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Office européen des brevets



(11) Publication number:

0 630 847 A2

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **94830273.2**(51) Int. Cl.⁵: **B66B 5/02**(22) Date of filing: **31.05.94**(30) Priority: **31.05.93 IT RM930358**(43) Date of publication of application:
28.12.94 Bulletin 94/52(84) Designated Contracting States:
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I-00186 Roma (IT)(54) **Emergency apparatus to move an elevator cabin to the nearest floor in case of power failure.**

(57) This invention consists of an emergency apparatus intended for moving the cage of a lift to one of the two nearest landings. This apparatus is easy to

be installed and can be put into operation by means of the control board and sensors of the already existing system.

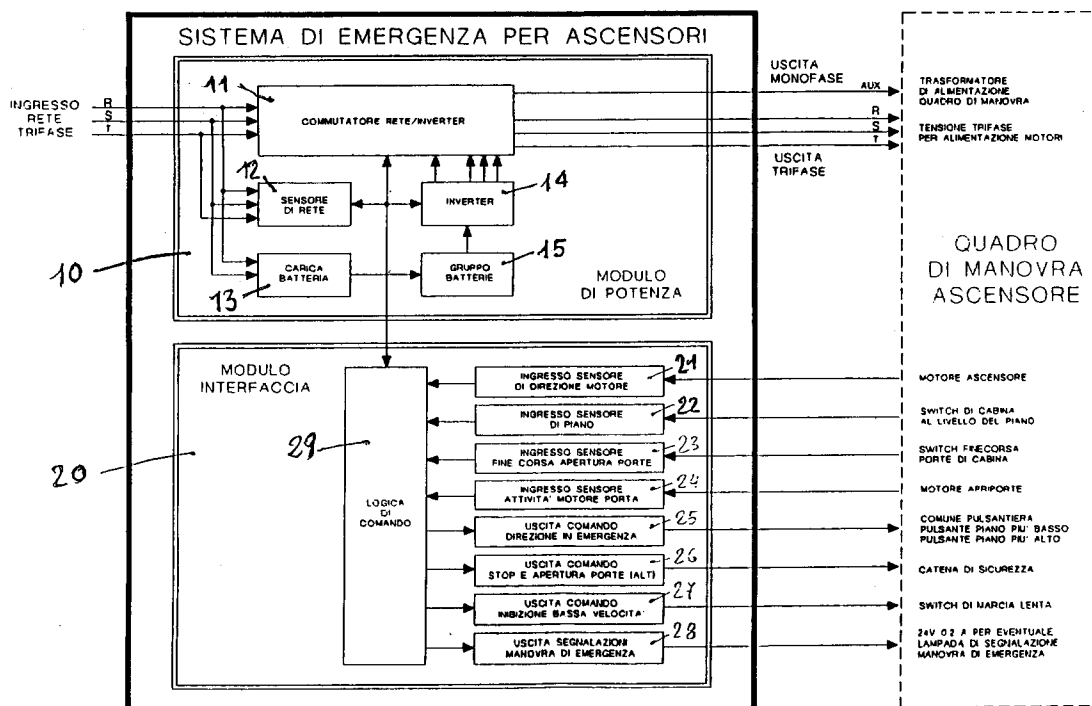


FIG 1

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The object of the present invention is an emergency apparatus intended to move the cage of the lift to one of the two nearest landings in case of a failure of the electric power supply.

At present, systems which can carry out the emergency manoeuvre are already available. Such systems, in case of blackout, come into operation switching the control of the motors to a board and simplified and essential sensor systems added to the existing system, which are necessary to the execution of the manoeuvre. The labour and materials needed for the transformation of the system are very costly, and such as to limit the diffusion of the system.

The object of this invention is to use the system of The control board and relative sensors previously installed and utilised in conditions of normal electric power supply to allow to perform all the operations required for the emergency in case of blackout. The installation of the apparatus can be accomplished by means of simple connections between the apparatus itself, the control board of the existing system and the electrical network. Its capacity of making use both of the existing control board and sensor system, makes it possible to avoid complicated and costly installations along the lift shaft, also permitting a remarkable saving in costs and materials.

Should the electricity supply fail while the cage is moving, the apparatus comes into operation, supplies the electric control board and the relative sensors thereof, and, making use of the data concerning the functioning of the cage previously stored therein, sends the necessary drive to the control board, for properly controlling the emergency manoeuvre.

Once all the stage of the emergency manoeuvre have been accomplished, the apparatus stops working, leaving the lift in the "out of order" condition until the electric power supply is back.

