# CPC COOPERATIVE PATENT CLASSIFICATION

## H01H ELECTRIC SWITCHES; RELAYS; SELECTORS; EMERGENCY PROTECTIVE DEVICES (contact cables H01B 7/10; overvoltage protection resistors, resistive arresters H01C 7/12, H01C 8/04; electrolytic self-interrupters H01G 9/18; switching devices of the waveguide type H01P; devices for interrupted current collection H01R 39/00; overvoltage arresters using spark gaps H01T 4/00; emergency protective circuit arrangements H02H; switching by electronic means without contact-making H03K 17/00)

**NOTES**

1. Attention is drawn to the Notes following the titles of class B81 an subclass B81B relating to "micro-structural devices" and micro-structural systems"

2. This subclass covers (in groups H01H 69/00 to H01H 87/00) devices for the protection of electric lines or electric machines or apparatus in the event of undesired change from normal electric working conditions, the electrical condition serving directly as the input to the device.

3. This subclass does not cover bases, casings, or covers accomodating two or more switching devices or for accomodating a switching device as well as another electric component, e.g. bus-bar, line connector. Those bases, casings or covers are covered by group H02B 1/26.

4. In this subclass, the following terms or expressions are used with the meanings indicated :
   - "relay" means a switching device having contacts which are operated from electric inputs which supply, directly or indirectly, all the mechanical energy necessary to cause both the closure and the opening of the contacts;
   - "driving mechanism" refers to the means by which an operating force applied to the switch is transmitted to the moving contact or contacts;
   - "operating" is used in a broader sense than "actuating" which is reserved for those parts not touched by hand to effect switching;
   - "acting" or "action" means a self-induced movement of parts at one stage of the switching.

   These connotations apply to all parts of the verbs "to operate", "to actuate" and "to act" and to words derived therefrom, e.g. to "actuation".

5. In this subclass, details are classified as follows :
   - details of an unspecified type of switching device, or disclosed as applicable to two or more kinds of switching devices designated by the terms or expressions "switches", "relays", "selector switches", and "emergency protective devices", are classified in groups H01H 1/00 to H01H 9/00;
   - details of an unspecified type of switch, or disclosed as applicable to two or more types of switches as defined by groups H01H 13/00 to H01H 43/00 and sub-groups H01H 35/02, H01H 35/06, H01H 35/14, H01H 35/18, H01H 35/24 and H01H 35/42, all hereinafter called basic types, are classified in groups H01H 1/00 to H01H 9/00;
   - details of an unspecified type of relay, or disclosed as applicable to two or more types of relays as defined by groups H01H 51/00 to H01H 61/00, hereinafter called basic types are classified in H01H 45/00;
   - details of an unspecified protective device, or applicable to two or more types of protective devices as defined by groups H01H 73/00 to H01H 83/00, hereinafter called basic types, are classified in H01H 71/00.

H01H
(continued)

– However, details only described with reference to, or clearly only applicable to, switching devices of a single basic type, are classified in the group appropriate to switching devices of that basic type, e.g. H01H 19/02, H01H 75/04;
– mechanical structural details of control members of switches or of keyboards such as keys, push-buttons, levers or other mechanisms for transferring the force to the activated elements are classified in this subclass, even when they are used for controlling electronic switches.

However, mechanical details directly producing electronic effects are classified in group H03K 17/94.

**WARNING**

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

H01H 33/575 covered by H01H 33/56
H01H 33/825 " H01H 33/82
H01H 33/835 " H01H 33/83
H01H 33/867 " H01H 33/86
H01H 33/873 " H01H 33/86
H01H 33/915 " H01H 33/91
H01H 33/985 " H01H 33/98
H01H 33/99 " H01H 33/98

**Electric switches**

| | |
|---|---|
| **H01H 1/00** | **Contacts** (liquid contacts H01H 29/04) |
| H01H 2001/0005 | . {Redundant contact pairs in one switch for safety reasons} |
| H01H 2001/001 | . {providing easy replacement of contacts} |
| H01H 1/0015 | . {Means for testing or for inspecting contacts, e.g. wear indicator (measuring circuits G01R 31/3274)} |
| H01H 2001/0021 | . . {Camera or endoscope for monitoring contacts, their position or mechanism} |
| H01H 2001/0026 | . . {wherein one or both contacts contain embedded contact wear signal material e.g. radioactive material being released as soon as the contact wear reaches the embedded layer} |
| H01H 2001/0031 | . . {by analysing radiation emitted by arc or trace material} |
| H01H 1/0036 | . {Switches making use of microelectromechanical systems [MEMS] ; (for electrostatic relays H01H 59/0009, for electromagnetic relays H01H 50/005; MEMS manufacturing processes B81C)} |
| H01H 2001/0042 | . . {Bistable switches, i.e. having two stable positions requiring only actuating energy for switching between them, e.g. with snap membrane or by permanent magnet} |
| H01H 2001/0047 | . . . {operable only by mechanical latching} |
| H01H 2001/0052 | . . {Special contact materials used for MEMS} |
| H01H 2001/0057 | . . . {the contact materials containing refractory materials, e.g. tungsten} |
| H01H 2001/0063 | . . {having electrostatic latches, i.e. the activated position is kept by electrostatic forces other than the activation force} |

H01H 2001/0068 . . {with multi dimensional movement, i.e. the movable actuator performing movements in at least two different directions}

H01H 2001/0073 . . {Solutions for avoiding the use of expensive silicon technologies in micromechanical switches}

H01H 2001/0078 . . {with parallel movement of the movable contact relative to the substrate}

H01H 2001/0084 . . {with perpendicular movement of the movable contact relative to the substrate}

H01H 2001/0089 . . {Providing protection of elements to be released by etching of sacrificial element; Avoiding stiction problems, e.g. of movable element to substrate}

H01H 1/0094 . {Switches making use of nanoelectromechanical systems [NEMS]}

H01H 1/02 . characterised by the material thereof {(containing gas-evolving material H01H 33/765)}

H01H 1/0201 . . {Materials for reed contacts}

H01H 1/0203 . . {specially adapted for vacuum switches}

H01H 2001/0205 . . . {Conditioning of the contact material through arcing during manufacturing, e.g. vacuum-depositing of layer on contact surface}

H01H 1/0206 . . . {containing as major components Cu and Cr}

H01H 2001/0208 . . {containing rhenium}

H01H 1/021 . . Composite materials

**NOTES**

1. In this group, the following expression is used with the meaning indicated :
   – "composite material" is a material made of two or more different materials, e.g. coated material, layered materials or carbon fibres in a copper base or matrix
2. Subject matter classifiable in more than one of the groups H01H 1/023 to H01H 1/029 should be classified in all relevant groups.

