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

Antriebseinheit für Gegenstände, die auf ein Rohr auf- und abgewickelt werden

Unité d'entraînement pour objets enroulés sur ou déroulés d'un tube

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(56) References cited:
EP-A- 0 965 724 DE-A1- 3 504 489
DE-A1- 10 038 285 DE-U1- 29 818 023
US-A- 5 711 360

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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 drive is known e. g. from DE 298 18 023 U1.

[0004] 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.

[0005] 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.

[0006] This object is solved according to the invention by a drive unit according to the teachings of claim 1.

[0007] 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.

[0008] The use of incremental encoders in connection with fixed magnetic field sensors and moving magnets as well as the use of concentric collector rings arranged in a plane perpendicular to the shaft is known as such from DE 100 38 285 A1.

[0009] Further embodiments of the invention are to be found in the subclaim and the following description.

[0010] 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.

[0011] 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.

[0012] 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.

[0013] 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.

[0014] When using a DC motor, one needs only two collector rings; otherwise at least three collector rings would be necessary.

[0015] 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.

[0016] 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.

[0017] 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.

[0018] 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.

[0019] As the active part of the encoder is unmovable whereas the passive part is rotatable, necessarily the plane carrying the collector rings is traversed.

[0020] 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).

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

Patentansprüche

1. Antriebseinheit für Gegenstände, die auf ein Rohr auf- oder davon abgewickelt werden sollen, wie beispielsweise Jalousien, Rollläden oder Filmleinwände, die eine Welle (Sh), eine Bremse (Br), einen Motor (Mo) und ein Getriebe (Ge) umfassen, wobei diese Kombination in ein Rohr eingesetzt werden kann, um einerseits das Rohr anzutreiben und andererseits für den Antrieb von Hand im Notfall, zusammen mit dem Rohr als eine beweglichen Komponente, angetrieben zu werden, wozu die Bremse und der Motor über Schleifringe (CR1, CR2) mit einer fixierten Komponente verbunden sind, **dadurch gekennzeichnet, dass** ein inkrementeller Codierer (Mg, HA, HB) verwendet wird, der einen aktiven Sensor (HA, HB) und ein passives Gegenstück (Mg) dazu aufweist, dass der Sensor (HA, HB) an der fixierten Komponente befestigt ist, dass das Gegenstück (Mg) an der beweglichen Komponente befestigt ist, dass der Sensor mindestens einen Sensor für Magnetfelder (HA, HB) umfasst und dass das passive Gegenstück dazu mindestens einen Magneten (Mg) umfasst, dass die Schleifringe (CR1, CR2) konzentrisch zur Welle (Sh) und in einer dazu senkrecht angeordneten Ebene angeordnet sind und dass die Welle (Sh) mit dem mindestens einen Magneten (Mg) oder dem mindestens einen Magnetfeldsensor (HA, HB) durch die Ebene mit den Schleifringen (CR1, CR2) geführt wird.
2. Antriebseinheit gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Motor (Mo) ein Gleichstrommotor ist.

Revendications

1. Unité d'entraînement pour des objets à enrouler sur

un tube et à dérouler de celui-ci tels que des stores, des volets roulants ou des écrans de cinéma, comprenant la combinaison d'un arbre (Sh), d'un frein (Br), d'un moteur (Mo) et d'une boîte de transmission (Ge), la combinaison pouvant être insérée dans un tube d'une part pour l'entraînement du tube et d'autre part pour, au besoin être entraînée à la main conjointement avec le tube en tant que partie mobile, dans quel cas le frein et le moteur sont reliés à une partie fixe par le biais de bagues collectrices (CR1, CR2), **caractérisée en ce qu'**un codeur incrémental (Mg, HA, HB) est utilisé, lequel comprend un capteur actif (HA, HB) et une contrepartie active (Mg) de celui-ci, que le capteur (HA, HB) est fixé à la partie fixe, que la contrepartie (Mg) est fixée à la partie mobile, que le capteur comprend au moins un capteur de champs magnétiques (HA, HB) et la contrepartie passive de celui-ci comprend au moins un aimant (Mg), que les bagues collectrices (CR1, CR2) sont disposées de manière concentrique par rapport à l'arbre (Sh) et dans un plan perpendiculaire à celui-ci et que l'arbre (Sh) muni de l'au moins un aimant (Mg) ou de l'au moins un capteur de champ magnétique (HA, HB) est amené à travers le plan avec les bagues collectrices (CR1, CR2).