The invention will be now described in detail with reference to the annexed drawings, wherein figure 1 shows the block diagram of the parts comprised in the emergency apparatus, and figure 2 shows the flow diagram of the functions, referred to the various situations wherein the blackout can occur.

DESCRIPTION OF THE BLOCK DIAGRAM

The emergency apparatus for lifts of the invention, comprises three principal units:

- 1) Power module
- 2) Interface module
- 3) Battery unit (which, for better convenience, has been drawn inside the power module.)

The power module includes a switch/inverter composed of a remote control switch, with the

relative control circuits usually on "network" position, which switches the system to the "inverter" position when the emergency manoeuvre starts.

A network sensor that transmits the condition of blackout to the interface module in case one or more of the three phases of input line voltage should fail.

A battery charger to recharge the battery unit and supply all the circuits inside the apparatus.

A section comprising two three-phase inverters, one of which is preferably a 50V/5Hz inverter intended for supplying the motor of the lift, while the other one is a 380V/50Hz inverter intended for feeding the control board and the door opening controls.

The interface module, by means of input sensors, continuously stores data from the control board, such as the position of the cage and the relative functions thereof.

In case of blackout the interface module employs such data to start the emergency manoeuvre, if needed, utilising the control outputs to transmit all the necessary operations to the control board for the "rescue" to be regularly carried out.

All along the operation, it is available a 24V/0.2A output for any "emergency manoeuvre" signals.

The battery unit is composed preferably of six sealed lead-acid batteries, preferably of 12V/6.5Ah, necessary to feed the apparatus in case of blackout.

When the system is working by input power supply, the apparatus is on bypass position, the battery charger is working, and the conditions transmitted to the different sensors are stored moment by moment. In case the blackout occurs when the lift cage is on a floor and the doors are open, no emergency manoeuvre is needed, the apparatus stays on bypass position and the lift goes "out of order" until the power supply is back.

In case of blackout with the cage on a floor and the doors closed, the emergency manoeuvre carried out by the apparatus is limited to the necessary opening of the doors. In case of blackout with the cage out of floor, the cage stops, and at the same time the network sensor puts the emergency apparatus into operation.

The references shown on the block diagram and on the logical flow diagram indicate:

- | | | |
|----|----|--|
| 50 | 10 | POWER MODULE |
| | 11 | NETWORK SWITCH/INVERTER |
| | 12 | NETWORK SENSOR |
| | 13 | BATTERY CHARGER SYSTEM |
| | 14 | INVERTER SYSTEM |
| 55 | 15 | ACCUMULATOR BATTERY |
| | 20 | INTERFACE MODULE |
| | 21 | INPUT OF THE SENSOR FOR THE DIRECTION OF MOTION OF THE MOTOR |

22	INPUT OF THE FLOOR SENSOR	
23	INPUT OF THE LIMIT SWITCH AND DOORS OPENING SENSOR	
24	INPUT OF THE SENSOR FOR THE DOOR MOTOR ACTIVITY	5
25	OUTPUT OF THE EMERGENCY DIRECTION CONTROL	
26	OUTPUT OF THE STOP AND DOOR OPENING CONTROL	
27	OUTPUT OF THE LOW SPEED INHIBITION CONTROL	10
28	OUTPUT OF THE EMERGENCY MANOEUVRE SIGNAL	
51	BLACKOUT	
52	CAGE AT FLOOR	15
53	START OF THE EMERGENCY MANOEUVRE	
54	MOTION OF THE CAGE TO ONE OF THE TWO NEAREST FLOORS	
55	OPEN DOORS	20
56	START OF THE EMERGENCY MANOEUVRE	
57	OPENING OF THE CAGE AND FLOOR DOORS	
58	END OF THE EMERGENCY MANOEUVRE	25
59	OUT OF ORDER TILL THE POWER SUPPLY IS BACK	
60	LIGHTING OF THE "EMERGENCY" SIGNAL	30
29	CONTROL LOGIC	
61	SWITCHING OFF OF THE "EMERGENCY" SIGNAL	

The various apparatus and logical operations accomplished are connected and arranged as shown on the block diagram (figure 1) and flow diagram (figure 2) enclosed to the present description.

Claims

1. An emergency apparatus to move the cage of a lift to one of the two nearest floors in case of electric power blackout, easy to be installed and working preferably employing the control board and sensors of the existing system by means of simple connections between the apparatus itself, the control board of the existing system and the electrical network.
2. The emergency apparatus for lifts of claim 1, comprising: a power module, an interface module and a battery unit, the power module comprising a switch/inverter composed of a remote control switch and relative control circuits usually in the "network" position, which switches the apparatus to the "inverter" position when the emergency manoeuvre starts.

