



- (51) International Patent Classification:
H01H 51/08 (2006.01) *H01H 50/64* (2006.01)
- (21) International Application Number: PCT/SI2011/000033
- (22) International Filing Date: 22 June 2011 (22.06.2011)
- (25) Filing Language: Slovenian
- (26) Publication Language: English
- (30) Priority Data:
P-201100165 12 May 2011 (12.05.2011) SI
- (71) Applicant (for all designated States except US): **ISKRA MIS, d.d.** [SI/SI]; Ljubljanska cesta 24A, 4000 Kranj (SI).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **RODE, Marko** [SI/SI]; Sveti Duh 64, 4220 Skofja Loka (SI).
- (74) Agent: **PIPAN, Marjan**; Kotnikova 5, 1000 Ljubljana (SI).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

[Continued on next page]

(54) Title: BISTABLE SWITCH WITH A BISTABLE MECHANISM

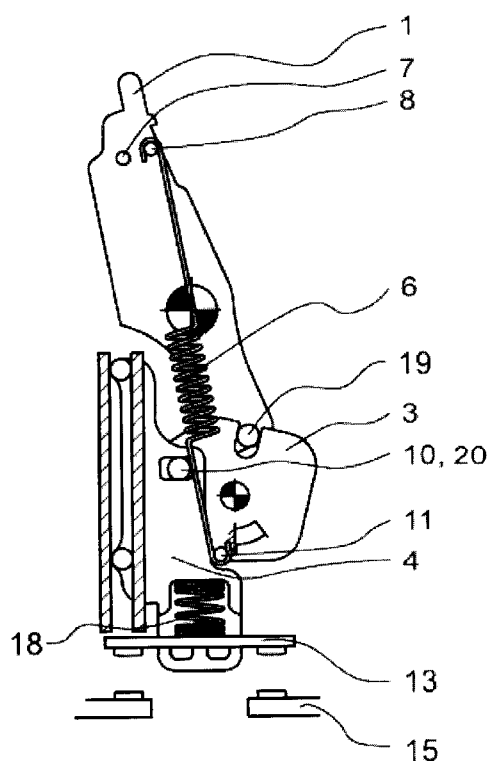


Fig. 5

(57) Abstract: A bistable switch with a bistable mechanism is carried out in a way that a spring (6) of a rocker arm is fastened onto a lever (1) and onto the rocker arm (3) and symmetrically to the axis of rotation of the rocker arm (3) also bridges (4, 5) are fastened onto said rocker arm (3), which allows for switching of the switch with various combinations of contacts with a minimum energy input provided by an electromagnet or an arm in case of manual switching.



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

BISTABLE SWITCH WITH A BISTABLE MECHANISM

5

The subject of the invention is a bistable switch with a bistable mechanism, wherein the mechanism and the construction of contacts that provide for the functioning of the fundamental function of a bistable switch, i. e. switching of contacts by means of an electromagnetic drive excited by electric pulses, enables switching of the switch with a minimum energy input. The present invention belongs to class H01H 51/08 of the international patent classification.

The technical problem satisfactorily solved by the present construction of a bistable switch is such construction of the switch and its mechanism that requires minimum energy for switching and is also construed in a simple and price efficient way.

Known solutions use various techniques and physical principles of switch mechanism operation. A switch mechanism designed by means of a toothed wheel according to the patent document EP 1024511 does not allow to switch large loads, since the forces needed for switching would cause too much friction.

Another solution is a switch mechanism based on the principle of a heart-shaped anchorage according to patent documents WO0186682 and

EP1901327. A drawback of this solution is that the switching off is effected at the second step, which means that the switch switches off only when the coil is without voltage or when the button is released in case the switch is switched manually.

5 A rocker arm mechanism of the patents EP0641000 and EP0641003 does not include switching of contacts by way of a contact bridge.

 The bistable switch with the bistable mechanism of the invention solves requirements for an energy-saving mechanism that simultaneously provides for coupling of contacts intended for large loads in a way that a spring of a
10 rocker arm 6 is fastened onto a lever 1 and a rocker arm 3, wherein bridges 4 and 5 are fastened to the latter symmetrically to the axis of rotation of the rocker arm 3.

