



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
25.02.2015 Bulletin 2015/09

(51) Int Cl.:
B66B 1/34 (2006.01) **B66B 5/00 (2006.01)**
B66B 1/46 (2006.01)

(21) Application number: **14001971.2**

(22) Date of filing: **06.06.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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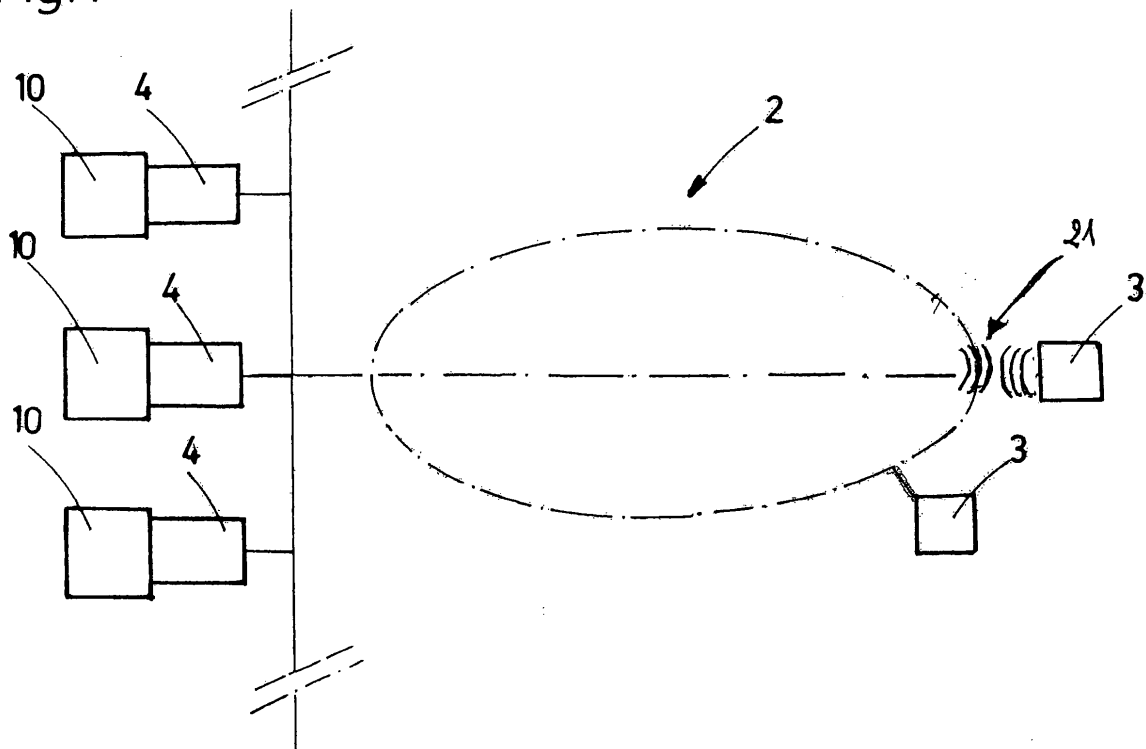
(30) Priority: **07.06.2013 IT RN20130022**

(54) **Remote monitoring system for lifts of various types**

(57) A remote monitoring system for lifts of various types, provided with information terminals (3) connected to transmission means (2) for remotely monitoring and controlling said lifts (10), comprises a universal interface device (4), allowing the exchange of signals between the

lifts (10) of any type and the transmission means (2); the transmission means (2) also comprise wireless connections (21), for allowing the delocalization of the information terminals (3).

Fig.4



Description

[0001] This invention relates to a remote monitoring system for lifts of various types.

[0002] Recently, for the production and management of major real estate structures which have shared service and social functions, such as hospitals, hotels, exhibition centres, various urban infrastructures, frequented by large numbers of members of the public and which must be managed in accordance with criteria for absolute efficiency and safety, there has been an increase in the installation of remote monitoring systems, substantially for the widespread and detailed monitoring, from supervision stations which may even be decentralized and remote, of the operation of all of the technological equipment in the above-mentioned real estate structures.