H01H 1/023 . . . having a noble metal as the basic material

H01H 1/0231 . . . . {provided with a solder layer}

H01H 1/0233 . . . . and containing carbides

H01H 1/0237 . . . . and containing oxides

H01H 1/02372 . . . . . {containing as major components one or more oxides of the following elements only : Cd, Sn, Zn, In, Bi, Sb or Te (if other oxides are mentioned H01H 1/0237)}

H01H 1/02374 . . . . . {containing as major component CdO}

H01H 1/02376 . . . . . {containing as major component $SnO_2$}

H01H 2001/02378 . . . . . {containing iron-oxide as major component}

H01H 1/025 . . . having copper as the basic material

H01H 1/027 . . . containing carbon particels or fibers

H01H 1/029 . . . comprising conducting material dispersed in an elastic support or binding material

H01H 1/04 . . Co-operating contacts of different material

H01H 1/06 . characterised by the shape or structure of the contact-making surface, e.g. grooved

H01H 1/065 . . {formed by freely suspended particles, e.g. magnetic dust or balls}
H01H 1/08 . . wetted with mercury
H01H 1/10 . . Laminated contacts with divided contact surface
H01H 1/12 . characterised by the manner in which co-operating contacts engage
H01H 2001/125 . . {whereby the contacts of the switch are formed by teeth of a zipper}
H01H 1/14 . . by abutting
H01H 2001/145 . . . {by crossing each other, the cooperating contacts each having a contact making ridge perpendicular to each other}
H01H 1/16 . . . by rolling; by wrapping; Roller or ball contacts
H01H 1/18 . . . with subsequent sliding
H01H 1/20 . . . Bridging contacts {(for circuit breakers H01H 73/045)}
H01H 1/2008 . . . . {Facilitate mounting or replacing contact bridge and pressure spring on carrier (H01H 11/0012 takes precedence)}
H01H 1/2016 . . . . {in which the two contact pairs commutate at substantially different moments}
H01H 1/2025 . . . . {comprising two-parallel bridges}
H01H 2001/2033 . . . . . {with a contact bridge on both opposite sides of a fixed contact pair, each contact bridge being moved to close or open the circuit}
H01H 1/2041 . . . . {Rotating bridge}
H01H 1/205 . . . . . {Details concerning the elastic mounting of the rotating bridge in the rotor}
H01H 1/2058 . . . . . {Rotating bridge being assembled in a cassette, which can be placed as a complete unit into a circuit breaker (non-rotating bridges H01H 71/0235)}
H01H 1/2066 . . . . {Fork-shaped bridge; Two transversally connected contact arms bridging two fixed contacts}
H01H 1/2075 . . . . {T-shaped bridge; bridging contact has lateral arm for mounting resiliently or on a pivot}
H01H 1/2083 . . . . {Bridging contact surfaces directed at an oblique angle with respect to the movement of the bridge}
H01H 2001/2091 . . . . {having two pivotally and electrically connected halve bridges}
H01H 1/22 . . . with rigid pivoted member carrying the moving contact
H01H 1/221 . . . . {and a contact pressure spring acting between the pivoted member and a supporting member}
H01H 2001/223 . . . . . {using a torsion spring}
H01H 1/225 . . . . . {the supporting member being pivotable}
H01H 1/226 . . . . . {having a plurality of parallel contact bars}
H01H 2001/228 . . . . . {with insulating spacers between the contact bars}
H01H 1/24 . . . with resilient mounting
H01H 1/242 . . . . {the contact forming a part of a coil spring}
H01H 1/245 . . . . {Spring wire contacts}
H01H 2001/247 . . . . {using an elastic hinge, the contact being composed of rigid parts connected by thinned flexible hinge parts}

H01H 1/26 . . . . with spring blade support

H01H 2001/265 . . . . . {having special features for supporting, locating or pre-stressing the contact blade springs}

H01H 1/28 . . . . . Assembly of three or more contact-supporting spring blades

H01H 1/30 . . . . within supporting guides

H01H 1/32 . . . Self-aligning contacts

H01H 1/34 . . . with provision for adjusting position of contact relative to its co-operating contact

H01H 1/36 . . by sliding (by rolling or wrapping H01H 1/16)

H01H 1/365 . . . {Bridging contacts}

H01H 1/38 . . . Plug-and-socket contacts

H01H 1/385 . . . . {Contact arrangements for high voltage gas blast circuit breakers}

H01H 1/40 . . . Contact mounted so that its contact-making surface is flush with adjoining insulation

H01H 1/403 . . . . {Contacts forming part of a printed circuit (multilayer keyboard switches H01H 13/702; thumbwheel switches H01H 19/001; for rotary switches with axial contact pressure H01H 19/585; printed contacts per se H05K)}

H01H 2001/406 . . . . {with holes or recesses between adjacent contacts, e.g. to collect abrasion powder}

H01H 1/42 . . . Knife-and-clip contacts

H01H 2001/425 . . . . {with separate contact pressure spring confined between two contact knifes and urging the knifes onto a mating contact}

H01H 1/44 . . . with resilient mounting

H01H 1/46 . . . Self-aligning contacts

H01H 1/48 . . . with provision for adjusting position of contact relative to its co-operating contact

H01H 1/50 . Means for increasing contact pressure, preventing vibration of contacts, holding contacts together after engagement, or biasing contacts to the open position

H01H 1/502 . . {the action of the contact pressure spring becoming active only after engagement of the contacts}

H01H 1/504 . . {by thermal means}

H01H 2001/506 . . {Fail safe contacts, i.e. the contacts being kept in a safe position, usually in an open circuit position, at end of life time of switch}

H01H 2001/508 . . {with mechanical means to prevent return/reverse movement of movable contact once opening or closing cycle has started}

H01H 1/52 . . Contacts adapted to act as latches

H01H 1/54 . . by magnetic force {(combined with electrodynamic opening H01H 77/101)}

H01H 2001/545 . . . {having permanent magnets directly associated with the contacts}

H01H 1/56 . Contact arrangements for providing make-before-break operation, e.g. for on-load tap changing {(for tap changers H01H 9/0016)}

H01H 1/58 . Electric connections to or between contacts; Terminals ({for high tension switches H01H 33/025; for electromagnetic relays H01H 50/14; for circuit breakers H01H 71/08}; electric connections in general H01R)

H01H 1/5805 . . {Connections to printed circuits (for slide switches H01H 15/005; for tumbler switches H01H 23/006)}