2. Unité d'entraînement selon la revendication 1, **caractérisée en ce que** le moteur (Mo) est un moteur à courant continu.

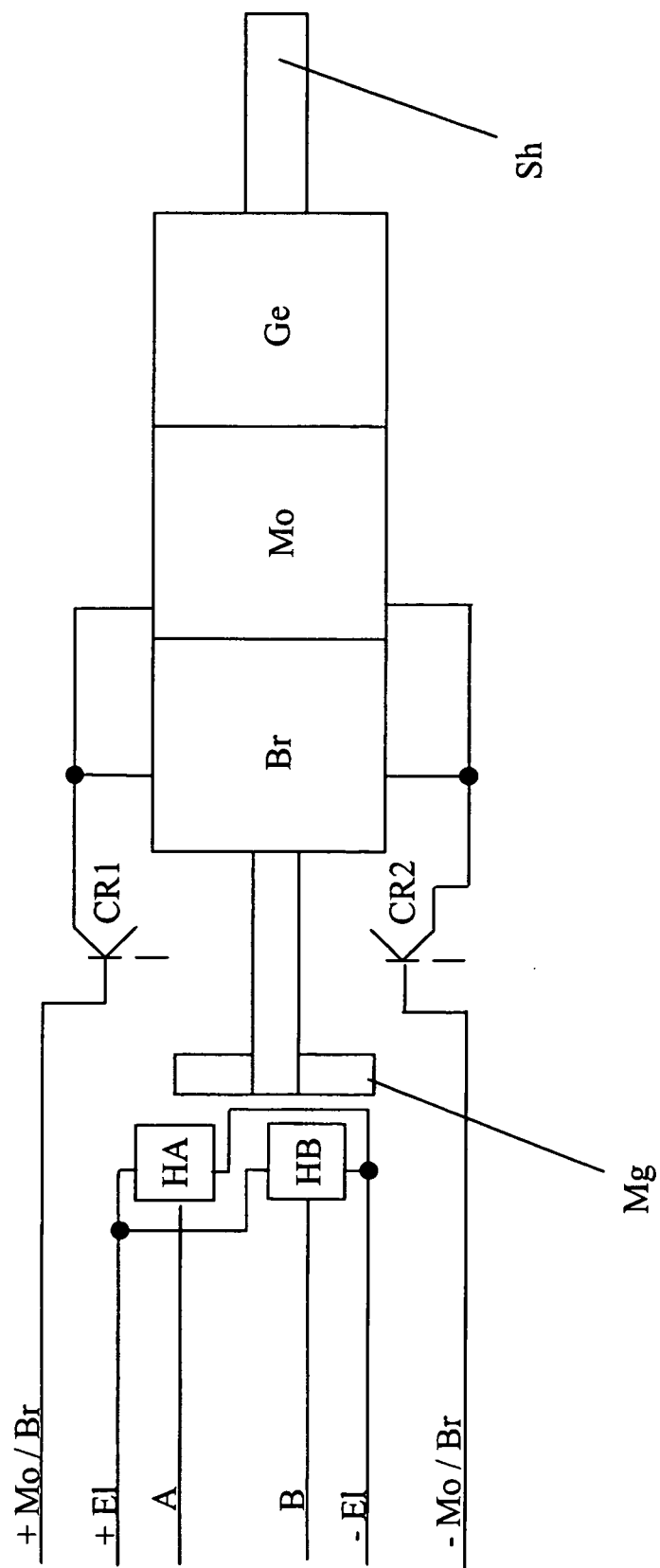


Fig. 1

