTROL**

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(57) **ABSTRACT**

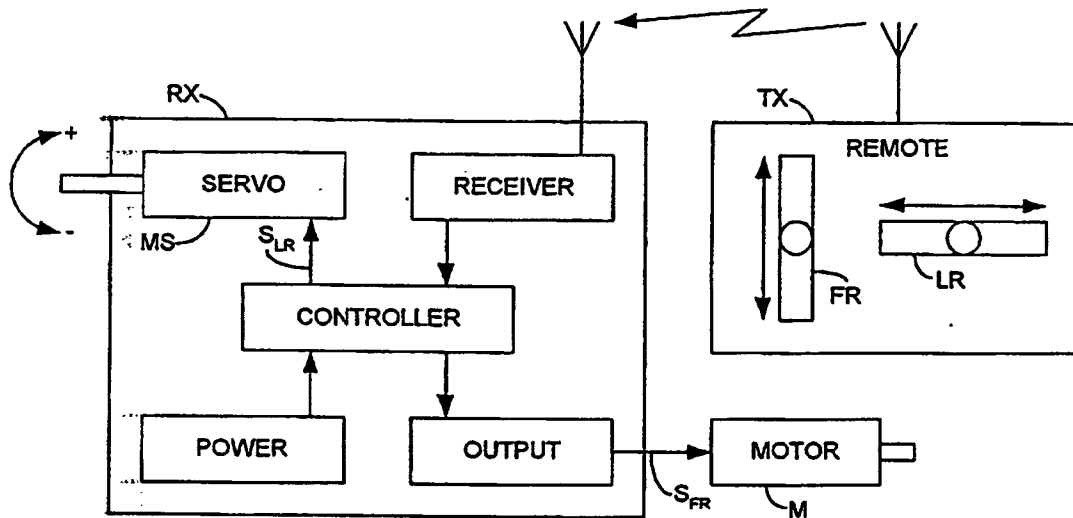
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A construction toy with a wireless transmitter (TX) having at least two channels and a receiver unit (RX). In the receiver unit is an integral first functionality unit (MS), eg a position servomotor, and at least one further external functionality unit (M), eg a motor, can be coupled to the receiver unit (RX) and operated thereby.