H01H 2001/5811 . . . {both fixed and movable contacts being formed by blank stamping and mounted or soldered on printed circuit board without any other housing elements}

H01H 2001/5816 . . . {Connections to flexible or curved printed circuit boards}

H01H 1/5822 . . {Flexible connections between movable contact and terminal}

H01H 2001/5827 . . . {Laminated connections, i.e. the flexible conductor is composed of a plurality of thin flexible conducting layers}

H01H 1/5833 . . {comprising an articulating, sliding or rolling contact between movable contact and terminal}

H01H 2001/5838 . . . {using electrodynamic forces for enhancing the contact pressure between the sliding surfaces}

H01H 1/5844 . . {making use of wire-gripping clips or springs}

H01H 1/585 . . . {and piercing the wire insulation}

H01H 1/5855 . . {characterised by the use of a wire clamping screw or nut}

H01H 2001/5861 . . . {Box connector with a collar or lug for clamping internal rail and external conductor together by a tightening screw}

H01H 1/5866 . . {characterised by the use of a plug and socket connector}

H01H 2001/5872 . . . {including means for preventing incorrect coupling}

H01H 2001/5877 . . {with provisions for direct mounting on a battery pole}

H01H 2001/5883 . . {the extension of the contact being crimped around a wire}

H01H 2001/5888 . . {Terminals of surface mounted devices [SMD]}

H01H 2001/5894 . . {the extension of the contact being welded to a wire or a bus}

H01H 1/60 . Auxiliary means structurally associated with the switch for cleaning or lubricating contact-making surfaces (cleaning by normal sliding of contacts H01H 1/18, H01H 1/36)

H01H 1/605 . . {Cleaning of contact-making surfaces by relatively high voltage pulses}

H01H 1/62 . Heating or cooling of contacts

H01H 1/64 . Protective enclosures, baffle plates, or screens for contacts (for arc-extinguishing H01H 9/30; for mercury contacts H01H 29/04)

H01H 1/645 . . {containing getter material (for explosion inhibiting in explosion-proofcases H01H 9/046; for vacuum switches H01H 33/6683)}

H01H 1/66 . . Contacts sealed in an evacuated or gas-filled envelope, e.g. magnetic dry-reed contacts

**H01H 3/00** **Mechanisms for operating contacts** (snap-action arrangements H01H 5/00; devices for introducing a predetermined time delay H01H 7/00; {for tap changers H01H 9/0027}; thermal actuating or release means H01H 37/02)

H01H 3/001 . {Means for preventing or breaking contact-welding}

H01H 2003/002 . . {with lockout, e.g. two contact pairs in series}

H01H 3/004 . {for operating contacts periodically}

H01H 3/005 . {making use of superconductivity, e.g. levitation switch}

H01H 2003/007 . {the contacts being actuated by deformation of a flexible housing}

H01H 2003/008 . {with a haptic or a tactile feedback controlled by electrical means, e.g. a motor or magnetofriction}

H01H 3/02 . Operating parts, i.e. for operating driving mechanism by a mechanical force external to the switch

H01H 3/0206 . . {Combined operation of electric switch and of fluid control device}

H01H 3/0213 . . {Combined operation of electric switch and variable impedance, e.g. resistor, capacitor (H01H 9/061 takes precedence)}

H01H 3/022 . . {Emergency operating parts, e.g. for stop-switch in dangerous conditions}

H01H 3/0226 . . . {operated by a pull cord}

H01H 2003/0233 . . . {for alarm triggering, e.g. fire alarm, emergency off switches operated by breaking a glass}

H01H 2003/024 . . . {Resetting of bistable emergency operating part by pulling it}

H01H 2003/0246 . . . {Resetting of bistable emergency operating part by rotating itself or an accessory}

H01H 3/0253 . . {two co-operating contacts actuated independently (for combined circuit-breaker-contactors H01H 89/10)}

H01H 2003/026 . . {specially adapted to avoid injury to occupants of a car during an accident}

H01H 2003/0266 . . {Operating part bringable in an inoperative position by an electrical drive}

H01H 2003/0273 . . {Manually irreversibly actuated switch}

H01H 2003/028 . . {Rotating knob or lever or tumbler that can be turned or pushed by hand in only one direction, e.g. by making inaccessible one side of a tumbler}

H01H 2003/0286 . . {having a weak point breaking or uncoupling on abnormal external force}

H01H 2003/0293 . . {with an integrated touch switch}

H01H 3/04 . . Levers (tumblers H01H 23/14)

H01H 3/06 . . . Means for securing to shaft of driving mechanism

H01H 3/08 . . Turn knobs

H01H 2003/085 . . . {Retractable turn knobs, e.g. flush mounted}

H01H 3/10 . . . Means for securing to shaft of driving mechanism

H01H 2003/105 . . . . {with compensation of misalignment in the link between the operating part, the driving mechanism and the switch, e.g. misalignment between two axis}

H01H 3/12 . . Push-buttons

H01H 3/122 . . . {with enlarged actuating area, e.g. of the elongated bar-type; Stabilising means therefor}

H01H 3/125 . . . . {using a scissor mechanism as stabiliser}

H01H 2003/127 . . . {Details of the key cap concerning the actuation by fingernails or having provision to allow usage with long fingernails}

H01H 3/14 . . adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 3/141 . . . {Cushion or mat switches}

H01H 3/142 . . . . {of the elongated strip type}

H01H 2003/143 . . . . . {provisions for avoiding the contact actuation when the elongated strip is bended}

H01H 2003/145 . . . . {provisions for avoiding closure or contact damage during manufacturing or mounting}

H01H 2003/146 . . . . {being normally closed}

H01H 2003/147 . . . . {Special aspects regarding the peripheral edges of the mat switches}

H01H 2003/148 . . . . {the mat switch being composed by independently juxtaposed contact tiles, e.g. for obtaining a variable protected area}

H01H 3/16 . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. for a door switch, a limit switch, a floor-levelling switch of a lift

H01H 3/161 . . . {for actuation by moving a closing member, e.g. door, cover, lid (H01H 27/002 takes precedence; the switch controlling enclosed equipment H01H 9/226; safety arrangements on doors of dishwashers A47L 15/4236, of laundry washing machines D06F 37/42, of ovens F24C 14/00, F24C 15/022; locks with means for operating switches E05B 17/22; alarm locks E05B 45/06; safety edges for power-operated wings E05F 15/40; safety devices in connection with the locking of doors, covers, guards, or like members giving access to movable machine parts F16P 3/08; of microwave ovens H05B 6/76)}

H01H 3/162 . . . . {associated with a hinge of the closing member}

H01H 3/163 . . . . {associated with locking or manipulating means of the closing member}