[0003] Amongst technological equipment to be monitored, lift plants are certainly important, both due to the complexity and delicacy of the technologies used, and because any inefficiency and malfunctions, such as people accidentally being trapped in the cars, may result in serious psychological and physical discomfort for those involved, particularly if work to restore normal operation is not carried out immediately.

[0004] Moreover, such attention to management and maintenance has also been increasingly spreading for lift plants in joint ownership buildings used for private residences, whose management is increasingly outsourced to specialised companies, which are very interested in the availability of monitoring/control systems equipped with supervision terminals that can be delocalized even outside the building involved.

[0005] However, in practical technical terms there are obstacles to the spread of integral remote monitoring systems for sets of lifts already existing in the above-mentioned structures. This is due to the fact that such sets usually comprise machines and equipment of different brands and different types, due to installations which took place one after another over the years, which are generally incompatible with the remote monitoring system to be implemented.

[0006] Document US 2004/0094366, for example, describes a remote monitoring device for lifts, in which a plurality of modular interfaces is used, each suitable for interacting with lifts from a single manufacturer.

[0007] However, it is difficult to imagine for such plants the complete substitution of lifts and accessories, particularly if, although dated, they still provide safe and reliable performance.

[0008] The aim of this invention is, therefore, to eliminate the above-mentioned disadvantages.

[0009] The invention, as described in the claims, achieves that aim by means of an electronic universal interface device, able to make any type of lift dialogue with remote management information terminals.

[0010] The main advantage obtained through this invention is basically the fact that all of the lifts of one or more real estate structures can be remotely monitored

through a single information terminal. In that way, emergency work for safety and correct operation of the plants is possible more quickly than with current techniques.

[0011] Another advantage of the invention is the fact that said remote monitoring can be carried out by personnel equipped with a mobile information terminal, without having to reach the remote monitoring system supervision station.

[0012] A further advantage, resulting from the use for the invention of transmission means which are common and shared as an alternative to private physical networks, is the low cost for system telecommunication.

[0013] Moreover, for plants on which the invention is installed, optimization of the maintenance and fault prevention system is possible. The advantages of this are both economic and in terms of the quality of the entire management.

[0014] Further advantages and features of the invention are more apparent in the detailed description which follows, with reference to the accompanying drawings, which illustrate an example embodiment of it without limiting the scope of the invention, in which:

- Figure 1 is a general block diagram of the invention;
- Figure 2 is a block diagram of a preferred embodiment of the invention;
- Figure 3 is a schematic illustration of possible alternative embodiments of parts of the invention;
- Figure 4 is a schematic illustration of an example embodiment of the invention;
- Figure 5 is a block diagram of a detail of the invention.

[0015] A remote monitoring system for lifts 10 of various types comprises data transmission means 2, suitable for transferring signals and commands from and to the lifts 10, universal interface devices 4, able to dialogue with any type of lift 10 and with the data transmission means 2, and information terminals 3, able to interact with the data transmission means 2, in such a way as to implement remote monitoring and control of said lifts 10.

[0016] In a preferred embodiment of the invention, schematically illustrated in Figure 2, the data transmission means 2 comprise at least wireless connections 21, for allowing the delocalization of the information terminals 3.

[0017] The universal interface device 4 comprises data processing means 4b, and at a plurality of printed circuit boards 4a, (equipped with a software, such as a firmware, and a hardware part), each directly connected to a lift 10, whatever type it is, for converting the in-out signals of the lifts 10 according to parameters compatible with the processing means 4b.

[0018] Such processing means 4b are, in various possible alternative embodiments, a PLC, or a PC, or a microprocessor. If the processing means 4b are a microprocessor, it may be integrated in the printed circuit board 4a, thereby producing a universal interface device 4 in a single body, associable with each of the lifts 10.

[0019] In contrast, when the data processing means 4b and the printed circuit board 4a are positioned at a distance from one another, the universal interface device 4 may have at least one wireless connection 4c, able to connect them to one another, as shown in Figure 3.

