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(54) **Security system and operating assembly therefor**

(57) A security system with an electronic lock having operating means, which have a profile with an outer contour of a standard lock cylinder. By accommodating the lock mechanism within the profile of a standard lock cyl-

inder, while at least on one side no part project outside the profile of this cylinder, the installation is remarkably simple.

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Description

[0001] The invention relates to a security system and to an operating assembly therefor.

[0002] In securing the entrance to objects which need to be accessible to different persons, key management forms a great problem. It is known to use electric or electronic locks, wherein the authorization code or codes with which the lock can be unlocked, for instance for releasing the operability of a lock bolt of a door or the drive of a motor for opening a door or gate, can be set in a simple manner, remotely or not remotely from a central point or the like.

[0003] In most cases, for the use of electric or electronic locks, much installation work is required because these locks often have deviating sizes and because power supply and operating lines have to be constructed. In particular when an existing mechanical, key-operated security system is present, the installation of electric or electronic locks goes together with relatively high costs. This is disadvantageous in particular when the use of electric locks is of a temporary nature, such as, for instance, in the social services where nurses nurse patients at home. Here, an electric or electronic lock that can be installed in a simple manner is helpful.

[0004] One condition in that respect is, that the locks have to meet the standards and safety requirements in force, such as the Dutch NEN 5089 standard in relation to burglary safety.

[0005] It is an object of the invention to provide an electric or electronic access security which can be easily installed as a replacement of a mechanical key-operated access security.

[0006] According to the present invention, this object is achieved by the provision of an access security according to claim 1.

[0007] By accommodating the lock mechanism within the profile of a standard lock cylinder, such as, for instance, a standard eurocylinder, wherein at least on one side no parts project outside the profile of this cylinder, installation is remarkably simple. During fitting, the security system can be slid into an existing lock housing and be fixed with the aid of, for instance, only one screw, to which end no specialized experts are required. The unlocking of the lock, which can otherwise remain unchanged, can then take place in an electric or electronic manner, for instance with the aid of a contactless chip card, serving as a key. This contactless chip card contains a unique identification number with which the lock can be opened, at least if this lock has been set beforehand to authorize the unlocking in reaction to this unique identification number. Setting this authorization can preferably take place in a contactless manner, for instance from a care center.

[0008] The invention can for instance be embodied in a security system wherein the electronic lock is based on the profile of a standard eurocylinder and wherein the locking function of the electronic lock is effected with

the aid of an electromotor with delay and transmission mechanism, which mechanism also provides that the bit, before locking, is at least turned in the prescribed minimal angle of 20 degrees relative to the central axis through the part projecting outside of the cylindrical part, so that the cylinder in the locked position cannot be slid from the lock housing and meets the requirements set with regard thereto.

[0009] The invention can further be embodied in an operating assembly according to claim 18, specifically designed to be used as a part of a security system according to claim 1.

[0010] Special embodiments of the invention, which, insofar as they relate to the operating assembly, are also applicable to the operating assembly separately, have been laid down in the dependent claims.

[0011] In the following, the invention is further elucidated with reference to an example, while referring to the drawing.

[0012] Fig. 1 shows a longitudinal cross section of a security system according to the invention with the profile (separately represented as cross section A-A) of a so-called eurocylinder.

[0013] Fig. 2 shows a detail of the locking means of the security system according to Fig. 1.

[0014] Fig. 3 shows a perspective, exploded representation of the components of these locking means.

[0015] In the cross section of Fig. 1, an example of an operating assembly of a security system according to the invention is represented. The operating assembly has a profile with an outer contour of a eurocylinder. A bit 1 in a lock housing 2 of the operating assembly, hereinafter also indicated as "the eurocylinder", is not, as is customary, operable by a key, but by means of an operating lip which is permanently present, while, in reaction to an authorization code, this is coupled to the bit 1 with the aid of an electromotor 3.