H01H 2003/165 . . . . {associated with an edge of the closing member}

H01H 3/166 . . . {Self-adjusting mountings, transmissions and the like}

H01H 2003/167 . . . . {with locking of the adjusted parts in the adjusted position by a separate action}

H01H 3/168 . . . {operated by movement in any direction}

H01H 3/18 . . . the movement in one direction being intentionally by hand, e.g. for setting automatically cancelled trafficators

H01H 3/20 . . wherein an auxiliary movement thereof, or of an attachment thereto, is necessary before the main movement is possible or effective, e.g. for unlatching, for coupling

H01H 3/22 . Power arrangements internal to the switch for operating the driving mechanism

H01H 3/222 . . {using electrodynamic repulsion}

H01H 2003/225 . . . {with coil contact, i.e. the movable contact itself forms a secondary coil in which the repulsing current is induced by an operating current in a stationary coil}

H01H 3/227 . . {Interlocked hand- and power-operating mechanisms}

H01H 3/24 . . using pneumatic or hydraulic actuator {(for storing energy in a spring motor H01H 3/301)}

H01H 3/26 . . using dynamo-electric motor (for storing energy in a spring motor H01H 3/30)

H01H 3/262 . . . {using a centrifugal mechanism}

H01H 3/264 . . . {using a travelling nut mechanism}

H01H 2003/266 . . . {having control circuits for motor operating switches, e.g. controlling the opening or closing speed of the contacts}

H01H 2003/268 . . . {using a linear motor}

H01H 3/28 . . using electromagnet (for storing energy in a spring motor H01H 3/30; for operating relays H01H 45/00)

H01H 3/30 . . using spring motor

H01H 3/3005 . . . {Charging means}

H01H 3/301 . . . . {using a fluid actuator}

H01H 3/3015 . . . . {using cam devices}

H01H 3/3021 . . . . {using unidirectional coupling}

H01H 3/3026 . . . . {in which the closing spring charges the opening spring or vice versa}

H01H 3/3031 . . . {Means for locking the spring in a charged state}

H01H 2003/3036 . . . . {using of balls or rollers in the locking device}

H01H 3/3042 . . . {using a torsion spring}

H01H 3/3047 . . . {adapted for operation of a three-position switch, e.g. on-off-earth}

H01H 3/3052 . . . {Linear spring motors}

H01H 2003/3057 . . . {provisions for avoiding idling, e.g. preventing release of stored energy when a breaker is closed, or when the springs are not fully charged}

H01H 2003/3063 . . . {Decoupling charging handle or motor at end of charging cycle or during charged condition}

H01H 2003/3068 . . . {Housing support frame for energy accumulator and cooperating mechanism}

H01H 2003/3073 . . . {Indication of the charge on the spring motor}

H01H 2003/3078 . . . {using an inertia element, e.g a flywheel, to controll the energy released by the spring}

H01H 2003/3084 . . . {Kinetic energy of moving parts recuperated by transformation into potential energy in closing or opening spring to be used in next operation}

H01H 2003/3089 . . . {Devices for manual releasing of locked charged spring motor; Devices for remote releasing}

H01H 2003/3094 . . . {allowing an opening - closing - opening [OCO] sequence}

H01H 3/32 . Driving mechanisms, i.e. for transmitting driving force to the contacts (snap-action arrangements H01H 5/00; introducing a predetermined time delay H01H 7/00)

H01H 2003/323 . . {the mechanisms being adjustable}

H01H 2003/326 . . {using bearings}

H01H 3/34 . . using ratchet

H01H 3/36 . . using belt, chain, or cord

H01H 3/38 . . using spring or other flexible shaft coupling

H01H 3/40 . . using friction, toothed, or screw-and-nut gearing

H01H 2003/405 . . . {using a walking nut}

H01H 3/42 . . using cam or eccentric

H01H 3/44 . . using Geneva movement

H01H 3/46 . . using rod or lever linkage, e.g. toggle

H01H 2003/463 . . . {using a blade spring lever for perpendicular force transmission}

H01H 2003/466 . . . {using a living hinge to connect the levers}

H01H 3/48 . . using lost-motion device

H01H 3/50 . . with indexing or locating means, e.g. indexing by ball and spring

H01H 3/503 . . . {making use of electromagnets}

H01H 2003/506 . . . {making use of permanent magnets}

H01H 3/52 . . with means to ensure stopping at intermediate operative positions

H01H 3/54 . Mechanisms for coupling or uncoupling operating part, driving mechanism or contacts

H01H 3/56 . . using electromagnetic clutch

H01H 3/58 . . using friction, toothed, or other mechanical clutch

H01H 3/60 . Mechanical arrangements for preventing or damping vibration or shock

H01H 3/605 . . {making use of a fluid damper}

H01H 3/62 . Lubricating means structurally associated with the switch (for lubricating contact-making surfaces H01H 1/60)

**H01H 5/00** **Snap-action arrangements, i.e. in which during a single opening operation or a single closing operation energy is first stored and then released to produce or assist the contact movement**

H01H 5/02 . Energy stored by the attraction or repulsion of magnetic parts

H01H 5/04 . Energy stored by deformation of elastic members (by deformation of bimetallic elements in thermally-actuated switches H01H 37/54)

H01H 5/045 . . {making use of cooperating spring loaded wedging or camming parts between operating member and contact structure}

H01H 5/06 . . by compression or extension of coil springs

H01H 5/08 . . . one end of spring transmitting movement to the contact member when the other end is moved by the operating part

H01H 5/10 . . . one end of spring being fixedly connected to the stationary or movable part of the switch and the other end reacting with a movable or stationary rigid member respectively through pins, cams, toothed or other shaped surfaces

H01H 5/12 . . . having two or more snap-action motions in succession

H01H 5/14 . . by twisting of torsion members

H01H 5/16 . . . with auxiliary means for temporarily holding parts until torsion member is sufficiently strained

H01H 5/18 . . by flexing of blade springs

H01H 5/20 . . . single blade moved across dead-centre position

H01H 5/22 . . . blade spring with at least one snap-acting leg and at least one separate contact-carrying or contact-actuating leg

H01H 5/24 . . . . having three legs

H01H 5/26 . . . having two or more snap-action motions in succession

H01H 5/28 . . . two separate blade springs forming a toggle

H01H 5/30 . . by buckling of disc springs

**H01H 7/00** **Devices for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts** (time or time-programme switches H01H 43/00)

H01H 7/02 . with fluid timing means

H01H 7/03 . . with dash-pots

H01H 7/04 . . with flies, i.e. fan governors

H01H 7/06 . with thermal timing means (thermally actuated switches H01H 37/00)

