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(54) **Drive unit for objects to be wound on to and off a tube**

(57) The invention relates to a drive unit for objects to be wound on to and off a tube, like sun blinds, roller shutters or cinema screens, including a combination of a shaft Sh, a brake Br, a motor Mo, and a gear Ge, the combination being insertable into the tube for on the one hand drive the tube and on the other hand being driven by hand together with the tube as a movable part, in case

of need, to which end the brake and the motor are connected to a fixed part via collector rings CR1, CR2, where an incremental encoder Mg, HA, HB is used including an active sensor HA, HB and a passive counterpart Mg thereof, and where the sensor HA, HB is attached to the fixed part and the counterpart Mg is attached to the moving part.

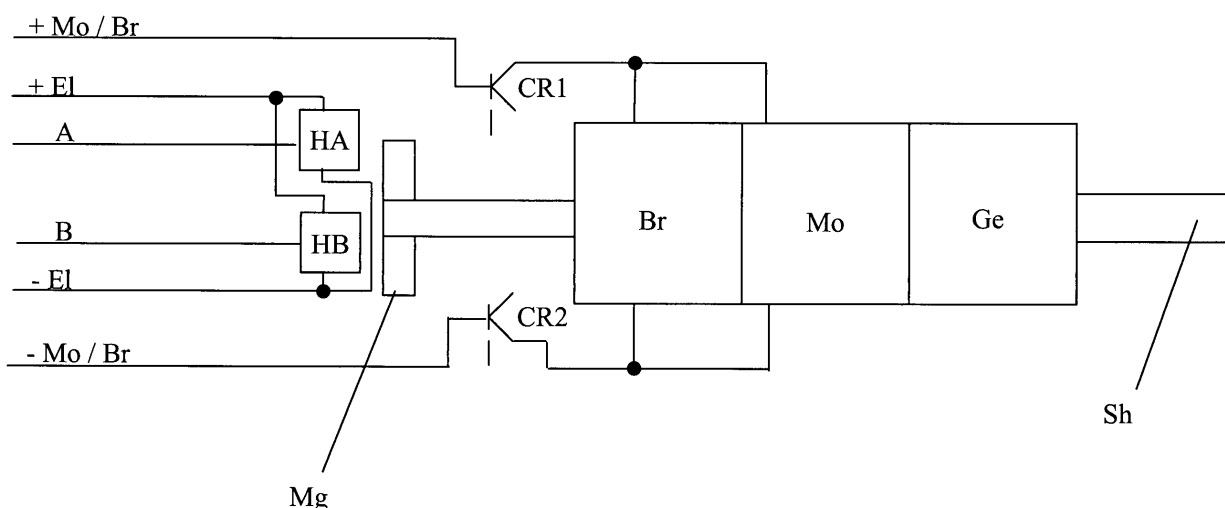


Fig. 1

Description

[0001] The invention relates to a drive unit for objects to be wound on to and off a tube according to the preamble of claim 1.

[0002] Drive units including a combination of a shaft, a brake, a motor, and a gear, the combination being insertable into a tube, normally are called tubular drives. Such drives are for driving objects to be wound on to and off said tube, like sun blinds, roller shutters or cinema screens. It is also known that such drive units are combined with a manual override where the whole drive unit or tubular drive together with the tube is rotated by hand. To this end the currents for the motor and the brake are to be fed via collector rings from a fixed and normally wall-mounted part.

[0003] Such tubular drives normally are combined with end switches in order to avoid damages. But often it would be desirable not only to detect the end positions but also any position in between.

[0004] The object of the invention therefore is to design the drive unit such that during normal operation also positions between the end positions can be detected and that it is not damaged during a manual override.

[0005] This object is solved according to the invention by a drive unit according to the teachings of claim 1.

[0006] The basic idea behind is to use an incremental encoder whose (electronic) sensor is attached to the fixed part of the drive unit and where the counterpart of the sensor, which is not an active part, is attached to the moving part.

[0007] Further embodiments of the invention are to be found in the subclaims and the following description.

[0008] In the following the invention will be described with reference to the accompanying drawings:

Figure 1 shows a first embodiment of a drive unit according to the invention.