 The invention will be described by way of an embodiment and the drawings representing in:

- 15 Figure 1 bistable switch of the invention in cross-section in axonometric projection viewed from the right side;
- Figure 2 bistable switch of the invention in cross-section in axonometric projection viewed from the left side;
- Figure 3 bistable switch of the invention viewed from the right
20 side and in cross-section;
- Figure 4 schematic view of the mechanism of the bistable switch of the invention for a variant with one closing and one opening contact;

Figure 5 schematic view of the mechanism of the bistable switch of the invention for a variant with two closing contacts in open state;

Figure 6 schematic view of the mechanism of the bistable switch of the invention for a variant with two closing contacts in closed state.

The bistable switch with the bistable mechanism of the invention comprises a rocker arm 3 centrally pivoted in the switch housing and having a plug 11, onto which a spring 6 of the rocker arm 3 is fastened. A lever 1 is fastened within the housing and reaches with a plug 19 through an oblong groove in the rocker arm 3. The lever 1 serves as a position indicator, a button for manual coupling of contacts 13, 15 and a holder for fastening the spring 6 of the rocker arm 3. The spring 6 is fastened by means of a plug 7 for constructions with one opening and one closing contact and with a plug 8 for constructions with two closing contacts. The force needed for coupling of contacts or contact springs is herewith optimized. A bridge 5 serving as a holder of an opening contact bridge 14 and a contact spring 18 is fastened with an oblong groove onto a plug 12 positioned on the rocker arm 3 symmetrically to the axis of rotation of the rocker arm 3 with respect to the plug 10, onto which the bridge 4 is fastened, wherein the bridge 4 serves as a holder of a closing contact bridge 13 and a contact spring 17. This type of fastening requires a smaller number of needed contacts 16, 15. In case of a

construction with two closing contacts two bridges 4 are fastened onto the rocker arm 3, namely one onto the plug 10 and one on the second side of the rocker arm onto a plug 20 arranged in the same position.

Switch-over energy is ensured by an electromagnet, a constituent part of
5 which is an anchor 9. The anchor 9 presses against a forcing means 2, which transfers this force to the rocker arm 3. The rocker arm 3 converts the linear movement of the forcing means 2 into a torque that moves the bridges 4 and 5 via plugs 10, 20 and 12.

The bistable switch of the invention can also be switched manually. In
10 this case the lever 1 is acted upon and oscillates around the fastening in the housing and drives the rocker arm 3 via plug 19. The rocker arm 3 in turn moves the bridges 4 and 5 via plugs 10, 20 and 12.

CLAIMS

1. Bistable switch with a bistable mechanism that uses a mechanism with a rocker arm (3) for its operation,

5

characterized in that

the fastening of springs (6) of the rocker arm (3) on the lever (1) differs in position in dependence of a construction of contacts (13, 15).

2. Bistable switch according to claim 1,

10

characterized in that

the fastening of bridges (4, 5) onto the rocker arm (3) is symmetrical to the axis of rotation of the rocker arm (3).