[0020] In the same situation of data processing means 4b and printed circuit board 4a positioned at a distance from one another, they may be connected to one another by means of a wired connection 4d, for example a Bus pair cable, also illustrated in Figure 3.

[0021] The data transmission means 2 may comprise at least VPN networks, which use a public and shared transmission system such as the internet, and can guarantee suitable protection for the data transmitted.

[0022] As shown in Figure 5, the printed circuit board 4a comprises a plurality of inputs 41 and a corresponding plurality of outputs 42.

[0023] The plurality of inputs 41 allows information to be received about the lift 10, whatever type it is, with which the printed circuit board 4a is associated.

[0024] For each type of information, the printed circuit board 4a can receive signals within a voltage range, including the voltages at which lifts 10 of various types transmit that type of signal. In this way, for example, the printed circuit board 4a comprises an input 41a dedicated to the brake contact: since this signal is transmitted at different voltages by the different types of lifts 10, the input 41a receives within a range of between 24 and 80 Volts d.c. (direct current), which covers all of the voltages at which the various types of lifts 10 transmit this type of signal.

[0025] Similarly, the printed circuit board 4a comprises an input 41b, dedicated to the electricity supply of the light in the car of the lift 10, at 220 Volts a.c. (alternating current), at least four inputs 41c, dedicated to the safety circuit of the lift 10, which receive signals within a range of between 48 and 110 Volts d.c./a.c. (direct current or alternating current), at least four inputs 41d, dedicated to the alarm circuit of the lift 10, which receive signals within a range of between 6 and 12 Volts d.c. (direct current), at least four inputs 41e, dedicated to the movement circuit of the lift 10, which receive signals within a range of between 24 and 80 Volts d.c. (direct current), at least four inputs 41f, dedicated to the circuit for indicating the position, that is to say, the floor on which the lift has stopped, which receive signals within a range of between 12 and 24 Volts d.c./a.c. (direct current or alternating current). Downstream of each input 41, or of a plurality of them, there is an optical isolator device 43, designed to directly pick up the voltage signal for transferring it to the processing means 4b which are located downstream of the outputs 42.

[0026] The number of inputs corresponding to the various types of information depends on the number of points where such information is picked up. In a preferred embodiment, shown in Figure 5, there are eight inputs 41c for the safety circuit, four inputs 41d for the alarm circuit, twelve inputs 41e for the movement circuit and

sixteen inputs 41f for the position indication circuit.

Claims

1. A remote monitoring system for lifts of various types, comprising data transmission means (2), designed to transfer signals and commands from and to the lifts (10), and information terminals (3), designed to interact with the data transmission means (2), in such a way as to implement remote monitoring and control of said lifts (10); said remote monitoring system (20) being **characterised in that** it comprises at least universal interface devices (4), designed to dialogue with any type of lift (10) and with the data transmission means (2).
2. The remote monitoring system for lifts according to claim 1, **characterised in that** the data transmission means (2) comprise at least wireless connections (21), for allowing the delocalization of the information terminals (3).
3. The remote monitoring system for lifts according to claim 1, **characterised in that** the universal interface device (4) comprises at least data processing means (4b), and at least a software - hardware printed circuit board (4a), designed to convert the in-out signals of at least one lift (10) according to parameters compatible with the data processing means (4b).
4. The remote monitoring system for lifts according to claim 3, **characterised in that** the data processing means (4b) and the printed circuit board (4a) are in a single body.
5. The remote monitoring system for lifts according to claim 3, **characterised in that** the universal interface device (4) comprises at least a wireless connection (4c), designed to connect the data processing means (4b) and the printed circuit board (4a).
6. The remote monitoring system for lifts according to claim 3, **characterised in that** the universal interface device (4) comprises at least a wired connection (4d), designed to connect the data processing means (4b) and the printed circuit board (4a).
7. The remote monitoring system for lifts according to claim 1, **characterised in that** the data transmission means (2) comprise at least VPN networks, designed to guarantee suitable protection for the data transmitted.
8. The remote monitoring system for lifts according to claim 3, **characterised in that** the printed circuit board (4a) comprises a plurality of inputs (41), designed to receive voltage signals from the lifts (10),

and a plurality of outputs (42), designed to transmit voltage signals to the data processing means (4b).

9. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises an input (41a), dedicated to the brake contact, designed to receive signals in direct current within a voltage range of between 24 and 80 Volts, and an input (41b), dedicated to the electricity supply, designed to receive signals in alternating current at 220 Volts. 5
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10. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises at least four inputs (41c), dedicated to the safety circuit of the lift (10), the inputs being designed to receive signals within a range of between 48 and 110 Volts, in direct current or alternating current. 15
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11. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises at least four inputs (41d), dedicated to the alarm circuit of the lift (10), the inputs being designed to receive signals within a range of between 6 and 12 Volts, in direct current. 25

12. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises at least four inputs (41e), dedicated to the movement circuit of the lift (10), the inputs being designed to receive signals within a range of between 24 and 80 Volts, in direct current. 30

13. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises at least four inputs (41f), dedicated to the position indication circuit of the lift (10), the inputs being designed to receive signals within a range of between 12 and 24 Volts, in direct current or alternating current. 35
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14. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises a plurality of optical isolator devices (43), located downstream of the inputs (41) and designed to directly pick up the voltage signal for transferring it to the processing means (4b), located downstream of the outputs (42). 45
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15. The remote monitoring system for lifts according to claim 8, **characterised in that** the printed circuit board (4a) comprises eight inputs (41c) for the safety circuit, four inputs (41d) for the alarm circuit, twelve inputs (41e) for the movement circuit and sixteen inputs (41f) for the position indication circuit. 55

