(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 762 683 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.03.2007 Bulletin 2007/11

(51) Int Cl.:
E05F 15/10 *(2006.01)* ***E05F 15/14*** *(2006.01)*

(21) Application number: **06076627.6**

(22) Date of filing: **28.08.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **31.08.2005 NL 1029840**

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(54) Control mechanism for automatic sliding doors

(57) A control mechanism for automatic sliding doors (10) comprises an elongate housing (30), a base printed circuit board (34) with a microprocessor (36) arranged thereon, as well as the terminals (38) for external data communication, encoder and signal processing, at least one connecting printed circuit board (46) parallel and at a distance from the base printed circuit board (34), comprising standard connectors (48), arranged so as to leave clear an open space (52) through which the terminals (38) of the base printed circuit board (34) protrude, and power connectors provided on an end side of the housing.

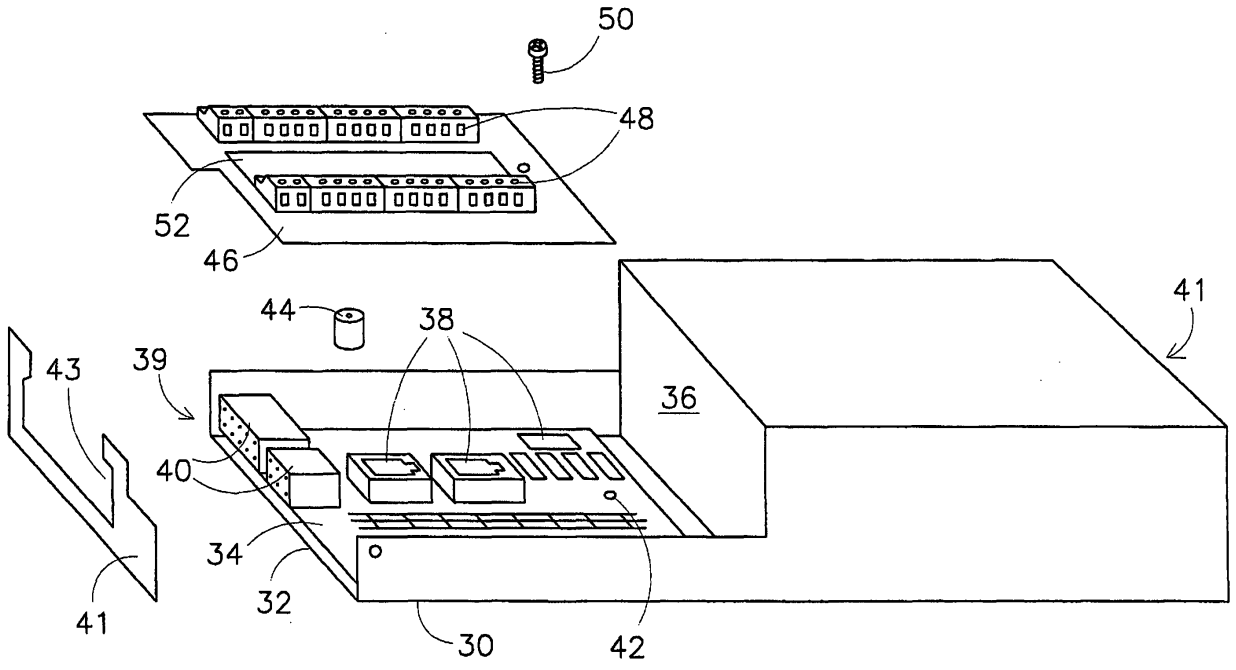

Fig 2

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Description

[0001] Firstly the invention relates to a control mechanism for automatic sliding doors.