H01H 7/08 . with timing by mechanical speed-control devices

H01H 7/10 . . by escapement

H01H 7/12 . . . mechanical

H01H 7/14 . . . electromagnetic

H01H 7/16 . Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 9/56)

**H01H 9/00** **Details of switching devices, not covered by groups H01H 1/00 to H01H 7/00** (casings for switchgear H02B 1/26; casings for electrical apparatus in general H05K 5/00)

H01H 9/0005 . {Tap change devices}

H01H 9/0011 . . {Voltage selector switches}

H01H 9/0016 . . {Contact arrangements for tap changers}

H01H 2009/0022 . . . {Mounting of the fixed contacts or taps on cylindrical wall of oil vessel containing the tap changer; Details of screening}

H01H 9/0027 . . {Operating mechanisms}

H01H 9/0033 . . . {with means for indicating the selected tap or limiting the number of selectable taps}

H01H 9/0038 . . {making use of vacuum switches}

H01H 9/0044 . . {Casings; Mountings; Disposition in transformer housing}

H01H 2009/005 . . . {Details concerning the sealing of the oil filled casings}

H01H 2009/0055 . . {Oil filters for tap change devices}

H01H 2009/0061 . . {Monitoring tap change switching devices}

H01H 9/0066 . {Auxiliary contact devices (for arc transfer H01H 9/38; for electromagnetic relays H01H 50/541)}

H01H 9/0072 . {particular to three-phase switches (synchronous switching H01H 9/563)}

H01H 2009/0077 . {using recyclable materials, e.g. for easier recycling or minimising the packing material}

H01H 2009/0083 . {using redundant components e.g. two pressure tubes for pressure switch}

H01H 2009/0088 . {Details of rotatable shafts common to more than one pole or switch unit}

H01H 2009/0094 . {Details of rotatable shafts which are subdivided; details of the coupling means thereof}

H01H 9/02 . Bases, casings, or covers (accommodating more than one switch or a switch and another electrical component H02B 1/26)

H01H 9/0207 . . {Adjustable mounting of casings}

H01H 9/0214 . . {Hand-held casings}

H01H 2009/0221 . . . {the switches being fixed to the operator's hand, e.g. integrated in a glove or fixed to a ring}

H01H 9/0228 . . . {Line cord switches}

H01H 9/0235 . . . {specially adapted for remote control, e.g. of audio or video apparatus}

H01H 9/0242 . . . . {Protective enclosures; Cushioning means}

H01H 9/025 . . . . {Stands or organisers to facilitate location or operation}

H01H 2009/0257 . . . . {Multisided remote control, comprising control or display elements on at least two sides, e.g. front and back surface}

H01H 9/0264 . . {Protective covers for terminals}

H01H 9/0271 . . {structurally combining a switch and an electronic component (for relays H01H 50/021)}

H01H 2009/0278 . . {Casings containing special noise reduction means, e.g. elastic foam between inner and outer casing}

H01H 2009/0285 . . {Casings overmoulded over assembled switch or relay}

H01H 2009/0292 . . {Transparent window or opening, e.g. for allowing visual inspection of contact position or contact condition}

H01H 9/04 . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings

H01H 9/041 . . . {Casings hermetically closed by a diaphragm through which passes an actuating member (vacuum switches H01H 33/66)}

H01H 9/042 . . . {Explosion-proof cases}

H01H 9/043 . . . . {with pressure-relief devices}

H01H 9/045 . . . . {with interlocking mechanism between cover and operating mechanism}

H01H 9/046 . . . . {with internal explosion inhibiting means}

H01H 9/047 . . . {provided with venting means}

H01H 2009/048 . . . {using a sealing boot, e.g. the casing having separate elastic body surrounding the operating member and hermetically closing the opening for it}

H01H 9/06 . . Casing of switch constituted by a handle serving a purpose other than the actuation of the switch, e.g. by the handle of a vacuum cleaner

H01H 9/061 . . . {enclosing a continuously variable impedance}

H01H 9/063 . . . {enclosing a reversing switch}

H01H 2009/065 . . . {Battery operated hand tools in which the battery and the switch are directly connected}

H01H 2009/066 . . . {having switches mounted on a control handle, e.g. gear shift lever}

H01H 2009/068 . . . {with switches mounted on a handlebar, e.g. for motorcycles, fork lift trucks, etc.}

H01H 9/08 . Arrangements to facilitate replacement of a switch, e.g. cartridge housing

H01H 9/085 . . {contact separation effected by removing contact carrying element}

H01H 9/10 . Adaptation for built-in fuses (mounting switch and fuse separately on, or in, common support H02B)

H01H 9/102 . . {Fuses mounted on or constituting the movable contact parts of the switch}

H01H 9/104 . . {with interlocking mechanism between switch and fuse}

H01H 9/106 . . {fuse and switch being connected in parallel}

H01H 2009/108 . . {Building a sliding and/or a removable bridging connector for batteries}

H01H 9/12 . Means for earthing parts of switch not normally conductively connected to the contacts