[0016] Apart from the locking means, the lock mechanism according to the invention is built up symmetrically with the aid of the same parts on both sides, while, independently of each other, operation from the inside as well as from the outside of the door is possible. From the outside of the door, the movement of the operating lip 29 is transmitted via a connecting strip 30 and sprocket 31 to the axle 23 which is provided on both ends with a small sprocket, one of which is in engagement with the sprocket 31 and the other one with the sprocket 21 in Fig. 2. Sprocket 21 is identical to sprocket 31 and therefore rotates perfectly synchronously with operating lip 29. Rerouting this movement along the cylindrical part of the lock housing 2 leaves space in the cylindrical part for accommodating a standard battery 36. From the inside of the door, this movement is transmitted in the same manner to axle 24 and sprocket 22 in Fig. 2.

[0017] In Figs. 2 and 3, the locking means are represented in more detail. The electromotor 3, with built-in delay mechanism and built-on electronic control module 4 is fitted in the lock housing 2 via ring 5 and is coupled

to an axle 6 on which a first cam disc 7 is non-rotatably mounted. The second cam disc 8, which is provided with locking cams engaging in the cam ring 9 connected to the lock housing 2, slides over the axle 6 and is pushed against first cam disc 7 with the aid of spring 10, while, in the position of rest as drawn, the locking cams of the second cam disc 8 are in engagement with the cam ring 9, so that rotation thereof in the lock housing 2 is not possible. At the left hand side, the first cam disc 7 has a segment that rotates through an optic switch 11 with which the blocking position, being the position of rest, is detected. The remaining positions of the axle 6 are derived with the aid of the control module 4, which detects the position of the rotor via Hall sensors and can thus determine the position of the axle 6 relative to the position of rest.

[0018] Via the earlier-mentioned cams, which correspond with openings in the bit 1, the second cam disc 8 is coupled to bit 1 and, as a result thereof, can slide but cannot rotate relative to the bit 1. In this manner, in the position of rest, the bit 1 too is locked relative to the lock housing 2. This locking of the bit 1 takes place at an angle which is greater than the minimal angle prescribed in the Dutch NEN standard 5089 of 20 degrees relative to the central axis, through the part of the lock profile projecting outside the cylindrical part indicated in detail A-A in Fig. 1.

[0019] At the left hand side, bit 1 is also provided with a segment which rotates in two optic switches 12, which are positioned at an angle of 90 degrees relative to each other and with which the position of the bit 1 relative to the lock housing 2 can be determined in four quadrants.

[0020] Apart from the first cam disc 7, on the axle 6, a sleeve with a curved disc 13 is non-rotatably mounted, around which a sleeve 14 can slide, which is provided with a pin 15 running in the curve of the curved disc 13. A pin 20, attached in the motor housing, allows for the sleeve 14 to only slide and not rotate relative to the lock housing 12.

[0021] Around the sleeve 14, two cam rings 16 and 17 rotate which, with the aid of a spring 18, are pushed apart but with the aid of a spring ring 19, are confined on a sleeve 14. The cams of these rings slide in corresponding openings in bit 1 and hence cannot rotate but only slide relative to the bit 1.

[0022] For allowing the lock to be opened from the outside of the door, the eurocylinder needs to be unlocked. To this end, the motor 3 rotates the axle 6 to the right through an angle of approximately 120 degrees, while, successively, with the aid of the first cam disc 7, the second cam disc 8 is slid out of locking and then, the sleeve 14 is slid to the right via the curved disc 13, while cam ring 16 enters into engagement with the sprocket 21 which is also provided with openings corresponding to these cams. Should the position be such that the cams of cam ring 16 do not slide into the openings of sprocket 21, then, the spring 18 is compressed.

[0023] If, thereupon, the operating lip 29 in Fig. 1 is

pivoted and the cams of cam ring 16 in Fig. 2 come to lie in front of the openings in sprocket 21, then, under the pressure of the spring 18, the cam ring 16 still slides into these openings and engagement occurs, whereupon the bit 1 can be moved by turning the operating lip 29 which drives the sprocket 21 and the cam ring 16, so that, manually or by a separate drive, the lock of the door can be opened or closed or be turned to the night position.