[0002] Sliding doors which operate automatically are often used at entrances of buildings, for example shops, companies, etc. The position of the sliding doors is controlled on the basis of signals emanating from one or more detection sensors by means of a control mechanism. This control mechanism is often arranged at the top of the sliding doors. The available space for such an arrangement of the control mechanism is essentially dependent on the width of the sliding door(s). In practice, each manufacturer has developed and utilized a dedicated control mechanism for each size of sliding door, with components and dimensions specific to the respective design. In case of repair and maintenance work, this means that an engineer has to have a large assortment of these specific components at his disposal. This is undesirable from the point of view of stock management and logistics. Consequently, there is a need in this technical field for a control mechanism which can be used universally for all common types of control mechanisms.

[0003] It is an object of the present invention to provide a control mechanism of this type, or to at least provide an alternative.

[0004] More particularly, it is an object of the invention to provide a compact control mechanism, which can be used for sliding doors with the smallest standard installation dimensions, as the available space is most limited for sliding doors of this type.

[0005] According to the invention, the control mechanism to this end comprises an elongate housing, a base printed circuit board with a microprocessor arranged thereon, as well as the terminals for external data communication, encoder and signal processing, at least one connecting printed circuit board parallel and at a distance from the base printed circuit board, comprising standard connectors, arranged so as to leave clear an open space through which the terminals of the base printed circuit board protrude, and power connectors provided on an end side of the housing.

[0006] The invention is based on the insight that it is necessary to use standard components in order to achieve a control mechanism which can be used universally and is consequently compact. However, these standard components have standard dimensions which do not readily make it possible to manufacture compact control mechanisms. With the control mechanism according to the invention, in order to remain within a limited height, the relatively large, more particularly tall, standard connectors for external communication are provided on the base printed circuit board which also houses the microprocessor. This base printed circuit board is arranged at the smallest possible distance from the bottom of the housing. The connecting printed circuit board is arranged parallel thereto and at a small distance therefrom, where the standard connectors for external communication, such as detection and security sensors, locks, push-buttons, etc. are preferably provided in parallel rows. The connecting printed circuit board is arranged such that the connectors of the base plate can be accessed. In one preferred embodiment, the standard connectors are arranged on a connecting printed circuit board, which is provided with a hole, through which the connectors of the base printed circuit board protrude. The power connectors are situated on an end side of the housing. Detection sensors detect the presence of objects, such as people, within a predetermined area.

[0007] This arrangement of the various connectors makes it possible to construct the control mechanism as a compact unit. In addition, it is possible in this way to keep all connections short, so that the risk of failure due to electromagnetic radiation is small.

[0008] The microprocessor which is advantageously used, is a processor with integrated memory. This measure also contributes to reducing the interfering electromagnetic radiation.

[0009] According to a second aspect, the invention relates to a drive for automatic sliding doors, comprising a power supply part, at least one electric motor and a control mechanism according to the invention. If a plurality of motors have to be used in the case of relatively heavy sliding doors, these are advantageously connected in series.

[0010] The drive advantageously comprises a protection against short-circuits, one coil being provided in the power connection of the motor and a measuring device for measuring the supply current drawn being provided on the non-ground side. This embodiment is designed to protect the device against short-circuits to ground. The supply current drawn is measured on the non-ground side. When the maximum permissible current is reached, the H-bridge is switched off, as a result of which the current is interrupted. The coil in the power connection limits the rise time of the short-circuit current, so that there is sufficient time to switch off the H-bridge. Advantageously, the H-bridge remains switched off for a certain period of time, after which the H-bridge can be switched on again. This protection against short-circuits can also be used for other applications.

[0011] The power supply part is advantageously designed as a separate unit. Usually, this part comprises one or more transformers with a mains filter.

[0012] According to a further aspect, the invention relates to an assembly comprising an automatically operating sliding door, detection sensors and a drive according to the invention.

[0013] The invention will be explained in more detail below with reference to the attached drawing, in which:

Fig. 1 shows a diagrammatic overview of an automatically operating sliding door with drive according to the invention;

Fig. 2 shows a diagrammatically exploded view of an embodiment of a drive according to the invention;

and

Fig. 3 shows a diagram of the protection against short-circuits.