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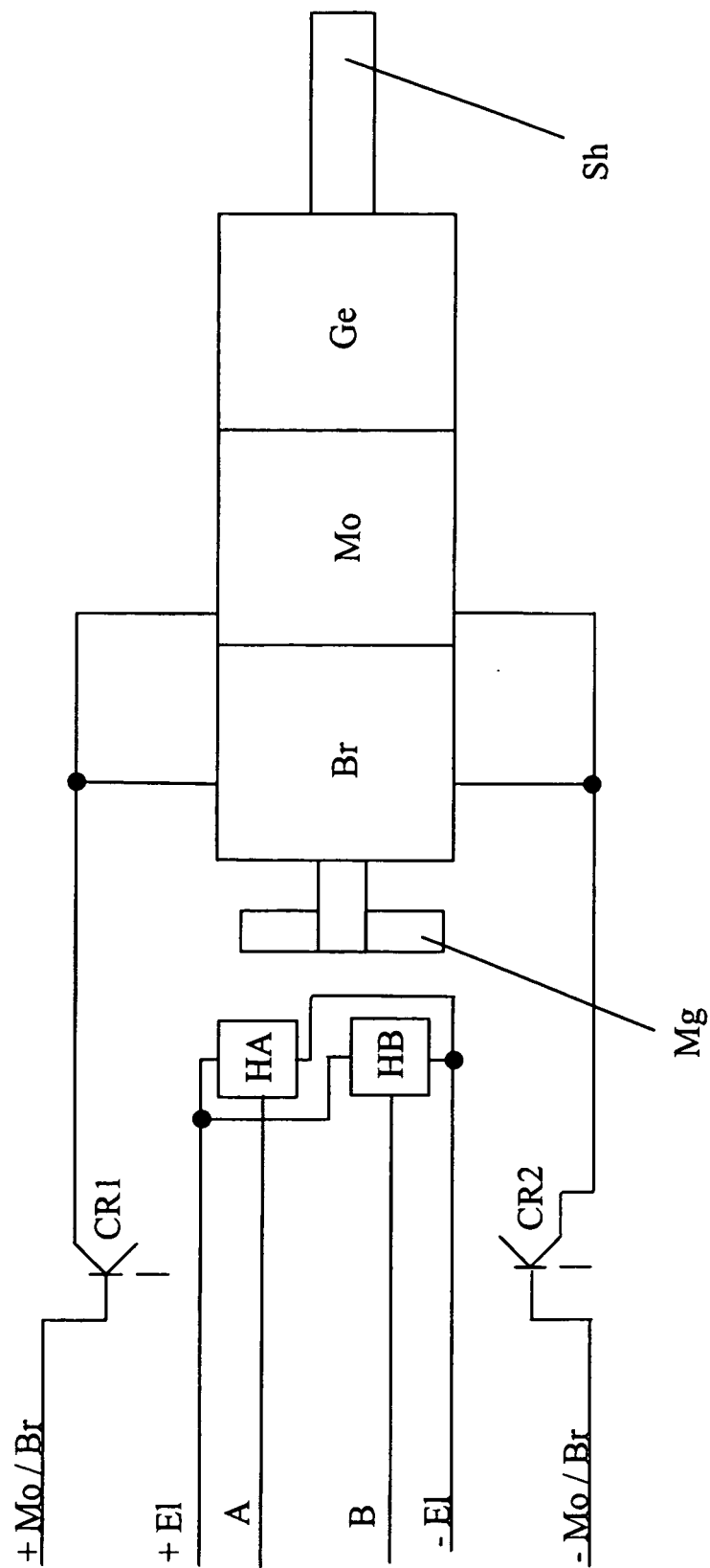


Fig. 2

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 29818023 U1 [0003]
- DE 10038285 A1 [0008]