Figure 2 shows a second embodiment of a drive unit according to the invention.

[0009] Figure 1 shows a combination of a brake Br, a motor Mo and a gear Ge on a common shaft Sh. It further shows a magnet Mg, two collector rings CR1 and CR2, two Hall sensors HA and HB, and leads +Mo/Br, -Mo/Br, +E1, -E1, A, and B.

[0010] The combination of the brake BR, the motor Mo and the gear Ge is shown as being concentric to the shaft Sh, what is normal for such tubular drives. At the right-hand-side the shaft Sh is foreseen to drive the tube for winding on and off whatever object.

[0011] In this example motor Mo and brake Br are connected in parallel. They are connected between the leads +Mo/Br and -Mo/Br via the collector rings CR1 and CR2. Short-circuiting this leads activates the brake Bk, applying a DC voltage thereto activates the motor Mo.

[0012] When using a DC motor, one needs only two collector rings; otherwise at least three collector rings

would be necessary.

[0013] In this example the two collector rings CR1 and CR2 are shown to lie in a plane, e.g. on a printed circuit board, perpendicular to the shaft Sh and concentric thereto. An other possibility would be to use cylinders concentric to the shaft.

[0014] The magnet Mg together with the two Hall sensors HA and HB build an incremental encoder. Another possibility of an incremental encoder could be a photo sensor in connection with a raster. In any case we have an active sensor and a passive counterpart thereof. There are enough known examples of such encoders and suitable evaluation circuits. They may include one single sensor part or more than one; they may include one single counterpart or more than one.

[0015] Normally when using such incremental encoders in connection with an electric motor the whole encoder is mounted within the housing of the motor and only the leads thereto are accessible outside. Here it is proposed to attach the sensor to the fixed part of the whole drive unit. The passive counterpart should be attached to the moving part, here the shaft Sh.

[0016] The active sensor here is powered by the leads +E1 and -E1, normally taken from the electronics evaluating the output signals; the output signals are accessible via the leads A and B.

[0017] As the active part of the encoder is unmovable whereas the passive part is rotatable, necessarily the plane carrying the collector rings is traversed.

[0018] In the example of figure 1 the shaft Sh traverses this plane, in the example of figure 2 the leads +E1, -E1, A, and B together with some support for the sensor traverse this plane. The choice there between may be made in view of an easy assembly. As the plane carrying the collector rings normally is not magnetic, the sensor could even be on one side and the magnet on the other side of this plane.

Claims

1. Drive unit for objects to be wound on to and off a tube, like sun blinds, roller shutters or cinema screens, including a combination of a shaft (Sh), a brake (Br), a motor (Mo), and a gear (Ge), the combination being insertable into the tube for on the one hand drive the tube and on the other hand being driven by hand together with the tube as a movable part, in case of need, to which end the brake and the motor are connected to a fixed part via collector rings (CR1, CR2), **characterized in, that** an incremental encoder (Mg, HA, HB) is used including an active sensor (HA, HB) and a passive counterpart (Mg) thereof, that the sensor (HA, HB) is attached to the fixed part, that the counterpart (Mg) is attached to the moving part, that the sensor includes at least one sensor for magnetic fields (HA, HB) and the passive counterpart thereof includes at least one magnet

(Mg), that the collector rings (CR1, CR2) are arranged concentric to the shaft (Sh) and in a plane perpendicular thereto and that the shaft (Sh) with the at least one magnet (Mg) or the at least one magnetic field sensor (HA, HB) is lead through the plane with the collector rings (CR1, CR2). 5

2. Drive unit according to claim 1, **characterized in, that** the motor (Mo) is a DC motor. 10

Amended claims in accordance with Rule 86(2) EPC.