[0024] When operating the unlocking of the lock from the inside of the door, with the aid of electromotor 3, the axle 6 is turned to the left through an angle of approximately 120 degrees, while, successively, in the same manner, with the aid of first cam disc 7, second cam disc 8 is slid from locking and then, sleeve 14 is slid to the left via curved disc 13, while cam ring 17 enters into engagement with sprocket 22. Should the position be such that the cams of cam ring 17 do not slide into the openings of sprocket 22, then, also, the spring 18 is compressed. If the operating lip at the inside of the door is then pivoted, and the cams of cam ring 17 come to lie before the openings in the sprocket 22, then, under pressure of the spring 18 the cam ring 17 still slides into these openings and engagement occurs whereupon the bit 1 can be moved from the inside of the door.

[0025] Operating the lock from the inside of the door is therefore completely independent of operation from the outside of the door, while operation from the inside has precedence over operation from the outside of the door. In this manner, it is also possible to leave the lock from the inside of the door in a daytime position, wherein the lock can be operated from within without contactless chip card.

[0026] The lock mechanism is protected by two hardened discs 25 and 26 in Fig. 2, so that it is not possible to drill out the lock out with the aid of a drill and hence the anti drill security required according to the NEN 5089 standard is provided for. Disc 25 also serves as seal of a battery holder 35 in which a battery 36 is present. Changing the batteries can be done by disassembling the cylinder from the lock housing and pivoting the battery holder upwards around the pivot point 37 (see Fig. 1).

[0027] According to this example, the electronics of the electronic lock are accommodated on different prints, the most important print 32 of which is located in the space where in a conventional, mechanical lock, the feeler pins of the key are located. On this print, a transmitter/receiver is present, arranged, for instance, for receiving signals in the 868 MHz band which, with the aid of antenna 39, has a range of approximately 20 meters and can communicate with a similar transmitter/receiver accommodated in an adapter module (not shown) which can be plugged into a socket and in which also a GSM modem has been accommodated so that the authorization codes can be transmitted via a wireless phone connection from, for instance, the care center to the electronic lock.

[0028] In the corresponding space at the other side of the cylinder, a print is located with which the energy supply is regulated, while, in the case of emptied batteries, via an external connection in opening 38, energy from outside can be supplied.

[0029] Print 33, which is provided both at the outside and at the inside of the door in the projecting part of the lock housing 2, contains a card reader for reading a contactless chip card. Behind a small lens in opening 34, a bicolored light emitting diode is arranged, with which information signals can be given to the user.

[0030] Apart from locking and unlocking the operating assembly by blocking or, conversely, releasing the movability of the bit 1 in Fig. 2, the motor 3 also allows the bit to be locked in the position of rest at the prescribed angle, when the bit, after a time delay, is controlled for bringing the locking means in the locking position. To this end, an additional cam 27 is provided on the second cam disc 8 and an additional cam 28 on curved disc 13. Should the second cam disc 8 not slide into the locking position but remain on top of the cam ring 9 and therefore in a position slid to the right, then, the cams 27 and 28 interlock and the second cam disc 8, and hence the bit 1, are taken along by the curved disc 13 until second cam disc 8 can engage in the cam ring 9 and locking occurs, while the bit 1 is at the prescribed minimal angle of 20 degrees relative to the central axis through the part projecting outside the cylindrical part.

[0031] Apart from the use of a contactless chip card it is, naturally, also possible to use a contactless label, for instance in the form of a key ring, or built-in in a watch. The security can also be improved by using a so-called "challenge/response" system, for instance according to the standard DES protocol.

[0032] With the aid of the optic switches it is possible to detect the rotation of the bit and hence determine in what position the lock is. Further, on the print 32 in the part of the cylinder projecting outside the door, an infrared transmitter and receiver are provided with which, together with a retroreflective mirror on the inside of the door post, it is possible to detect whether or not the door is closed. This information can also be transmitted via the 868 MHz transmitter/receiver to the central authorization system.