[0014] Fig. 1 shows an embodiment of an automatically operating sliding door 10. This door 10 comprises two door panels 12, which are illustrated here in their open position. The control mechanism is accommodated inside a duct 14, which is fitted above the door opening 16. The top of a door panel 12 is fitted to a continuous belt 18 which is guided over return pulleys 20, at least one of which is driven by an electric motor 22. The motor is controlled by the control device 24 on the basis of signals emanating from a detection sensor 26, for example an infrared sensor which detects the presence of objects within a certain area. Reference numeral 28 denotes the power supply for the control device 24.

[0015] Fig. 2 shows the control device 24, which comprises an elongate housing 30, which is partly removed at one end. At that end, a base printed circuit board 34 is arranged at a short distance from the bottom 32 of the housing 30, on which base printed circuit board 34 the microprocessor is arranged, which is diagrammatically illustrated and denoted by reference numeral 36. The base printed circuit board is also provided with the connectors 38 for external data communication, the encoder and the detection sensor. On the end side 39 of the left-hand side of the housing 30, further connectors 40 for external communication are provided. Power connectors (not shown) are provided at the other end side 41 of the housing 30. The base printed circuit board 34 is provided with a securing hole 42 for securing, with the interposition of a spacer 44, a connection plate 46 with standard connectors 48 with the aid of a bolt 50 in a position parallel to the plane of the base printed circuit board 34 above the further connectors 40. The end side 39 can be closed off using a closure plate 41 provided with an aperture 43, which retains and secures the connection plate 46. The connection plate 46 leaves a space 52 clear, in this case a hole, through which connectors 38 protrude. Thus, it becomes possible to build a control device of compact dimensions.

[0016] The power supply part of the motor which is not explained in any more detail here, comprises, for example, two transformers provided with a mains filter.

[0017] Fig. 3 diagrammatically shows a preferred embodiment of the protection against short-circuits of the motor control mechanism. The driver circuit 60 drives the motor 22 via the H-bridge, denoted overall by 62 and comprising four switches TF1-TF4. The non-ground side of the H-bridge is provided with a coil L1 and a measuring device D1 for measuring the current drawn on the non-ground side. When a short-circuit occurs, the device D1 switches the driver circuit 60 off.

Claims

1. Control device (24) for automatic sliding doors, comprising an elongate housing (30),
a base printed circuit board (34) on which a microprocessor (36) is arranged, as well as the terminals (38) for external data communication, encoder and signal processing,
at least one connecting printed circuit board (46) parallel and at a distance from the base printed circuit board (34), comprising standard connectors (48), arranged so as to leave clear an open space (52) through which the terminals (38) of the base printed circuit board (34) protrude, and
power connectors provided on an end side of the housing (30).

2. Control mechanism according to claim 1, in which the standard connectors (48) are arranged in parallel rows on either side of the space (52).

3. Control mechanism according to claim 1 or 2, in which the standard connectors (48) are provided on a connecting printed circuit board (46), which has a hole (52), through which the connectors (38) of the base printed circuit board (34) protrude.

4. Control mechanism according to one of the preceding claims, in which the microprocessor (36) has an integrated memory.

5. Drive for automatic sliding doors, comprising a power supply part (28), at least one electric motor (22) and a control device (24) according to one of the preceding claims.

6. Drive according to claim 5, in which the drive comprises two motors which are connected in series.

7. Drive according to one of the preceding claims 5-6, provided with a protection against short-circuits comprising an H-bridge (62; TF1-TF4), in which a coil (L1) is provided in the power connection of the motor (22) and a measuring device (D1) for measuring the supply current drawn is provided on the non-ground side.

8. Drive according to one of the preceding claims, in which the power supply part (28) comprises a transformer with a mains filter.

9. Assembly comprising an automatically operating sliding door, detection sensors (26) and a drive according to one of the preceding claims.