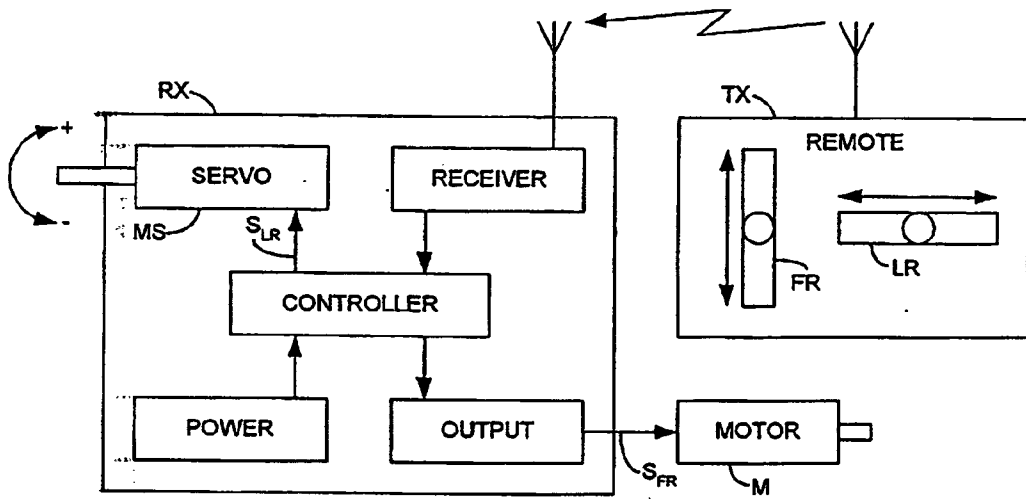


Fig. 1

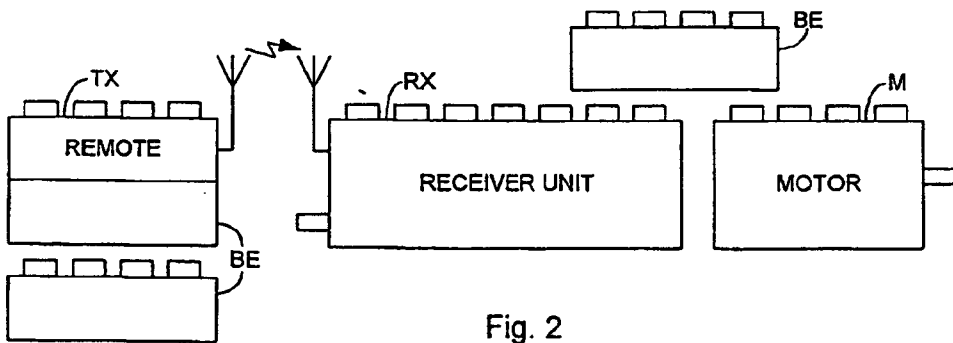


Fig. 2

## CONSTRUCTION TOY WITH REMOTE CONTROL

[0001] This invention relates to a construction toy comprising a wireless remote control with transmitter and receiver. With the construction toy it is possible to build various structures, such as a toy vehicle in accordance with the wishes of the user, and the structures thus constructed can be remote-controlled.

### BACKGROUND OF THE INVENTION

[0002] Construction building sets are available for building remote-controlled structures, wherein the user is to assemble various basic elements and functionality blocks featuring each their functionality. Thus, in a remote-controlled toy there may be a receiver for receiving wireless remote-control signals, a control unit emitting control signals to a number of functionality units, and a power supply, eg in the form of a battery. In particular for new users it may be a complex and time-consuming task to assemble the individual elements and the work associated therewith may be confusing.

[0003] Also ready-configured, remote-controlled toys are available, wherein the toy contains a receiver for one or more independent channels, a control unit and all functionality elements that receive control signals from the control unit. Most often, such remote-controlled toys are suitable only for one specific purpose and do not provide the user with any degree of freedom when it comes to expressing his imagination; rather they are limited to one signal or very few and closely related uses.

### OBJECT OF THE INVENTION

[0004] It is an object of the invention to provide a construction toy that is not limited to one single or a few uses, but can rather be used for many purposes and that thus provides the user with a high degree of flexibility.

### BRIEF DESCRIPTION OF THE INVENTION

[0005] This object is achieved with a construction toy in accordance with the invention, wherein one single receiver unit contains a receiver for wireless signals a control unit and a first functionality unit in fixed connection to the control unit, and wherein a second functionality unit which is external in relation to the receiver unit can selectively be connected to the receiver unit, thereby enabling it to receive corresponding control signals from the control unit.

[0006] Hereby it is ensured that the first functionality unit operates as intended, since erroneous mounting is not an option. This is of importance, in particular to young users and new users who will immediately experience success, in particular when using the construction toy with only one remote-controlled functionality, as its ability to function is readily ensured. Moreover, the construction toy according to the invention also presents challenges to more experienced users who are themselves able to connect one or more functionality units in a configuration designed to his own wishes.

[0007] The first functionality unit is preferably a position servomotor. A position servomotor can be used for operating a steering linkage in a toy vehicle or elevator aileron or rudder in a model plane, but a position servomotor can also be used in other constructions where a specific angular

position is desired within specific limits. One example of this is a toy figure, in which the head, an arm or a leg is to be moved.

[0008] The second functionality unit is preferably one or more electrical motors that can be used for operating a toy vehicle, but functionality units are also perceivable that have other functions, such as light and sound or activation of further functions, tc.

[0009] Preferably the construction toy comprises interconnectable building elements with coupling means in the form of protruding studs and corresponding cavities for receiving coupling studs on other building elements or other coupling means known from toy building sets marketed under trademarks LEGO® or DUPLO®.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a schematic flow chart of the essential elements of the invention in a preferred embodiment; and

[0011] FIG. 2 shows an exemplary embodiment with interconnectable building elements.

### DETAILED DESCRIPTION OF THE INVENTION

[0012] FIG. 1 is a flow chart of a remote-controlled construction toy with a remote-control unit or transmitter TX and a receiver unit RX. The transmitter TX is a conventional two-channel transmitter with two operating means FR and LR. When these operating means are activated the transmitter TX emits two independent radio-frequency, remote-control signals in correspondence with the user's operation of the operating means. Alternatively, it is an option to use infrared signals or other wireless signals, such as sound signals, in particular ultrasound signals.

[0013] The receiver unit RX has a receiver with an antenna for receiving the remote-control signals from the transmitter TX and a power supply unit that supplies electrical energy to all units in the receiver unit RX. The receiver processes the signals thus received, eg by down-conversion, and transmits the processed signals to a control unit. In the control unit the received signals are detected and control signals  $S_{FR}$  and  $S_{LR}$  are generated in correspondence with the actual positions of the operating means FR and LR to a motor M and a servomotor MS, respectively. The motor M is external in relation to the receiver unit RX and receives the control signal  $S_{FR}$  via a cord. The motor M rotates continuously with a speed of rotation that depends on the magnitude of the control signal  $S_{FR}$ , thereby enabling the motor M to drive eg a toy vehicle at a speed that can be regulated by the operating means FR on the transmitter TX. The servomotor MS adjusts the angular position of its output shaft in response to the control signal  $S_{LR}$ , such that the servomotor MS can operate eg a steering linkage on a toy vehicle, thereby imparting to the leading wheels a turning that can be regulated by the operating means LR on the transmitter TX. The servomotor MS is shown with a shaft that can either be the rotor shaft of the servomotor that protrudes from the housing of the servomotor, or it can be an external extension shaft introduced into an aperture intended therefore and is thus operated by the servomotor. Correspondingly applies to the motor M.