[0033] Apart from being operated with the aid of the contactless chip card, the lock can also be operated via the contactless transmitter/receiver in the 868 MHz band. With this, it is possible to make a remote control with which, for instance, a patient can open the door from a distance.

Claims

1. A security system with an operating assembly comprising electric or electronic locking means, while at least one part of the operating assembly has a profile with a cross-sectional contour of a standard lock

cylinder.

2. A security system according to claim 1, wherein the security system has a bolt and wherein the operating assembly has a bit engaging the bolt and wherein the locking means are arranged for locking the operating assembly only if the bit is in a position in which it projects outside the cross-sectional contour of the operating assembly, such that the operating assembly in the locked position cannot be slid from the security system.

3. A security system according to claim 2, wherein the locking means comprise a motor and are arranged for displacing the bit, prior to locking the operating assembly, and driven by the motor, to said position in which the bit projects outside the cross-sectional contour of the operating assembly.

4. A security system according to any one of the preceding claims, wherein the locking means comprise a motor drive, which motor drive and, are arranged for controlling, in reaction to an authorization code to unlock, the motor drive for unlocking the locking means and, after a particular time delay and/or in reaction to operation of the operating assembly, controlling the motor drive for unlocking the locking means.

5. A security system according to any one of the preceding claims, wherein the locking means comprise a receiver for detecting a contactless chip card or a different contactless label.

6. A security system according to any one of the preceding claims, further comprising separate operating means for operating the operating assembly from the outside and the operation from the inside.

7. A security system according to claim 6, wherein operating means for operation from the inside have precedence over the operating means for operation from the outside.

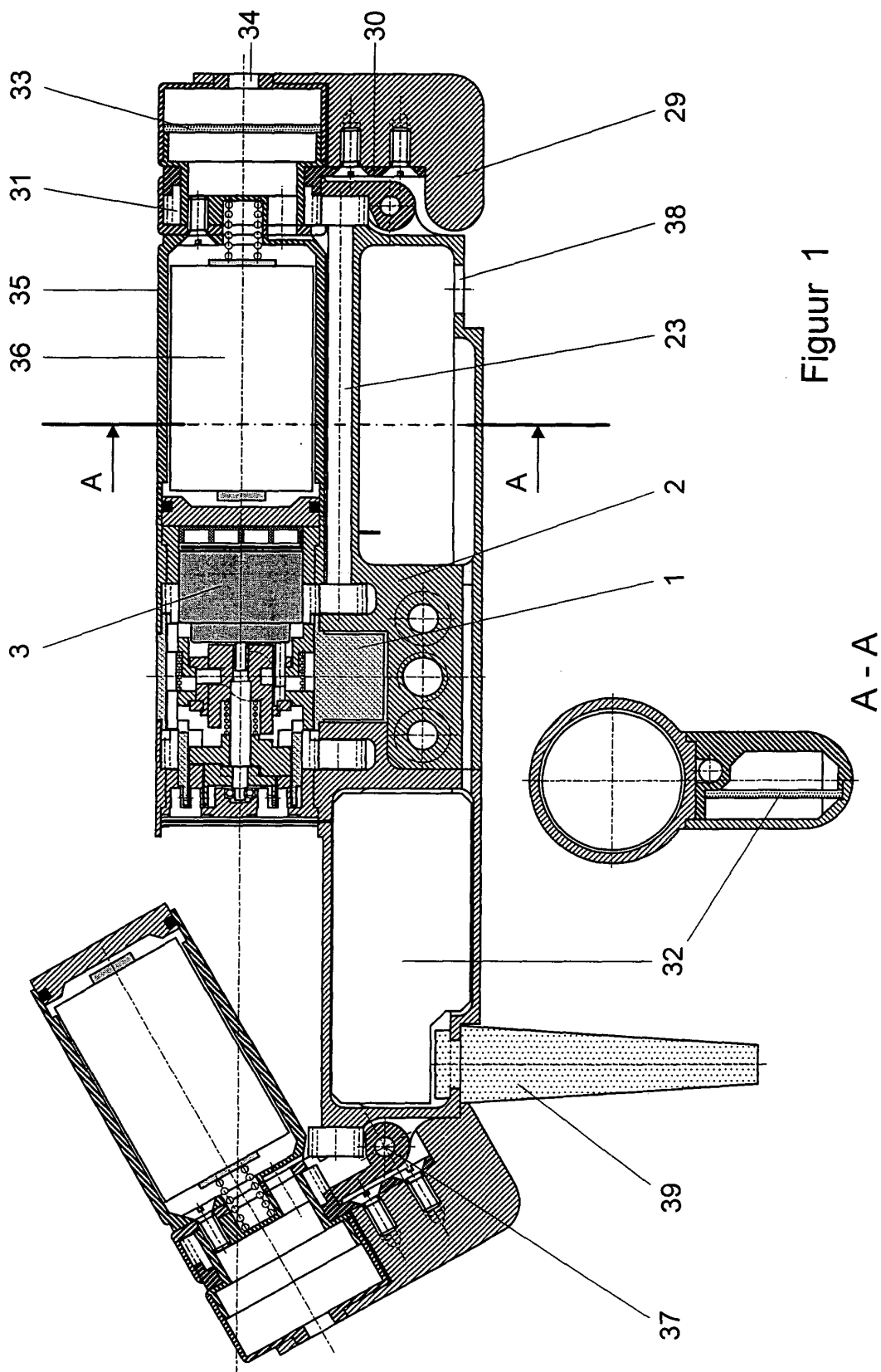
8. A security system according to any one of the preceding claims, wherein the locking means comprise a transmitter/receiver, for instance in the 868 MHz band.