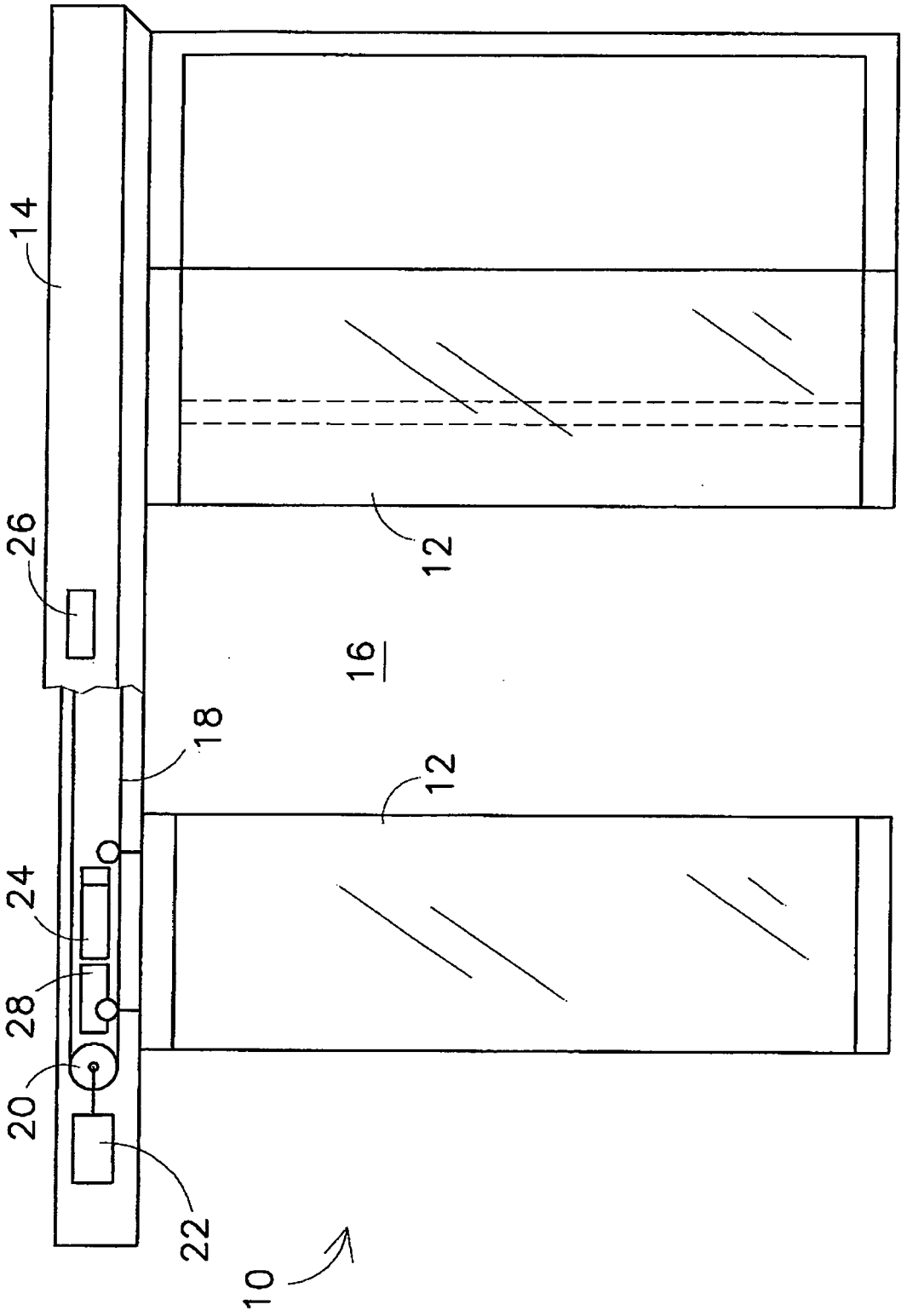

Fig 1

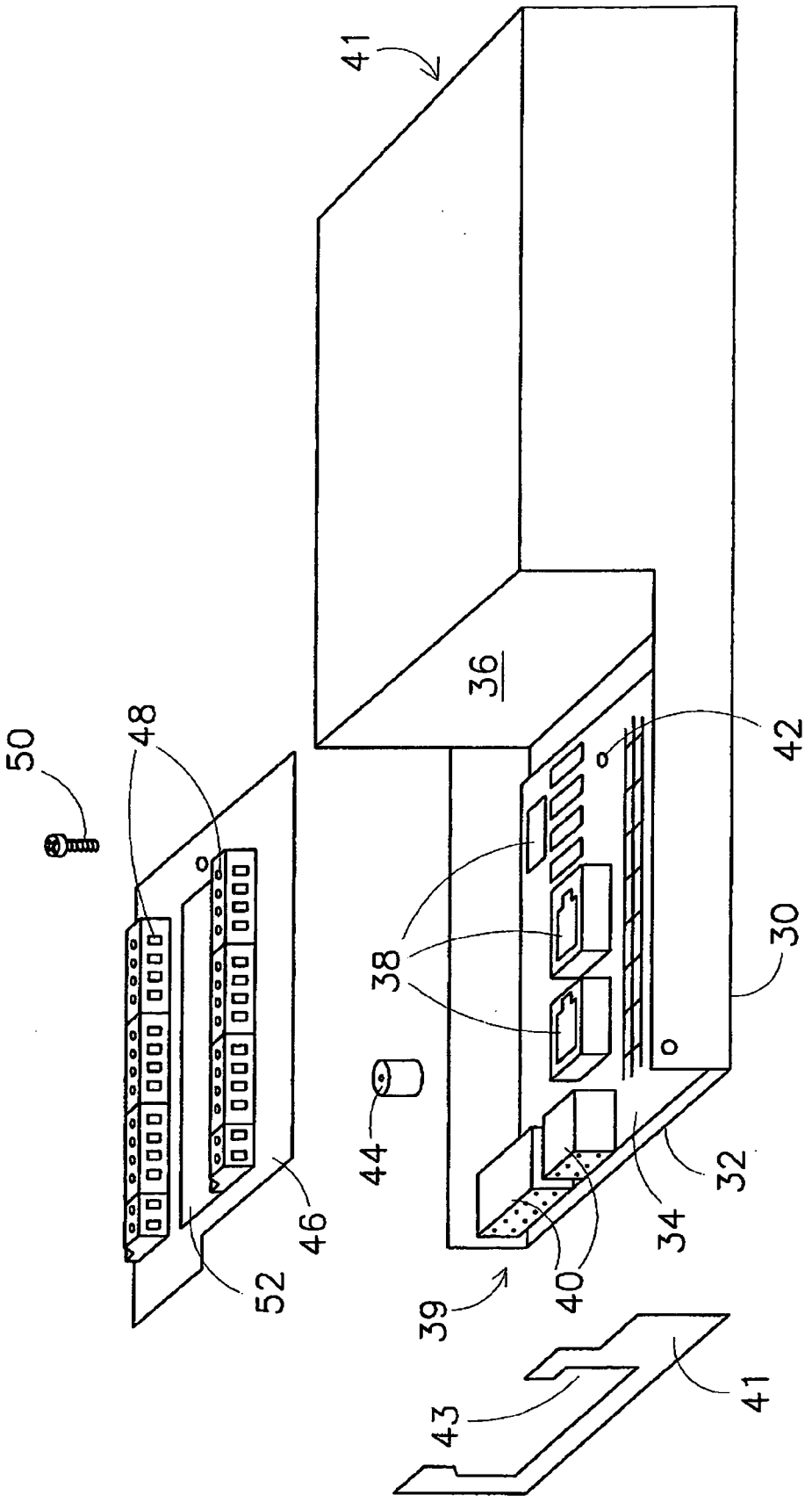