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| H01H 9/14 | . | Adaptation for built-in safety spark gaps |
| H01H 9/16 | . | Indicators for switching condition, e.g. "on" or "off" |
| H01H 9/161 | . . | {comprising light emitting elements} |
| H01H 9/162 | . . . | {Means to facilitate removal or replacement of light-emitting elements} |
| H01H 2009/164 | . . . | {the light emitting elements being incorporated in and movable with the operating part} |
| H01H 9/165 | . . | {comprising numbered dials (thumb-wheel switches H01H 19/001)} |
| H01H 9/167 | . . | {Circuits for remote indication (for protection circuits H02H 3/04; for distribution networks H02J 13/00)} |
| H01H 9/168 | . . | {making use of an electromagnetic wave communication} |
| H01H 9/18 | . | Distinguishing marks on switches, e.g. for indicating switch location in the dark; Adaptation of switches to receive distinguishing marks |
| H01H 9/181 | . . | {using a programmable display, e.g. LED or LCD} |
| H01H 9/182 | . . | {Illumination of the symbols or distinguishing marks (H01H 9/181 takes precedence)} |
| H01H 2009/183 | . . . | {Provisions for enhancing the contrast between the illuminated symbol and the background or between juxtaposed symbols} |
| H01H 2009/184 | . . . | {Illumination of symbols by using laser light} |
| H01H 9/185 | . . | {Fluorescent or phosphorescent symbols or distinguishing marks (H01H 9/181 takes precedence)} |
| H01H 2009/186 | . . | {using an electroluminiscent panel} |
| H01H 2009/187 | . . | {having symbols engraved or printed by laser} |
| H01H 2009/188 | . . | {with indication of rating} |
| H01H 2009/189 | . . | {with a tactile symbol or indication, e.g. for blind people} |
| H01H 9/20 | . | Interlocking, locking, or latching mechanisms (contacts adapted to act as latches H01H 1/52; by an auxiliary movement of the operating part or of an attachment thereto H01H 3/20; {for withdrawable switchgear H02B 11/00}) |
| H01H 9/22 | . . | for interlocking between casing, cover, or protective shutter and mechanism for operating contacts {(explosion-proof cases H01H 9/045; built-in fuses and interlocking mechanisms H01H 9/104; by automatic release of circuit breakers H01H 71/126)} |
| H01H 9/223 | . . . | {Defeatable locking means} |
| H01H 9/226 | . . . | {the casing containing electrical equipment other than and operated by the switch} |
| H01H 9/24 | . . | for interlocking two or more parts of the mechanism for operating contacts |
| H01H 9/26 | . . | for interlocking two or more switches ({H01H 13/568 takes precedence}; by a detachable member H01H 9/28; {for electromagnetic relays H01H 50/323}) |
| H01H 9/262 | . . . | {using flexible transmission elements, e.g. Bowden cable} |
| H01H 2009/265 | . . . | {with interlocking of more than two switches} |
| H01H 2009/267 | . . . | {with interlocking of two out of three switches, e.g. two switches each connecting a power supply to a busbar and a bus coupling switch interlocked in such a way that the power supplies are never connected in parallel} |

H01H 9/28 . . for locking switch parts by a key or equivalent removable member (switches operated by a key H01H 27/00; locking by removable part of two-part coupling device H01R)

H01H 9/281 . . . {making use of a padlock (H01H 9/287 takes precedence)}

H01H 9/282 . . . . {and a separate part mounted or mountable on the switch assembly and movable between an unlocking position and a locking position where it can be secured by the padlock}

H01H 9/283 . . . . . {the part being removable}

H01H 9/285 . . . {Locking mechanisms incorporated in the switch assembly and operable by a key or a special tool}

H01H 9/286 . . . {making use of a removable locking part acting directly on the operating part (H01H 9/281 takes precedence)}

H01H 9/287 . . . {wherein the operating part is made inaccessible or more difficult to access by a lid, cover or guard, e.g. lockable covers}

H01H 2009/288 . . . {Provisions relating to welded contacts}

H01H 9/30 . Means for extinguishing or preventing arc between current-carrying parts

H01H 9/302 . . {wherein arc-extinguishing gas is evolved from stationary parts}

H01H 2009/305 . . {including means for screening for arc gases as protection of mechanism against hot arc gases or for keeping arc gases in the arc chamber}

H01H 2009/307 . . {with slow break, e.g. for AC current waiting for a zero crossing}

H01H 9/32 . . Insulating body insertable between contacts

H01H 9/34 . . Stationary parts for restricting or subdividing the arc, e.g. barrier plate

H01H 9/341 . . . {Barrier plates carrying electrodes}

H01H 9/342 . . . {Venting arrangements for arc chutes}

H01H 2009/343 . . . . {with variable venting aperture function of arc chute internal pressure, e.g. resilient flap-valve or check-valve}

H01H 9/345 . . . {Mounting of arc chutes}

H01H 9/346 . . . {Details concerning the arc formation chamber}

H01H 2009/347 . . . {using lids for closing the arc chamber after assembly}

H01H 2009/348 . . . {Provisions for recirculation of arcing gasses to improve the arc extinguishing, e.g. move the arc quicker into the acring chamber}

H01H 9/36 . . . Metal parts

H01H 9/362 . . . . {Mounting of plates in arc chamber}

H01H 2009/365 . . . . {using U-shaped plates}

H01H 2009/367 . . . . {defining a recurrent path, e.g. the subdivided arc is moved in a closed path between each pair of splitter plates}

H01H 9/38 . . Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing-horns H01H 9/46)

H01H 9/383 . . . {Arcing contact pivots relative to the movable contact assembly}

H01H 9/386 . . . {Arcing contact pivots relative to the fixed contact assembly}

H01H 9/40 . . Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc {(multiple parallel contact bars H01H 1/226)}

H01H 9/42 . . Impedances connected with contacts

H01H 9/44 . . using blow-out magnet

H01H 9/443 . . . {using permanent magnets}

H01H 9/446 . . . {using magnetisable elements associated with the contacts}

H01H 9/46 . . using arcing-horn (using blow-out magnet H01H 9/44; arcing-horns per se H01T 4/14)

H01H 9/465 . . . {Shunt circuit closed by transferring the arc onto an auxiliary electrode}

H01H 9/48 . Means for preventing discharge to non-current-carrying parts, e.g. using corona ring

H01H 9/50 . Means for detecting the presence of an arc or discharge

H01H 9/52 . Cooling of switch parts (cooling of contacts H01H 1/62)

H01H 2009/523 . . {by using heat pipes}

H01H 2009/526 . . {of the high voltage switches}

H01H 9/54 . Circuit arrangements not adapted to a particular application of the switching device and for which no provision exists elsewhere

H01H 9/541 . . {Contacts shunted by semiconductor devices}

H01H 9/542 . . . {Contacts shunted by static switch means}

H01H 2009/543 . . . . {third parallel branch comprising an energy absorber, e.g. MOV, PTC, Zener}

H01H 2009/544 . . . . {the static switching means being an insulated gate bipolar transistor, e.g. IGBT, Darlington configuration of FET and bipolar transistor}

H01H 2009/545 . . . . {comprising a parallel semiconductor switch being fired optically, e.g. using a photocoupler,}

H01H 2009/546 . . . . {the static switching means being triggered by the voltage over the mechanical switch contacts}

H01H 9/547 . . {Combinations of mechanical switches and static switches, the latter being controlled by the former}

H01H 9/548 . . {Electromechanical and static switch connected in series}

H01H 9/56 . . for ensuring the operation of the switch at a predetermined point in the cycle

H01H 9/563 . . . {for multipolar switches, e.g. different timing for different phases, selecting phase with first zero-crossing}

H01H 2009/566 . . . {with self learning, e.g. measured delay is used in later actuations}

**H01H 11/00** **Apparatus or processes specially adapted for manufacture of electric switches** (processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards, H01H 13/88; processes or apparatus specially adapted for the manufacture or treatment of micro-structural devices or systems, e.g. in combination with electrical devices, B81C)

