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(71) Applicant: **Nagares, S.A.**
16200 Motilla del Palancar,
Cuenca (ES)

(72) Inventor: **Navalon Carretero, Herminio**
16200 Motilla del Palancar (Cuenca) (ES)

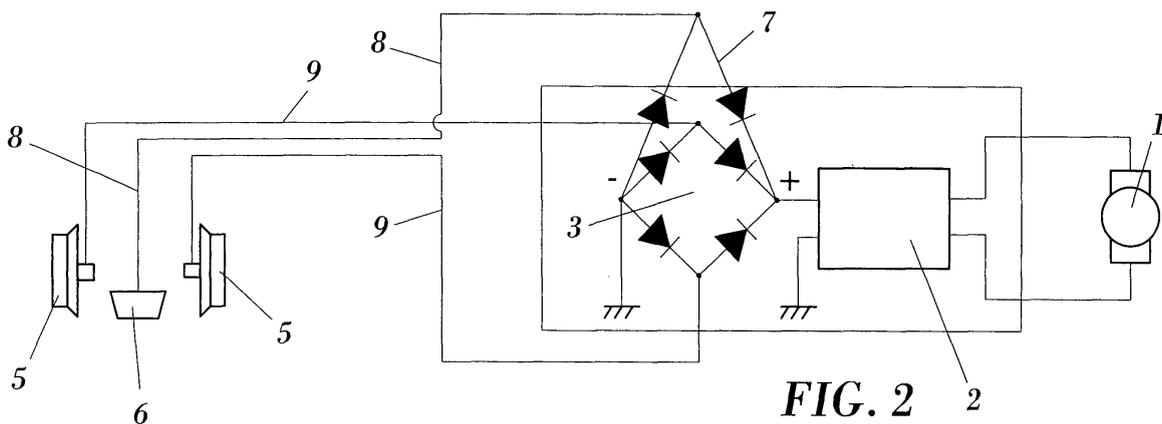
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(74) Representative: **Carpintero Lopez, Francisco et al**
Herrero & Asociados, S.L.
Alcalá 35
28014 Madrid (ES)

(54) **Universal control device for miniature digital trains, under power supply systems through two or three rails**

(57) The invention relates to a universal control device for miniature digital trains, under power supply systems through two or three rails, the object of which is to make the two systems that are currently prevailing on the market compatible and which is basically formed by a drive motor (1), an electronic control decoder (2) of the

motor and a diode bridge (3) rectifying the alternating supply current coming from the two or three-rail track, wherein a second rectifier bridge (7) is provided, fed through the current collector coming from the central shoe (6) between the current collector of the central shoe (6) and the diode bridge (3) feeding the electronic control decoder (2) of the motor (1).



Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is comprised within the field of railroad modeling, attempting to make the two systems that are currently prevailing on the market compatible so that the actual locomotive, rail car or any other element that is fed through the track can do so without distinction through the power supply system by two or three rails, and can thus work correctly.

BACKGROUND OF THE INVENTION

[0002] Initially concentrating on the world of conventional miniature scale trains, analogue models can be pointed out, among which there are two different, clearly differentiated systems.

[0003] Direct current power supply systems, which are the most widespread, including most of the manufacturers such as FLEISCHMANN, TRIX, ROCO, etc..., in which there is a wide range of models, wherein the power supply to the locomotives occurs in a more realistic manner by means of the direct current power supply through each of the rails. This option is more realistic since the locomotives only have wheels, which are insulated on each axle, forming the contact element with the track and the power supply, lacking other elements that would not be those included in real trains.

[0004] The track is fed with direct current and the locomotives are able to vary their speed by varying the voltage applied on the track. The direction in which the tractive stock moves can be reversed by reversing the polarity between the rails. This system does not allow individualized control of the locomotives, therefore the model must be divided into different independent sections in order to keep trains with different operating features.