3. The emergency apparatus for lifts of claim 1, wherein said interface module, by means of input sensors, continuously stores the data existing on the control board, such as the position of the cage and the relative functions.
4. The emergency apparatus for lifts of claim 1 wherein the battery unit preferably consists of six sealed lead-acid batteries, preferably of 12V/6.5Ah, that are necessary to supply the whole apparatus.

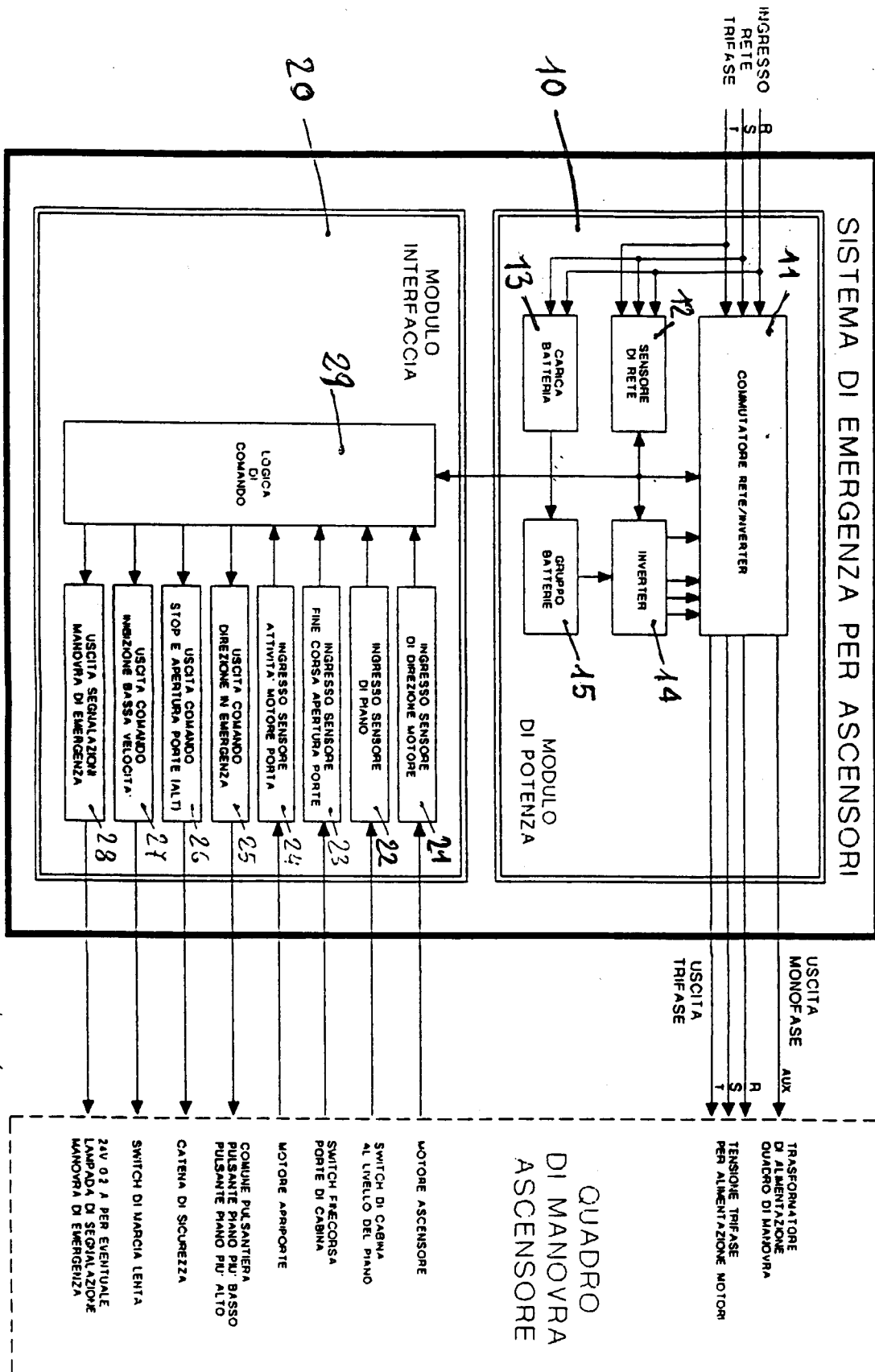


FIG. 1