H01H 11/0006 . {for converting electric switches (H01H 13/564 takes precedence)}

H01H 11/0012 . . {for converting normally open to normally closed switches and vice versa}

H01H 11/0018 . . {for allowing different operating parts}

H01H 2011/0025 . . . {with provisions for allowing different orientation of the operating part, e.g. turning knob can be mounted in different positions}

H01H 11/0031 . . {for allowing different types or orientation of connections to contacts}

H01H 2011/0037 . . . {with removable or replaceable terminal blocks}

H01H 2011/0043 . . {for modifying the number or type of operating positions, e.g. momentary and stable}

H01H 11/005 . {of reed switches}

H01H 11/0056 . {comprising a successive blank-stamping, insert-moulding and severing operation}

H01H 11/0062 . {Testing or measuring non-electrical properties of switches, e.g. contact velocity (monitoring contacts H01H 1/0015; monitoring gas density H01H 33/563; monitoring vacuum H01H 33/668; calibrating H01H 69/01; adjusting H01H 71/74; testing of electrical properties G01R 31/333)}

H01H 2011/0068 . . {measuring the temperature of the switch or parts thereof}

H01H 2011/0075 . {calibrating mechanical switching properties, e.g. "snap or switch moment", by mechanically deforming a part of the switch, e.g. elongating a blade spring by puncturing it with a laser}

H01H 2011/0081 . {using double shot moulding, e.g. for forming elastomeric sealing elements on form stable casing}

H01H 2011/0087 . {Welding switch parts by use of a laser beam}

H01H 2011/0093 . {Standardization, e.g. limiting the factory stock by limiting the number of unique, i. e. different components}

H01H 11/02 . for mercury switches

H01H 11/04 . of switch contacts

H01H 11/041 . . {by bonding of a contact marking face to a contact body portion}

H01H 11/042 . . . {by mechanical deformation}

H01H 11/043 . . . {by resistance welding}

H01H 11/045 . . . {with the help of an intermediate layer (contacts provided with a solder layer H01H 1/0231)}

H01H 2011/046 . . . {by plating}

H01H 2011/047 . . . {on both sides of the contact body portion}

H01H 11/048 . . {by powder-metallurgical processes}

H01H 11/06 . . Fixing of contacts to carrier; {Fixing of contacts to insulating carrier}

H01H 2011/062 . . . {by inserting only}

H01H 2011/065 . . . {by plating metal or conductive rubber on insulating substrate, e.g. Molded Interconnect Devices [MID]}

H01H 2011/067 . . . {by deforming, e.g. bending, folding or caulking, part of the contact or terminal which is being mounted}

**H01H 13/00** **Switches having rectilinearly-movable operating part or parts adapted for pushing or pulling in one direction only, e.g. push-button switch** (wherein the operating part is flexible H01H 17/00)

H01H 13/02 . Details (specially adapted for rectilinearly movable switches having operating members associated with different sets of contacts, e.g. keyboards, H01H 13/70)

H01H 13/023 . . {Light-emitting indicators (for multi-layer switches H01H 13/83)}

H01H 2013/026 . . . {with two or more independent lighting elements located inside the push button switch that illuminate separate zones of push buttons}

H01H 13/04 . . Cases; Covers

H01H 13/06 . . . Dustproof, splashproof, drip-proof, waterproof or flameproof casings

H01H 13/063 . . . . {Casings hermetically closed by a diaphragm through which passes an actuating member (vacuum switches H01H 33/66)}

H01H 2013/066 . . . . {using bellows}

H01H 13/08 . . . Casing of switch constituted by a handle serving a purpose other than the actuation of the switch

H01H 13/10 . . Bases; Stationary contacts mounted thereon

H01H 13/12 . . Movable parts; Contacts mounted thereon

H01H 13/14 . . . Operating parts, e.g. push-button

H01H 13/16 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 13/18 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

H01H 13/183 . . . . . {for actuation by moving a closing member, e.g. door, cover (H01H 13/186, H01H 27/002 take precedence; the switch controlling enclosed equipment H01H 9/226)}

H01H 13/186 . . . . . {wherein the pushbutton is rectilinearly actuated by a lever pivoting on the housing of the switch}

H01H 13/20 . . . Driving mechanisms

H01H 13/22 . . . . acting with snap action (depending upon deformation of elastic member H01H 13/26)

H01H 13/24 . . . . with means for introducing a predetermined time delay

H01H 13/26 . . Snap-action arrangements depending upon deformation of elastic members

H01H 13/28 . . . using compression or extension of coil springs

H01H 13/285 . . . . {having a symmetrical configuration (H01H 13/30 to H01H 13/34 take precedence)}

H01H 13/30 . . . . one end of spring transmitting movement to the contact member when the other end is moved by the operating part

H01H 13/32 . . . . one end of spring being fixedly connected to the stationary or movable part of the switch and the other end reacting with a movable or stationary member respectively through pins, cams, toothed or other shaped surfaces

H01H 13/34 . . . . having two or more snap-action motions in succession

H01H 13/36 . . . using flexing of blade springs

H01H 13/365 . . . . {having a symmetrical configuration (H01H 13/38 to H01H 13/46 take precedence)}

H01H 13/38 . . . . Single blade moved across dead-centre position

H01H 13/40 . . . . Blade spring with at least one snap-acting leg and at least one separate contact-carrying or contact-actuating leg

H01H 13/42 . . . . . having three legs

H01H 13/44 . . . . having two or more snap-action motions in succession

H01H 13/46 . . . . two separate blade springs forming a toggle

H01H 13/48 . . . using buckling of disc springs

H01H 13/50 . having a single operating member

H01H 13/503 . . {Stacked switches}

H01H 13/506 . . {with a make-break action in a single operation}

H01H 13/52 . . the contact returning to its original state immediately upon removal of operating force, e.g. bell-push switch

H01H 2013/525 . . . {using a return spring acting perpendicular to the actuating direction}

H01H 13/54 . . the contact returning to its original state a predetermined time interval after removal of operating force, e.g. for staircase lighting

H01H 13/56 . . the contact returning to its original state upon the next application of operating force

H01H 13/562 . . . {making use of a heart shaped cam}

H01H 13/564 . . . . {convertible to momentary push button switches}

H01H 2013/566 . . . . . {by removable or exchangeable parts}

H01H 13/568 . . . . {the contact also returning by some external action, e.g. interlocking, protection, remote control}

H01H 13/58 . . . with contact-driving member rotated step-wise in one direction

H01H 13/585 . . . . {wherein the movable contact rotates around the axis of the push button}

H01H 13/60 . . . with contact-driving member moved alternately in opposite directions