[0014] FIG. 2 is a schematic view of an embodiment of the invention, wherein the elements of the invention are

integral with interconnectable toy building elements having coupling means in the form of protruding coupling studs on the top faces of the building elements and corresponding coupling cavities on the bottom faces for receiving coupling studs on other building elements. Such building elements are known from toy building sets marketed under trademarks LEGO® or DUPLO® and are described in detail in eg U.S. Pat. No. 3,005,282, reference being made to that. As outlined in **FIG. 2** the receiver unit RX and the motor M can be combined to form an assembly by means of one or more of the prior art building elements BE, whereby the assembled structure is eg a toy vehicle, wherein the motor operates one or more wheels. In the same manner the transmitter TX can, if desired, be interconnected with one or more of the known building elements BE.

[0015] Interconnection of the receiver unit RX and the motor M may also be accomplished by means of other coupling means than the coupling studs and coupling cavities described above. The construction toy can thus comprise particular building elements that are constructed in particular for assembly of two or more building elements and enable eg mutual rotation of interconnected elements. One example of such assembly element is shown in U.S. Pat. No. 4,461,116.

[0016] The motor M is provided with electrical energy from the receiver unit RX. To this end, specialised building elements can be used, the coupling studs and coupling cavities of which have metallic contact faces with electrical connection to eg a lead wire. In the same manner both the receiver unit RX and the motor M have their electrical terminals on such metallic contact faces on coupling studs or in coupling cavities. Upon interconnection by means of such building elements an electrical connection is immediately formed without the use of separate wires.

[0017] The particular building elements mentioned herein for interconnection are known from toy building sets sold under the trademark LEGO TECHNIC®.

1. A construction toy of interconnectable building elements and comprising

- a transmitter (TX) with at least two independent channels and an operating means (FR, LR) for each channel, wherein the transmitter (TX) is configured for emitting, in response to the operating means (FR, LR), wireless remote control signals for each of the independent channels;
- a receiver configured for receiving the wireless remote control signals from the transmitter (TX);
- a control unit configured for emitting, in response to received remote-control signals, independent control signals ( $S_{LR}$ ,  $S_{FR}$ ) for each channel;

a first and a second functionality unit (MS, M) associated to a respective one of the independent channels, wherein each functionality unit (MS, M) is configured for receiving corresponding control signals ( $S_{LR}$ ,  $S_{FR}$ ) from the control unit and performing a function corresponding to a received control signal,

characterised in that the construction toy comprises a receiver unit (RX), wherein the receiver, the control unit and the first functionality unit (MS) are integral with the receiver unit (RX); and that the second functionality unit (M) is external in relation to the receiver unit (RX) and can selectively be connected to the receiver unit (RX), such that the second functionality unit (M) is able to receive corresponding control signals from the control unit.

2. A construction toy according to claim 1, characterised in that the receiver unit (RX) and the second functionality unit (M) have coupling means by which they can selectively be interconnected and separated.

3. A construction toy according to claim 2, characterised in that the first functionality unit is a position servomotor (MS) with an output shaft, whose angular position is controlled in response to the corresponding operating means (LR).

4. A construction toy according to claims 2-3, characterised in that the second functionality unit is a motor (M) with an output shaft, whose speed of rotation is controlled in response to the corresponding operating means (FR).

5. A construction toy according to claims 2-4, characterised in that the second functionality unit comprises two or more motors (M) with each their output shaft, the speed of rotation of which is controlled in response to corresponding operating means (FR).

6. A construction toy according to claims 2-5, characterised in comprising interconnectable building elements (BE) for the construction of a toy vehicle with controllable wheels that can be controlled by the first functionality unit (MS).

7. A construction toy according to claims 1-6, characterised in that each of the interconnectable building elements (BE) has coupling means in the form of protruding studs and corresponding cavities for receiving studs on another building element (BE).

8. A construction toy according to claim 7, characterised in that the coupling means on the interconnectable building elements (BE) have electrical contact faces with electrical connection to other parts.

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