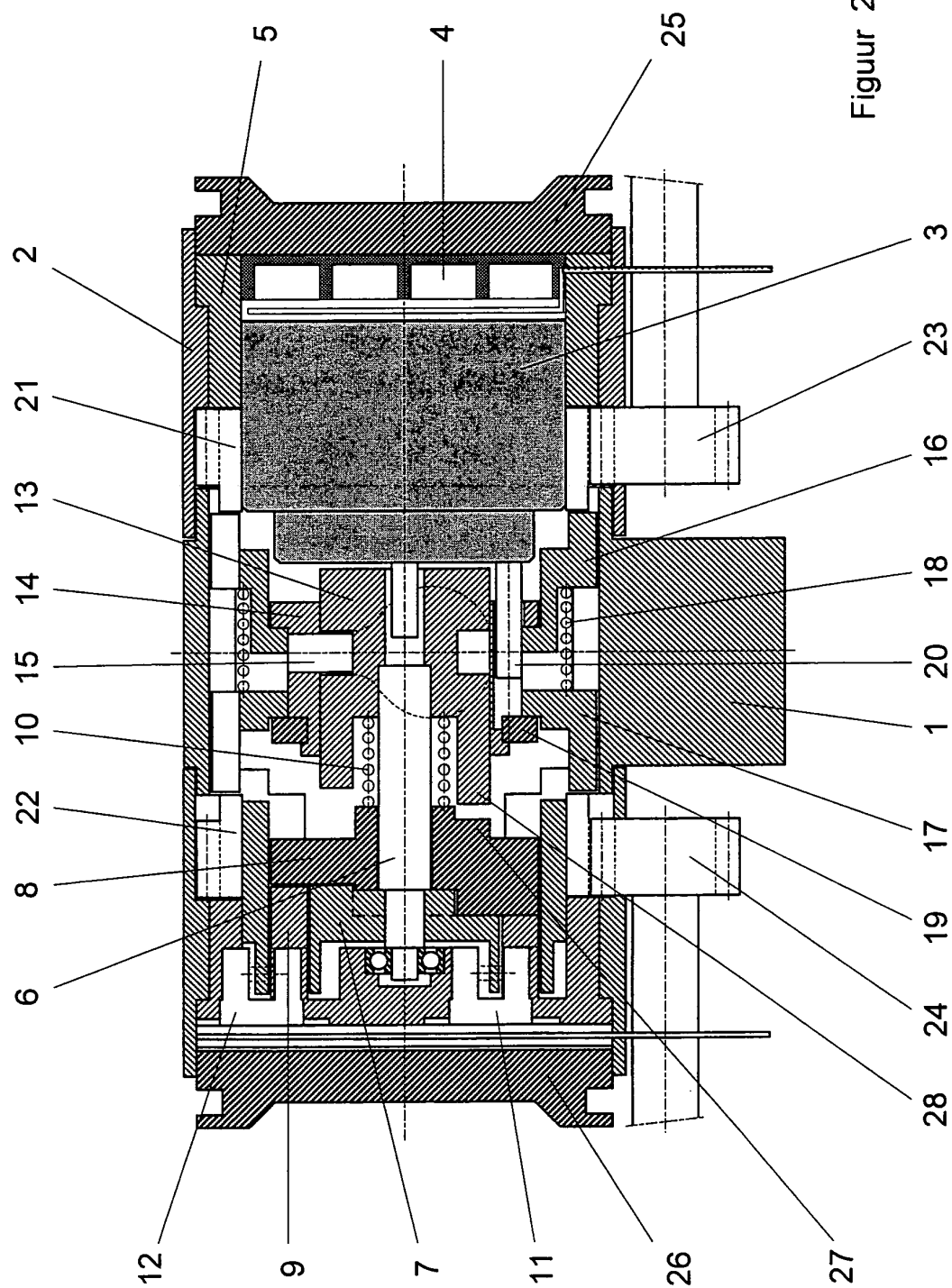
9. A security system according to any one of the preceding claims, wherein the unlocking means comprise a transmitter/receiver for transmitting authorization codes for operating the locking means of the operating assembly.