1. Drive unit for objects to be wound on to and off a tube, like sun blinds, roller shutters or cinema screens, including a combination of a shaft (Sh), a brake (Br), a motor (Mo), and a gear (Ge), the combination being insertable into the tube for on the one hand drive the tube and on the other hand being driven by hand together with the tube as a movable part, in case of need, to which end the brake and the motor are connected to a fixed part via collector rings (CR1, CR2), **characterized in, that** an incremental encoder (Mg, HA, HB) is used including an active sensor (HA, HB) and a passive counterpart (Mg) thereof, that the sensor (HA, HB) is attached to the fixed part and the counterpart (Mg) is attached to the moving part. 15 20 25

2. Drive unit according to claim 1, **characterized in, that** the sensor includes at least one sensor for magnetic fields (HA, HB) and the passive counterpart thereof includes at least one magnet (Mg). 30

3. Drive unit according to claim 2, **characterized in, that** the collector rings (CR1, CR2) are arranged concentric to the shaft (Sh) and in a plane perpendicular thereto. 35

4. Drive unit according to claim 3, **characterized in, that** the shaft (Sh) with the at least one magnet (Mg) is lead through the plane with the collector rings (CR1, CR2). 40

5. Drive unit according to claim 3, **characterized in, that** the at least one magnetic field sensor (HA, HB) is lead through the plane with the collector rings (CR1, CR2). 45

6. Drive unit according to claim 1, **characterized in, that** the motor (Mo) is a DC motor. 50

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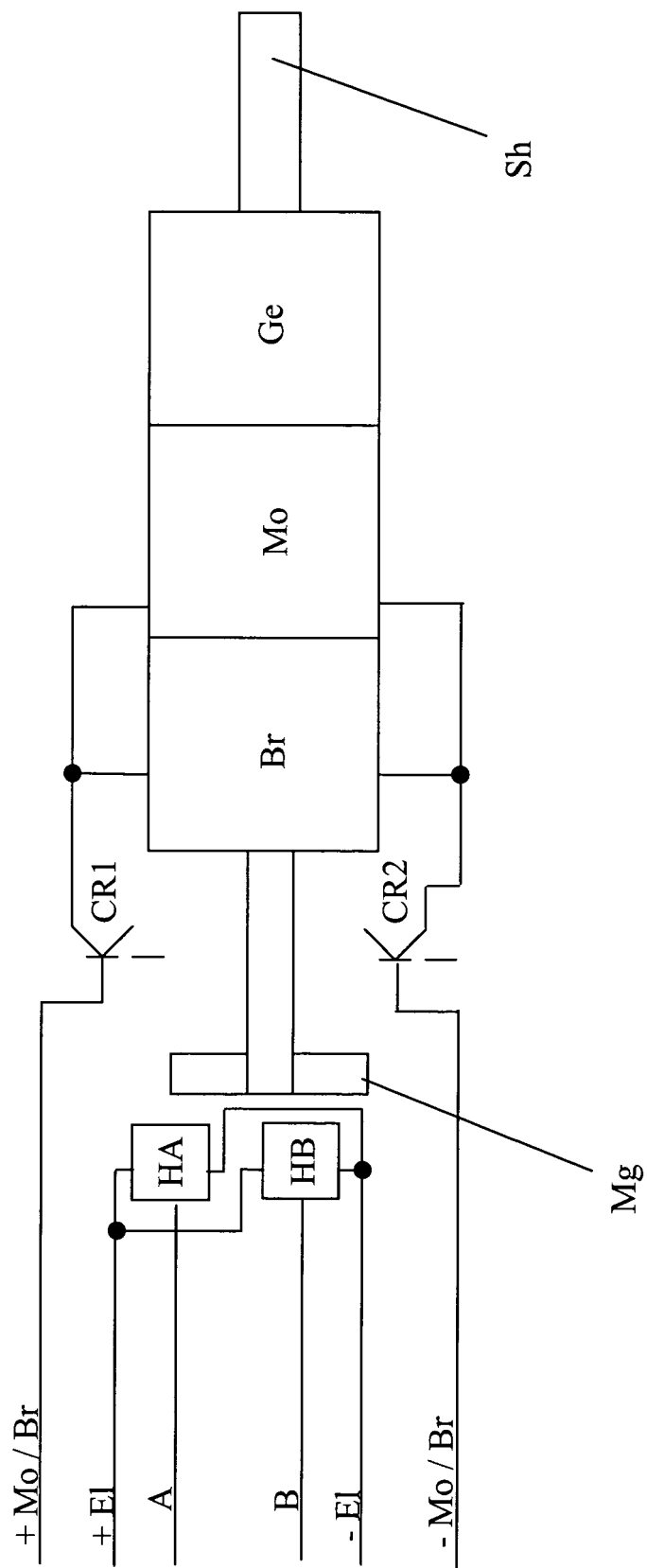