Fig.1

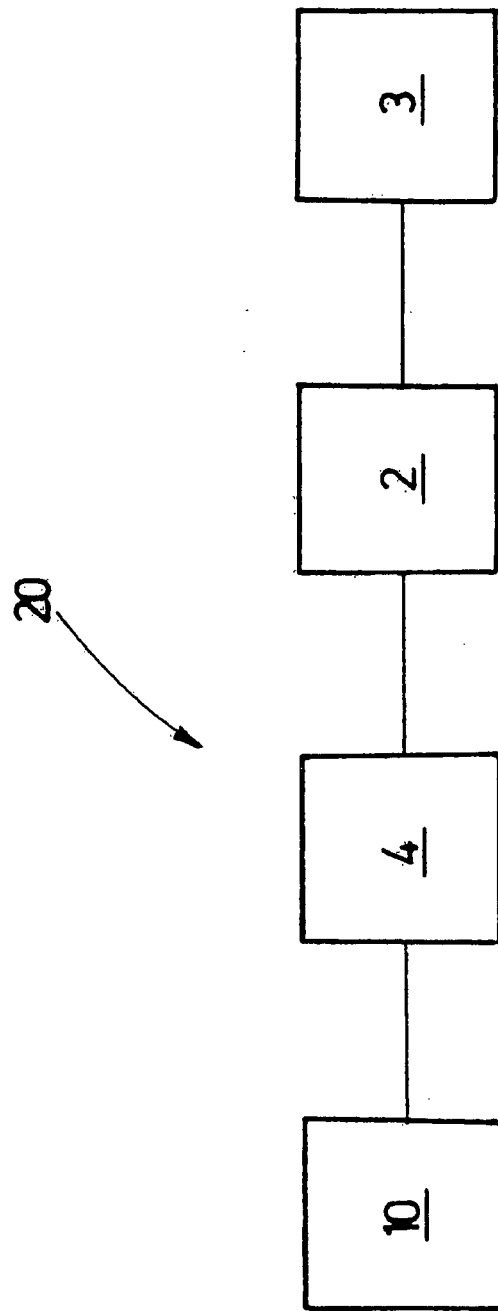
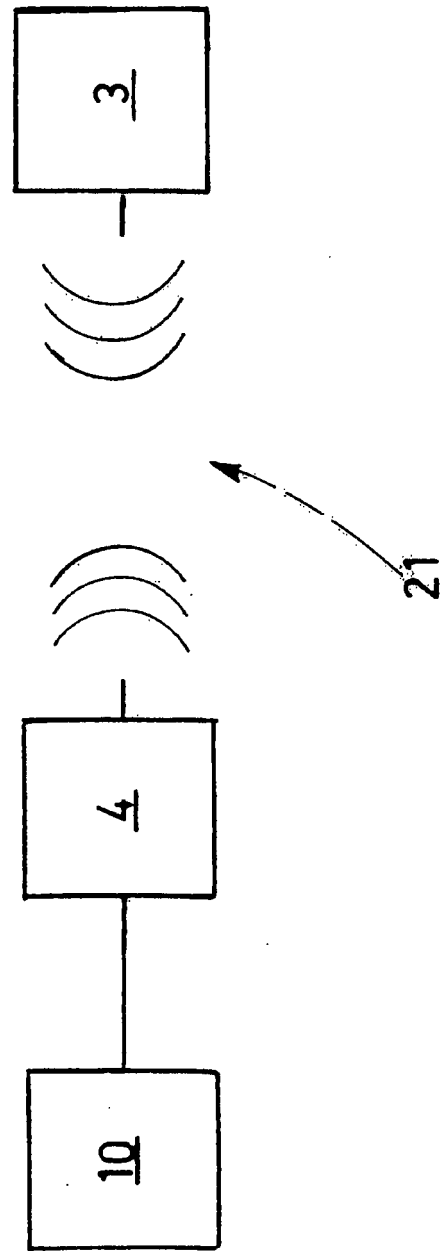