10. A security system according to any one of the preceding claims, wherein the operating assembly, apart from the locking means, relative to a plane

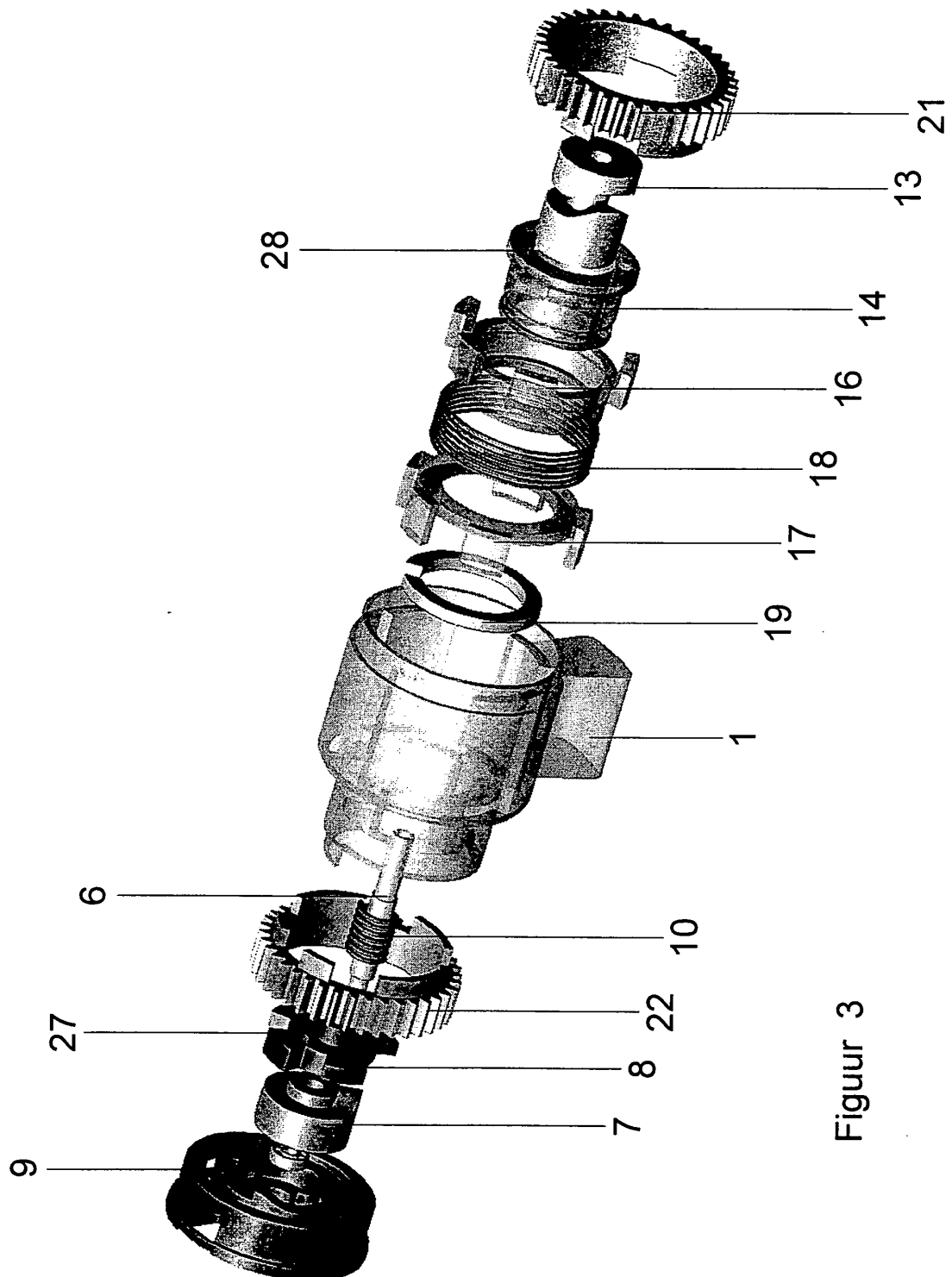
perpendicular to the longitudinal direction of its profile, is built up in a symmetrical manner while using the same parts.

11. A security system according to any one of the preceding claims, further comprising sensors for determining the position of the operating assembly. 5
12. A security system according to any one of the preceding claims, further comprising a light emitting diode, a sensor and a mirror in the door post for determining whether a door is opened or closed. 10
13. A security system according to any one of the preceding claims, wherein the operating assembly is provided with an anti drill security, for instance in the form of hardened discs. 15
14. A security system according to any one of the preceding claims, wherein the operating assembly comprises at least one battery and is arranged for supply of electric energy from the outside. 20
15. A security system according to any one of the preceding claims, further comprising means, such as light emitting diode, for giving information signals to the user. 25
16. A security system according to any one of the preceding claims, wherein the locking means are arranged for communication with a contactless chip card according to a challenge/response communication, for instance according to the standard DES protocol. 30
17. A security system according to any one of the preceding claims, wherein the locking means comprise a receiver, for instance a 868 MHz band receiver for remotely unlocking the operating assembly. 35
18. An operating assembly for a security system, comprising electric or electronic locking means, wherein at least a part of the operating assembly has a profile with the cross-sectional contour of a standard lock cylinder and wherein at least at one side no parts project outside said profile. 40
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Figuur 2