1/6

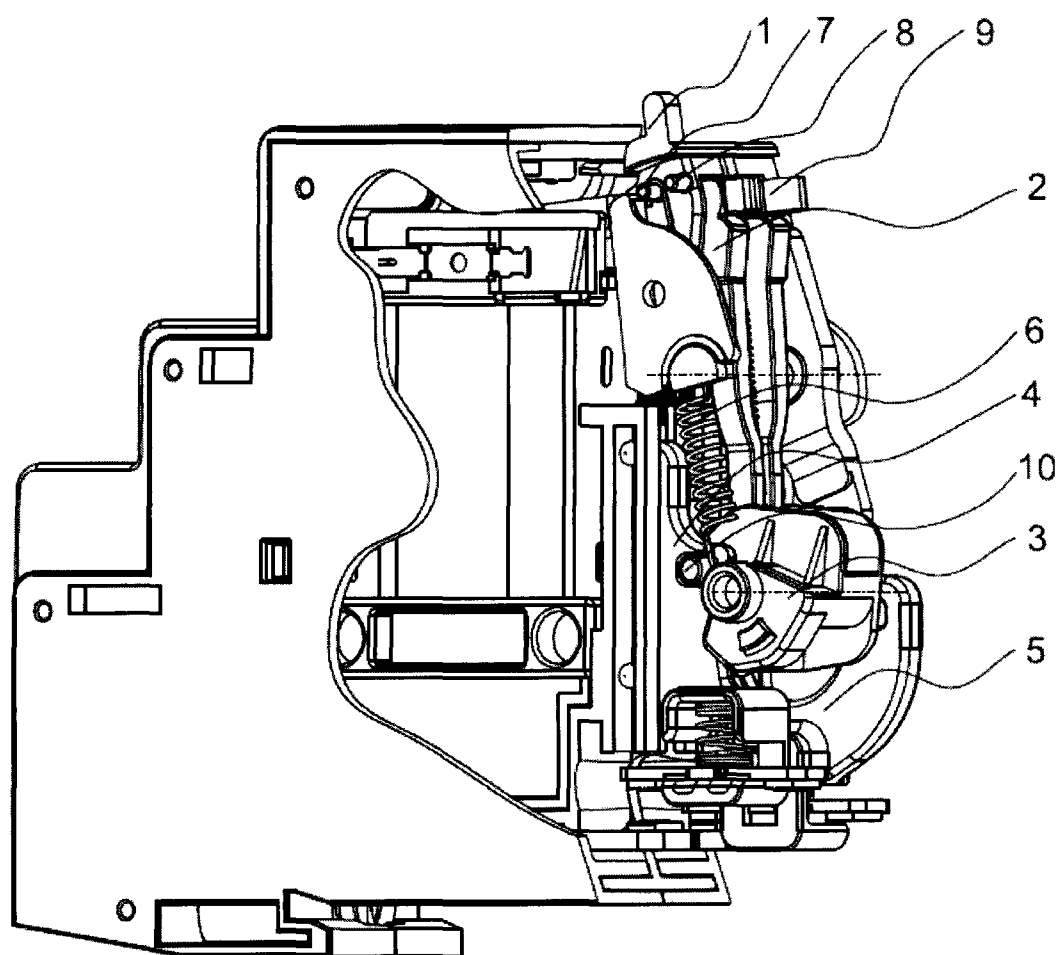


Fig. 1

2/6

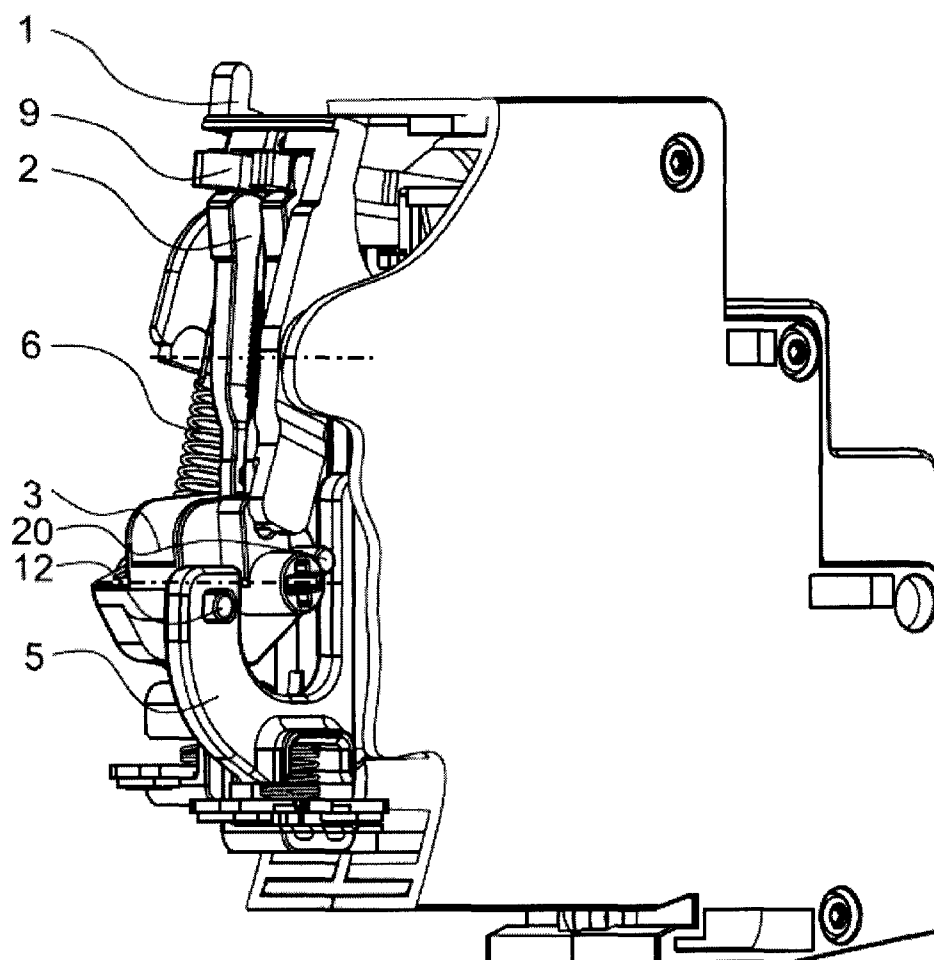


Fig. 2

3/6

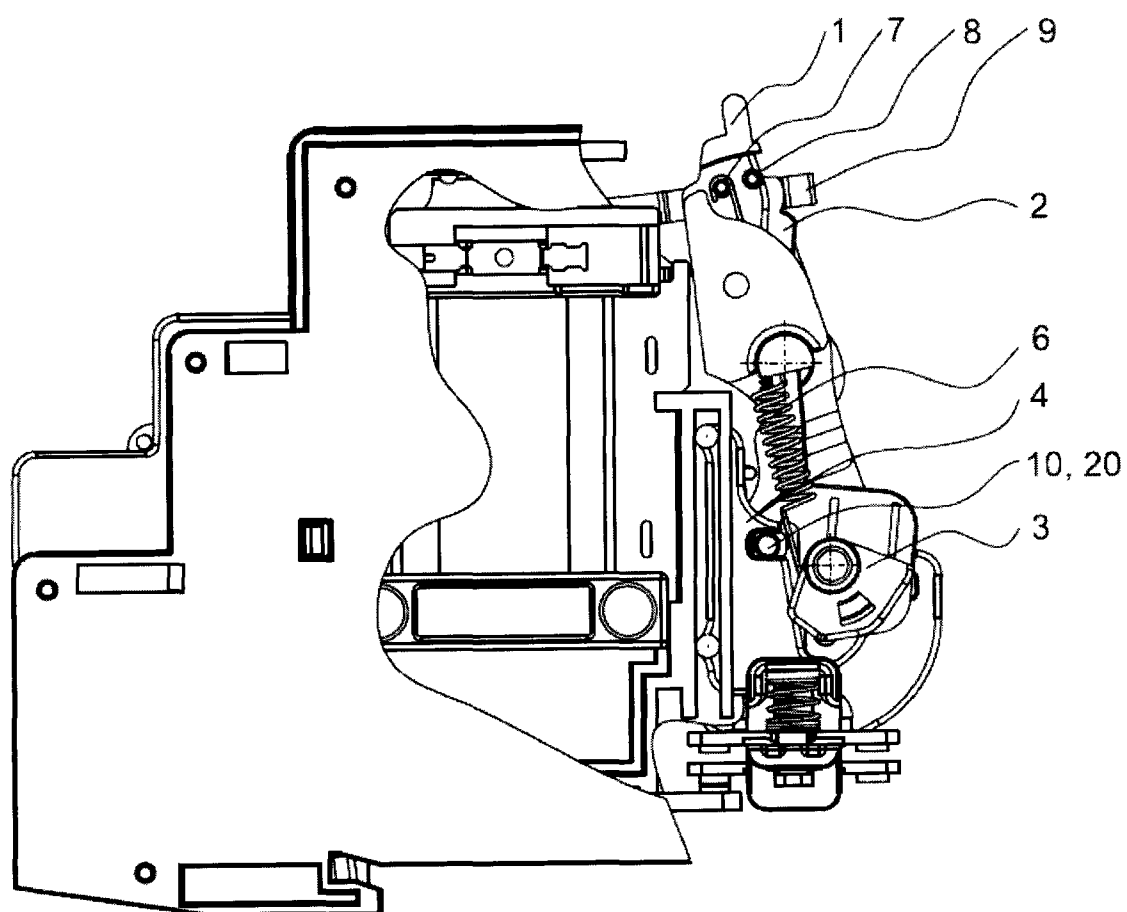


Fig. 3

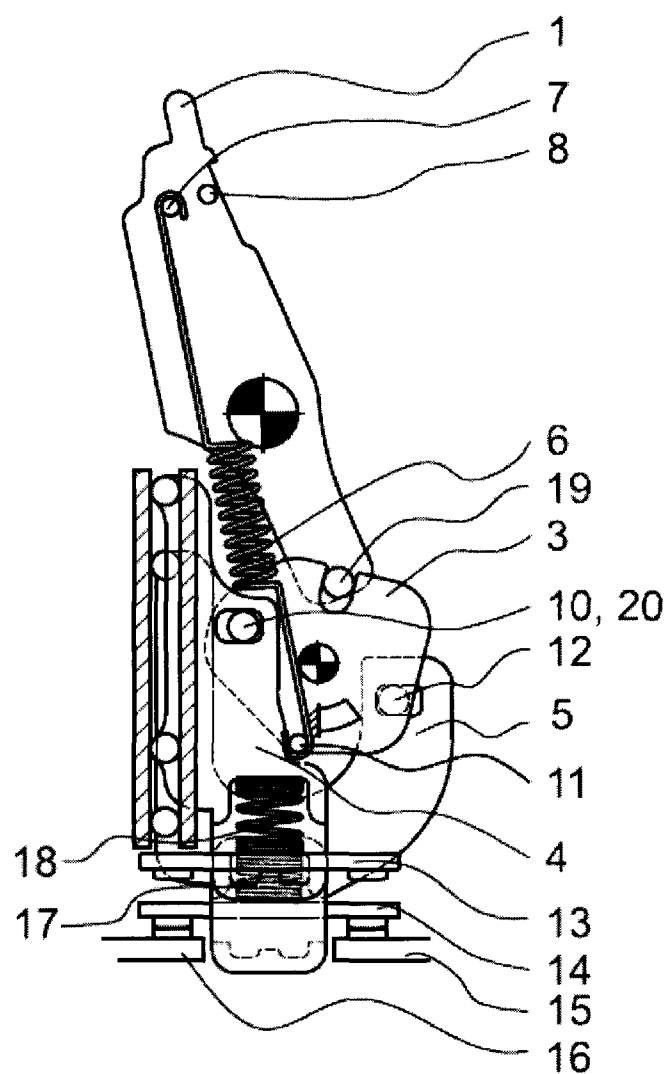


Fig. 4

5/6

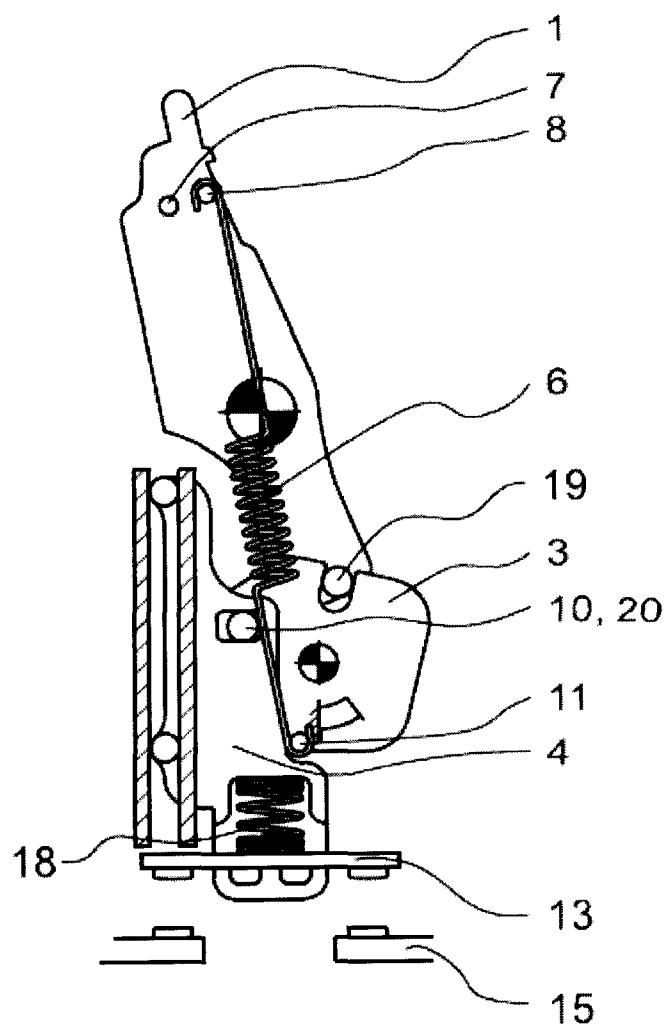


Fig. 5

6/6

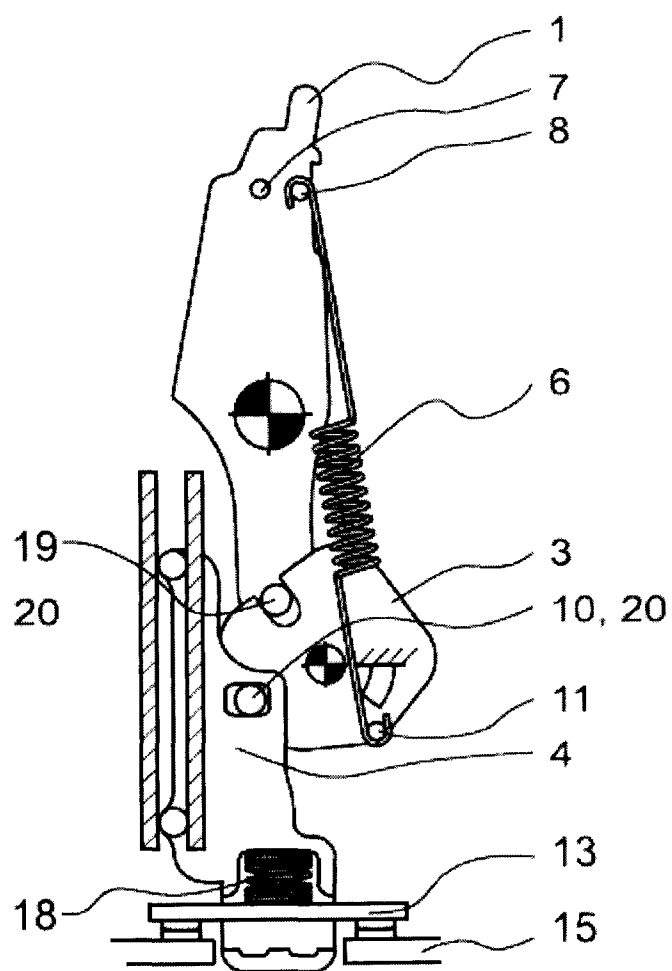


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/SI2011/000033

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01H51/08 H01H50/64