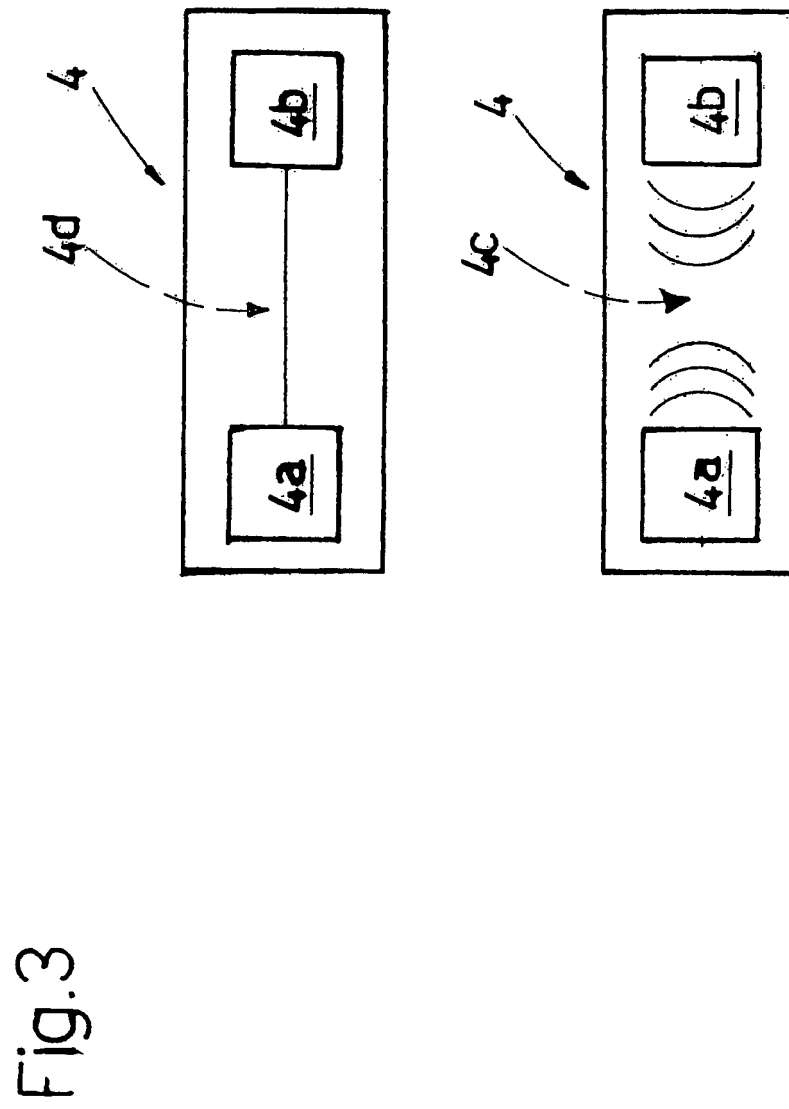
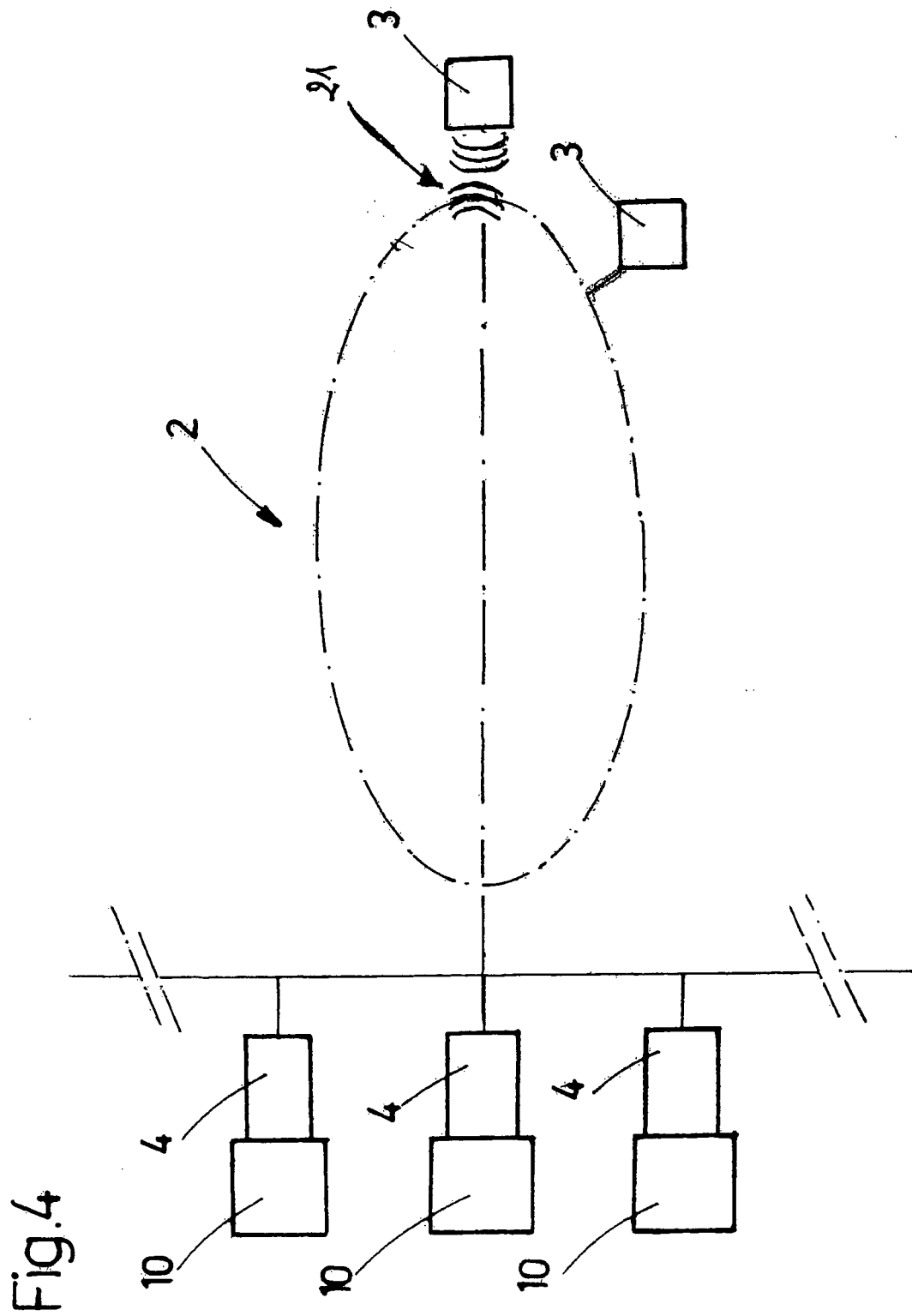