Figuur 3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 07 8497

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X A	WO 92/22720 A (EVVA-WERK GMBH & CO KG) 23 December 1992 (1992-12-23) * claims; figures 1-3 *	1-4, 11, 18 5-10, 12-17	E05B47/02
X A	EP 0 712 981 A (AZBE B. ZUBIA SA) 22 May 1996 (1996-05-22) * the whole document *	1, 6, 10, 18 2-4	
X A	DE 296 21 441 U (LARCH) 6 February 1997 (1997-02-06) * the whole document *	1, 11, 18 2-7, 9-14	
X A	US 6 334 347 B1 (ISCLA) 1 January 2002 (2002-01-01) * column 6, line 40 - line 41; figures *	1, 6, 7, 10, 14, 18 2	
X A	DE 200 03 715 U (LANGBEIN) 10 August 2000 (2000-08-10) * the whole document *	1, 5, 6, 8, 9, 11, 18 2-4, 7, 10, 12-17	
X A	FR 2 655 367 A (VACHETTE) 7 June 1991 (1991-06-07) * the whole document *	1, 10, 18 2	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E05B
X A	US 6 412 321 B1 (ARAMBURU ET AL) 2 July 2002 (2002-07-02) * the whole document *	1, 10, 18 2	
A	WO 99/42686 A (LERCHNER) 26 August 1999 (1999-08-26) * the whole document *	1-18	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 February 2004	Examiner Van Beurden, J
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	

EPO FORM 1503 03.02 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 07 8497

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-02-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9222720	A	23-12-1992	AT 396163 B	25-06-1993
			AT 117491 A	15-10-1992
			WO 9222720 A1	23-12-1992
			AT 133464 T	15-02-1996
			DE 9207789 U1	10-09-1992
			DE 59205160 D1	07-03-1996
			DK 542944 T3	03-06-1996
			EP 0542944 A1	26-05-1993
			ES 2082469 T3	16-03-1996
			FI 930586 A	10-02-1993
			NO 922196 A	14-12-1992
EP 0712981	A	22-05-1996	ES 2106668 A1	01-11-1997
			AT 176707 T	15-02-1999
			DE 69507774 D1	25-03-1999
			DE 69507774 T2	02-09-1999
			DK 712981 T3	20-09-1999
			EP 0712981 A1	22-05-1996
			US 5628217 A	13-05-1997
DE 29621441	U	06-02-1997	AT 1213 U1	27-12-1996
			DE 29621441 U1	06-02-1997
			IT MI960818 U1	15-06-1998
US 6334347	B1	01-01-2002	FR 2779168 A1	03-12-1999
			AT 221609 T	15-08-2002
			AU 3831499 A	13-12-1999
			BG 104985 A	31-10-2001
			BR 9910713 A	30-01-2001
			CA 2333140 A1	02-12-1999
			CN 1307662 T	08-08-2001
			DE 69902380 D1	05-09-2002
			DE 69902380 T2	24-04-2003
			EP 1080286 A1	07-03-2001
			ES 2182520 T3	01-03-2003
			WO 9961728 A1	02-12-1999
			HU 0102645 A2	28-11-2001
			JP 2002516936 T	11-06-2002
			PL 344473 A1	05-11-2001
			TR 200003463 T2	20-04-2001
DE 20003715	U	10-08-2000	DE 20003715 U1	10-08-2000
			DE 10009700 A1	09-11-2000
FR 2655367	A	07-06-1991	FR 2655367 A1	07-06-1991

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 07 8497

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-02-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6412321	B1	02-07-2002	AT 238474 T	15-05-2003
			AU 4253600 A	08-02-2001
			DE 50001837 D1	28-05-2003
			DK 1072741 T3	25-08-2003
			EP 1072741 A1	31-01-2001
			FI 20001229 A	27-01-2001
			FR 2796978 A1	02-02-2001
			NO 20002907 A	29-01-2001
WO 9942686	A	26-08-1999	DE 19807553 C1	01-07-1999
			AT 248974 T	15-09-2003
			BR 9904867 A	26-09-2000
			WO 9942686 A1	26-08-1999
			EP 0979335 A1	16-02-2000
			HU 0002485 A2	28-11-2000
			JP 2001522420 T	13-11-2001
			NO 995161 A	23-12-1999
			PL 336314 A1	19-06-2000
			US 6418764 B1	16-07-2002