Fig. 1

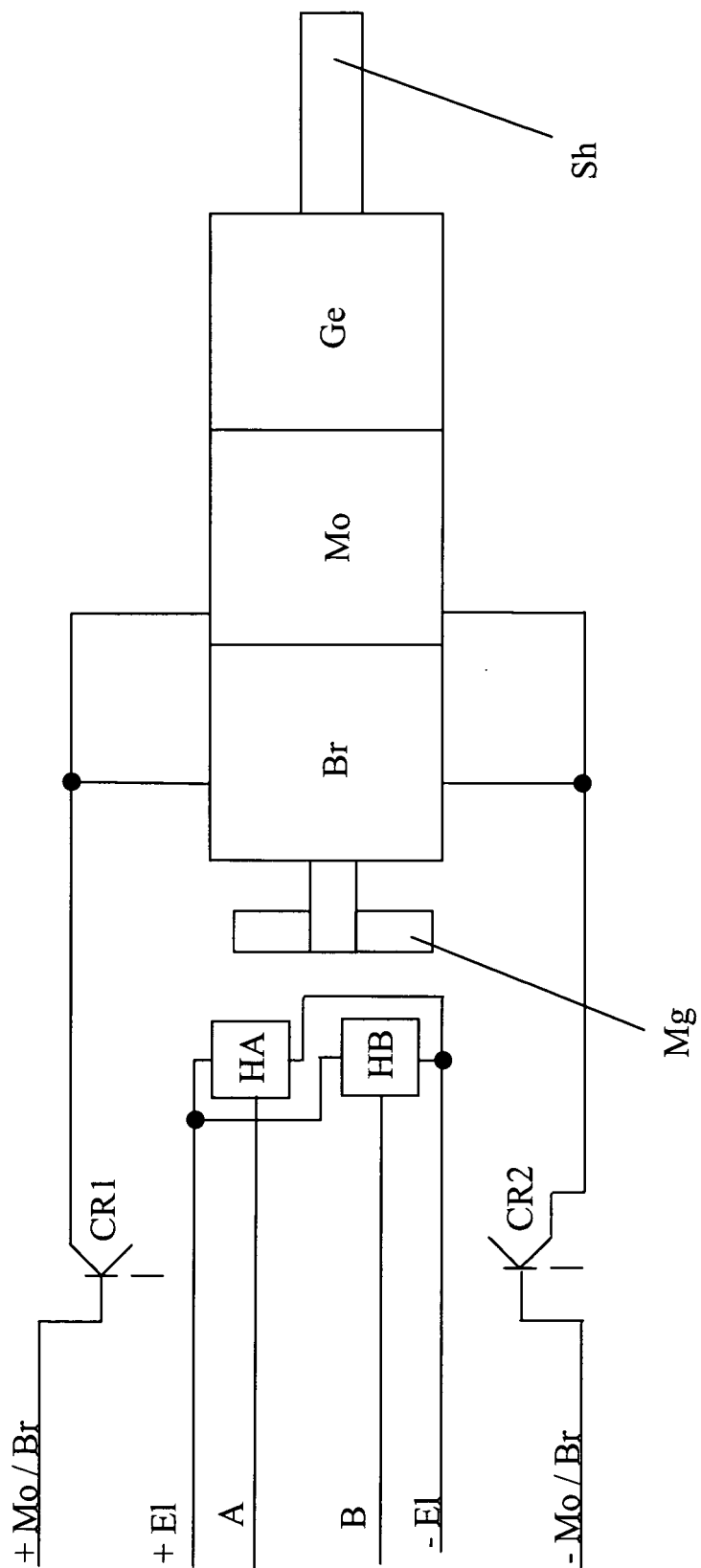


Fig. 2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 29 1705

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 January 2006	Examiner Baath, S
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 29 1705

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
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