Fig.2







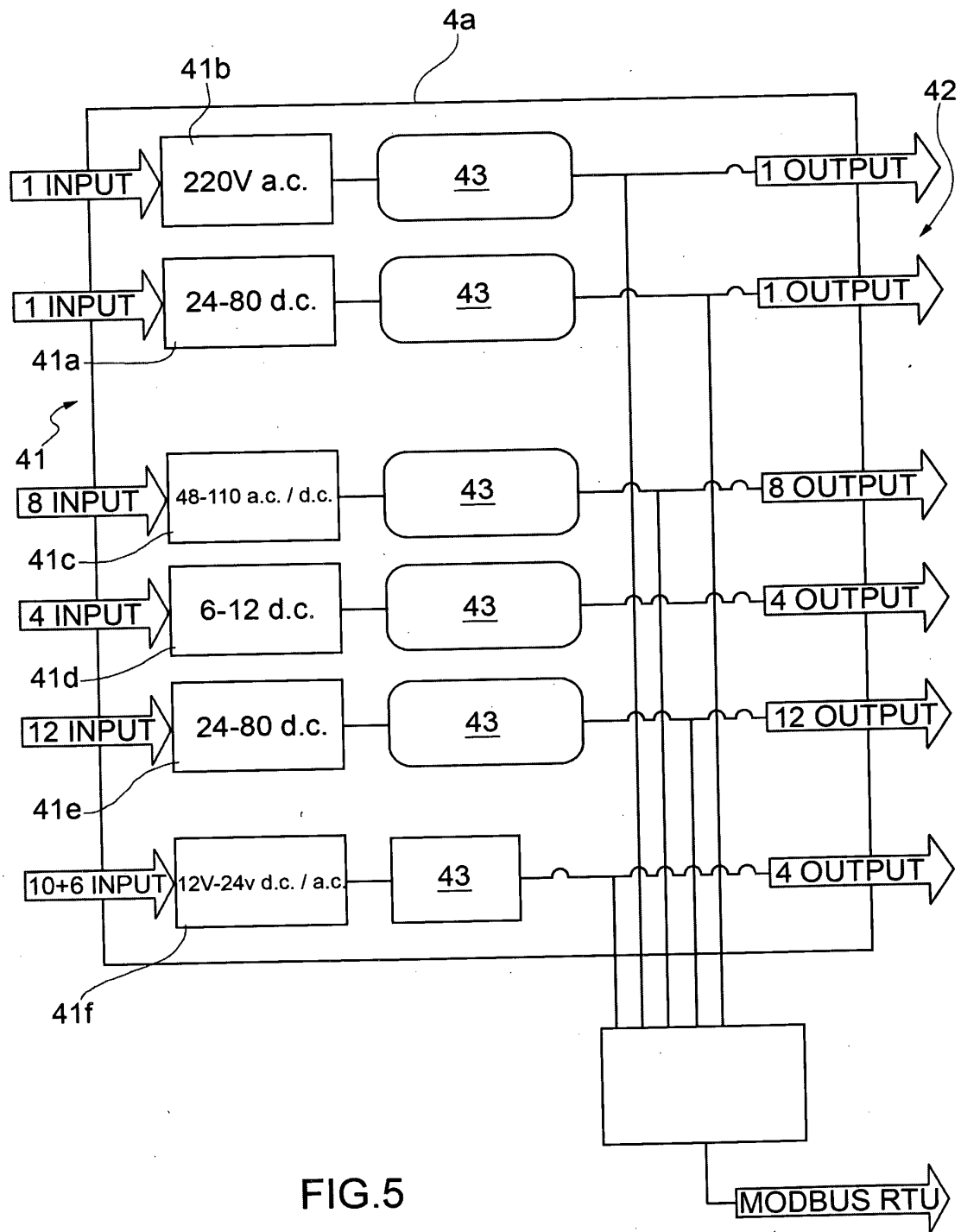


FIG.5



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