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 641 003 A1 (SCHNEIDER ELECTRIC SA [FR]) 1 March 1995 (1995-03-01) cited in the application column 2, line 25 - column 4, line 55; figures 1-7 -----	1,2
A	GB 2 246 240 A (TELEMECANIQUE ELECTRIQUE [FR]) 22 January 1992 (1992-01-22) page 4, line 18 - page 9, line 21; figures 5,6,10,11 -----	1,2
A	EP 1 901 327 A1 (LEGRAND FRANCE [FR]; LEGRAND SNC [FR]) 19 March 2008 (2008-03-19) cited in the application paragraph [0018] - paragraph [0080]; figure 2 -----	1,2



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search

13 January 2012

Date of mailing of the international search report

20/01/2012

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Drabko, Jacek

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/SI2011/000033

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0641003	A1	01-03-1995	BR 9403330 A 11-04-1995
		CN 1104368 A 28-06-1995	
		DE 69415440 D1 04-02-1999	
		DE 69415440 T2 10-06-1999	
		EP 0641003 A1 01-03-1995	
		ES 2126728 T3 01-04-1999	
		FR 2709370 A1 03-03-1995	

GB 2246240	A	22-01-1992	NONE

EP 1901327	A1	19-03-2008	AT 488855 T 15-12-2010
		BR PI0704578 A 03-06-2008	
		CN 101246774 A 20-08-2008	
		EP 1901327 A1 19-03-2008	
		ES 2356518 T3 08-04-2011	
		FR 2906075 A1 21-03-2008	