[0005] The second or alternating current power supply train system is less widespread among the manufacturers, although it has always had great importance due to the fact that the distinctive brand has been MARKLIN. In this system one of the current collector points are both rails of the track along which the locomotives slide, therefore it is no longer necessary to keep the wheels of one same axle isolated, whereas the second contact consists of a central current collector between the rails of the track, whereby the locomotive collects current as a result of carrying a central current collector shoe. The modification of the speed of the tractive stock is achieved by varying the alternating voltage level on the track, whereas the modification of the movement direction is carried out by superimposing a voltage peak on the voltage used in traction.

[0006] For some time now the digital world has been introduced in railroad modeling and each manufacturer adopted digital model control systems, among which the FLEISCHMANN FMZ system and the MARKLIN MO-

TOROLA systems can be mentioned, although direct current digital systems, by means of the universal DCC system for two-rail systems, and the MARKLIN type MOTOROLA systems for three tracks have been unified.

Both systems, because of the rolling stock that is used, are incompatible in the way in which the current traversing the track is obtained, therefore the manufacturers must have duplicate rolling elements both if the digital power supply is by two or three tracks, therefore the purpose of the invention is to attempt the unification of the rolling stock.

DESCRIPTION OF THE INVENTION

[0007] One of the first available advantages is the use in both digital systems of the supply current of the track, since the track is fed by a constant voltage of 20 volts which does not vary, since the decoder carrying the locomotive, the rail car, etc. controls the supply voltage of the motor at all times and therefore the speed of the driving element, in addition to other controls with multiple functions which these decoders can carry out, for example such as lighting control, sound and smoke-causing substance control etc..

[0008] Digital systems consist of different elements such as:

- An alternating voltage source feeding the entire assembly
- A digital station capable of forming the previous voltage and superimposing thereon coded control messages from the decoder incorporated by every locomotive
- The track to which the signal produced by the digital station is connected either by two or three rails
- The tractive stock including

- o Power collection mechanisms from the track
- o A digital decoder separating the power supply for the traction of the control signals, interpreting it and therefore capable of providing the motor with the suitable power supply corresponding to the order received for the corresponding locomotive or rail car from the control station.
- o A motor for moving the locomotive, rail car or tractive stock in general, which is controlled by the decoder.

[0009] The means that are currently used to make two and three-rail digital systems compatible is based on a manual switch changing the power supply of the motor according to whether it comes from two or from three rails. This switch is connected to a diode bridge feeding the electronic module of the decoder so that it always correctly receives the current.

[0010] The object of the invention is based on having one same diode bridge fed by each of the terminals coming from the wheels of the model and in parallel a second

diode bridge connected to the previous one which is joined to the central rail.

[0011] These diode bridges are joined to the electronic circuit of the decoder feeding the motor.

[0012] If the system is a two-rail digital system, a traditional diode bridge is used for the power supply of the decoder and of the motor with rectified direct current. However, if the system receives current from the central shoe, the second diode bridge is used in order to obtain the same direct voltage feeding the decoder feeding the motor, i.e. this second diode bridge will allow the current coming from the central shoe to be equally rectified prior to the feeding of the decoder and of the motor.

[0013] Consequently, whether the system used is of two or three rails, both locomotives equipped or not equipped with a central current collector shoe can work in such system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] To complete the description which is being made and with the object of aiding to better understand the features of the invention, a set of drawings is attached to this specification as an integral part thereof, in which with an illustrative and non-limiting character, the following have been shown:

Figure 1 shows a traditional manual control system for making two and three-rail digital power supply systems compatible.

Figure 2 shows the circuit of the object of the invention which automatically allows the use without distinction with two or three rails.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

[0015] Figure 1 shows a traditional digital power supply system formed by a motor (1), a decoder (2) feeding the mentioned motor; the current collection is carried out by means of wheels (5) only if it is with a two-track system or by means of wheels (5) and a central shoe (6) if it is with a three-track system.