Fig 2

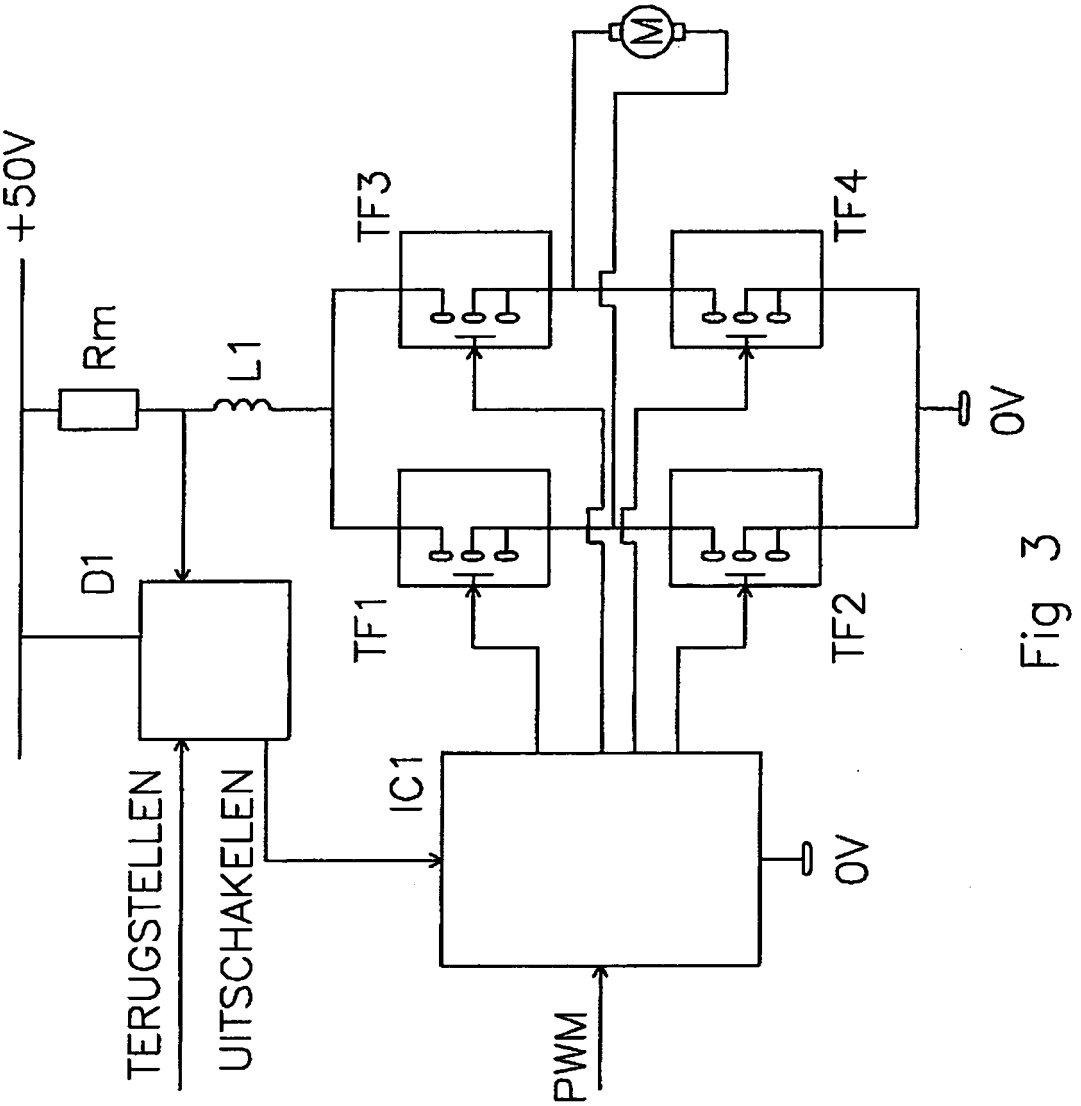
+50V
Rm
L1
D1
TF3
TF4
TF1
TF2
M
0V
IC1
0V
TERUGSTELLEN
UITSCHAKELEN
PWM

Fig 3