[0016] The switch (4), according to its setting by the user, will feed with the cables (9) the rectifier diode bridge (3) feeding the decoder (2) or if the system is a three-rail system, the switch will take the power supply coming from the cable (8), from the central shoe to feed the rectifier diode bridge (3).

[0017] As can be observed, it is a complicated and manual system that can give rise to errors in the system operation.

[0018] The exact same numerical references indicated above are valid for the explanation of Figure 2, except for the fact of incorporating a second rectifier bridge (7) in parallel with the traditional diode rectifier (3) and which will be fed directly by the terminal (8) coming from the

power supply of the central shoe, the alternating current being rectified in order to transform it into rectified direct current.

[0019] In the event that the power supply is through the wheels (5), the connecting cables (9) feed the rectifier diode bridge (3) as in the traditional system and the parallel diode bridge (7) rectifying the alternating current in order to convert it into rectified direct current will be fed only in the event that the three-rail power supply system, through the shoe (6), is used, all of this together with the rectifier bridge (3), which will feed the decoder (2) and thus the motor (1).

[0020] This system is completely automatic and works without user involvement.

Claims

1. A universal control device for miniature digital trains, under power supply systems through two or three rails, formed by a drive motor (1), an electronic control decoder (2) of the motor and a diode bridge (3) rectifying the alternating supply current coming from the two or three-rail track, **characterized by** having a second rectifier bridge (7) between the current collector of the central shoe (6) and the diode bridge (3) feeding the electronic control decoder (2) of the motor (1).
2. A universal control device for miniature digital trains, under power supply systems through two or three rails, according to claim 1, **characterized in that** the second rectifier bridge (7) is connected in parallel with the diode bridge (3).
3. A universal control device for miniature digital trains, under power supply systems through two or three rails, according to any previous claim, **characterized in that** the second rectifier bridge (7) is fed through the current collector coming from the central shoe (6) and **in that** in its output, which is a rectified direct current, one of its terminals is joined to the ground collector of the main diode bridge (3) and the other current output is joined to the electronic control decoder (2) of the motor (1).

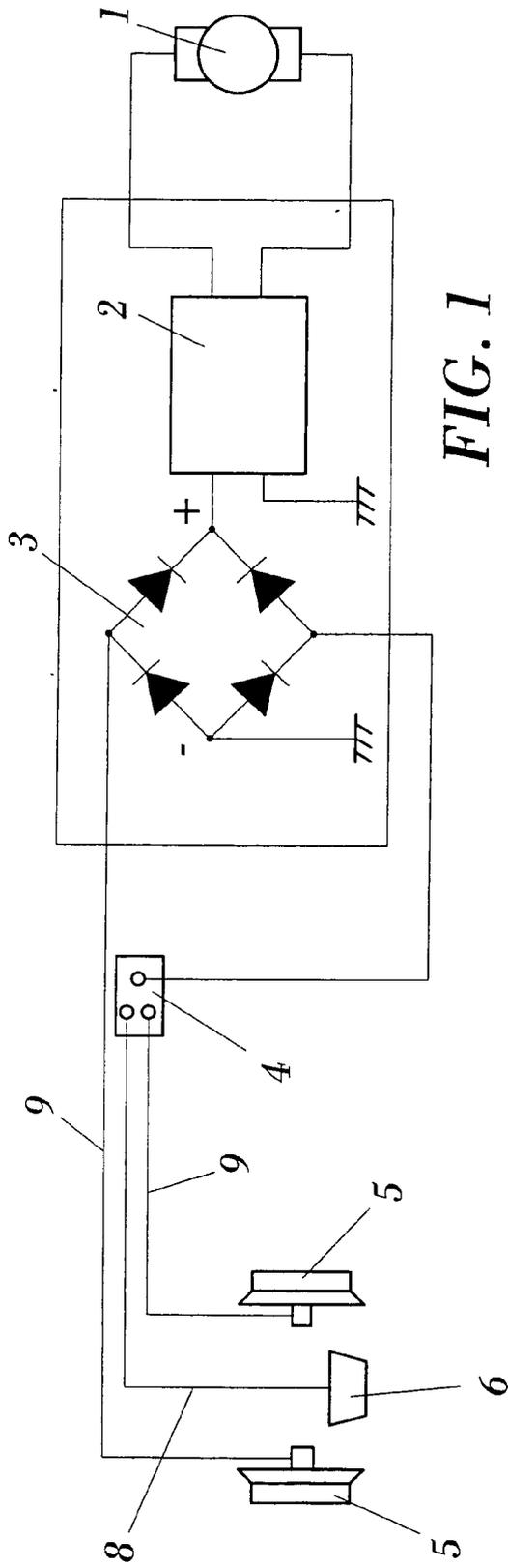


FIG. 1

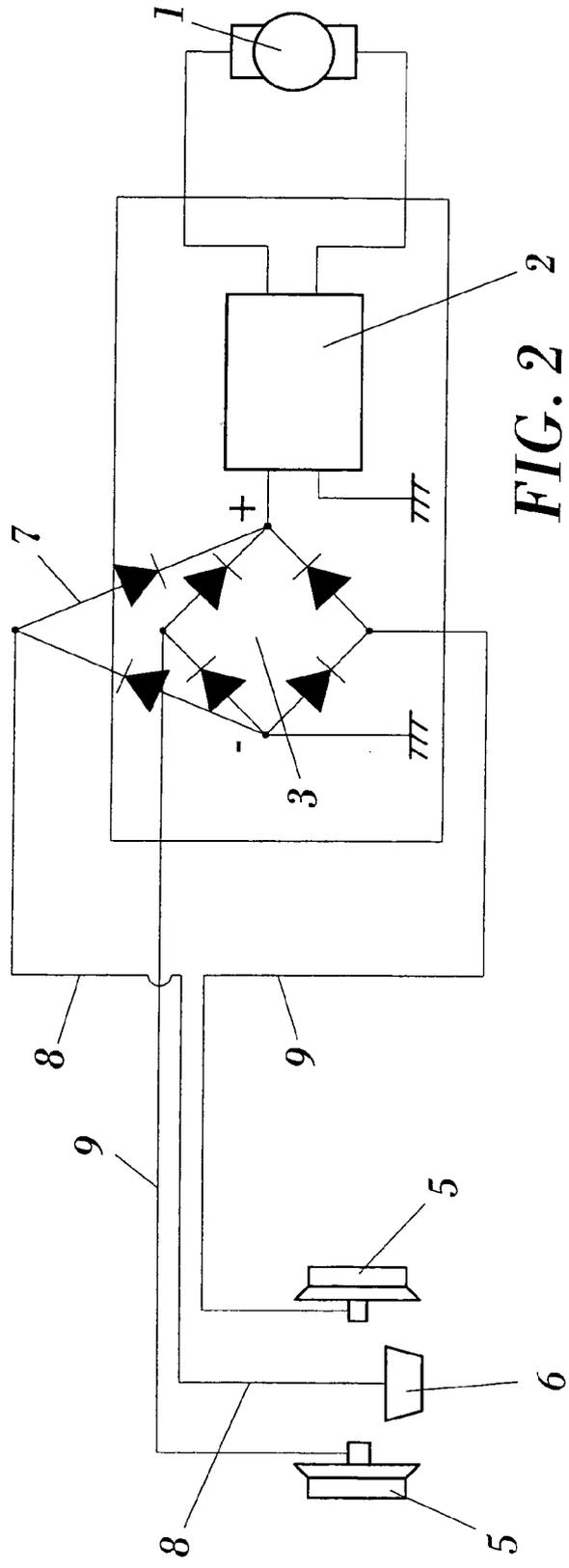


FIG. 2



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		24 July 2008	Brumme, Ion
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPC FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 38 0320

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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