H01H 13/62 . . the contact returning to its original state upon manual release of a latch (latch released by second push-button H01H 13/68)

H01H 13/64 . . wherein the switch has more than two electrically distinguishable positions, e.g. multi-position push-button switches

H01H 13/66 . . . the operating member having only two positions

H01H 13/68 . having two operating members, one for opening and one for closing the same set of contacts (single operating member protruding from different sides of switch casing for alternate pushing upon opposite ends H01H 15/22)

H01H 13/70 . having a plurality of operating members associated with different sets of contacts, e.g. keyboard ({keyboards specially adapted for specific applications, see the relevant subclasses or groups, e.g. B41J, G06F 3/023, H04L 17/00, H04M 1/00; multiple switches specially adapted for electromechanical clocks or watches G04C 3/005}; mounting together a plurality of independent switches H02B)

H01H 13/7006 . . {comprising a separate movable contact element for each switch site, all other elements being integrated in layers}

H01H 13/7013 . . {in which the movable contacts of each switch site or of a row of switch sites are formed in a single plate}

H01H 13/702 . . with contacts carried by or formed from layers in a multilayer structure, e.g. membrane switches

H01H 13/703 . . . characterised by spacers between contact carrying layers

H01H 13/704 . . . characterised by the layers, e.g. by their material or stucture (H01H 13/703 takes precedence)

H01H 13/705 . . . characterised by construction, mounting or arrangement of operating parts, e.g. push-buttons or keys

H01H 13/7057 . . . . characterised by the arrangement of operating parts in relation to each other, e.g. pre-assembled groups of keys

H01H 13/7065 . . . . characterised by the mechanism between keys and layered keyboards

H01H 13/7073 . . . . . characterised by springs, e.g. Euler springs

H01H 13/72 . . wherein the switch has means for limiting the number of operating members that can concurrently be in the actuated position

H01H 13/74 . . . each contact set returning to its original state only upon actuation of another of the operating members

H01H 13/76 . . wherein some or all of the operating members actuate different combinations of the contact sets, e.g. ten operating members actuating different combinations of four contact sets

H01H 13/78 . . characterised by the contacts or the contact sites

H01H 13/785 . . . characterised by the material of the contacts, e.g. conductive polymers

H01H 13/79 . . . characterised by the form of the contacts, e.g. interspersed fingers or helical networks

H01H 13/80 . . . characterised by the manner of cooperation of the contacts, e.g. with both contacts movable or with bounceless contacts

H01H 13/803 . . . characterised by the switching function thereof, e.g. normally closed contacts or consecutive operation of contacts

H01H 13/807 . . . characterised by the spatial arrangement of the contact sites, e.g. superimposed sites

H01H 13/81 . . characterised by electrical connections to external devices

H01H 13/82 . . characterised by contact space venting means

H01H 13/83 . . characterised by legends, e.g. Braille, liquid crystal displays, light emitting or optical elements

H01H 13/84 . . characterised by ergonomic functions, e.g. for miniature keyboards; characterised by operational sensory functions, e.g. sound feedback (legends H01H 13/83)

H01H 13/85 . . . characterised by tactile feedback features

H01H 13/86 . . characterised by the casing, e.g. sealed casings or casings reducible in size

H01H 13/88 . . Processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards

**H01H 15/00 Switches having rectilinearly-movable operating part or parts adapted for actuation in opposite directions, e.g. slide switch**

H01H 15/005 . {adapted for connection with printed circuit boards (in general H01H 1/5805)}

H01H 15/02 . Details

H01H 15/025 . . {Light-emitting indicators}

H01H 15/04 . . Stationary parts; Contacts mounted thereon

H01H 15/06 . . Movable parts; Contacts mounted thereon

H01H 15/08 . . . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing

H01H 15/10 . . . Operating parts

H01H 15/102 . . . . {comprising cam devices}

H01H 15/105 . . . . . {Adjustable cams}

H01H 15/107 . . . . . {actuating conventional selfcontained microswitches (H01H 15/105 takes precedence)}

H01H 15/12 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 15/14 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

H01H 15/16 . . . Driving mechanisms

H01H 15/18 . . . . acting with snap action

H01H 15/20 . . . . with means for introducing a predetermined time delay

H01H 15/22 . having a single operating part protruding from different sides of switch casing for alternate actuation from opposite ends

H01H 15/24 . having a single operating part only protruding from one side of the switch casing for alternate pushing and pulling

**H01H 17/00 Switches having flexible operating part adapted only for pulling, e.g. cord, chain {(for emergency stop switches H01H 3/0226)}**

H01H 17/02 . Details

H01H 17/04 . . Stationary parts (guides H01H 17/14)

H01H 17/06 . . Movable parts (guides H01H 17/14)

H01H 17/08 . . . Operating part, e.g. cord

H01H 17/10 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 17/12 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

H01H 17/14 . . Guiding means for flexible operating part

H01H 17/16 . having a single flexible operating part adapted for pulling at one end only

H01H 17/165 . . {secured to a part of the switch mechanism that has only rectilinear movement}

H01H 17/18 . . secured to part of the switch driving mechanism that has only angular movement

H01H 17/20 . . . the contact returning to its original state immediately upon removal of operating force

H01H 17/22 . . . the contact returning to its original state upon the next application of operating force

H01H 17/24 . . secured to a part of the switch driving mechanism that has both angular and rectilinear motion

H01H 17/26 . having two flexible operating parts; having a single operating part adapted for pulling at both ends

H01H 17/28 . . secured to part or parts of the switch driving mechanism having only rectilinear motion

H01H 17/30 . . secured to a part or parts of the switch driving mechanism having only angular motion

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| **H01H 19/00** | **Switches operated by an operating part which is rotatable about a longitudinal axis thereof and which is acted upon directly by a solid external to the switch, e.g. by a hand** (rotary current collectors, distributors or interrupters H01R 39/00) |
| H01H 19/001 | . {Thumb wheel switches} |
| H01H 19/003 | . . {having a pushbutton actuator} |
| H01H 19/005 | . {Electromechanical pulse generators (integrated in time-pieces G04C 3/007)} |
| H01H 2019/006 | . . {being rotation direction sensitive, e.g. the generated pulse or code depends on the direction of rotation of the operating part} |
| H01H 2019/008 | . {with snap mounting of rotatable part on fixed part, e.g. rotor on stator, operating knob on switch panel} |
| H01H 19/02 | . Details |
| H01H 19/025 | . . {Light-emitting indicators} |
| H01H 19/03 | . . Means for limiting the angle of rotation of the operating part |
| H01H 19/04 | . . Cases; Covers |
| H01H 19/06 | . . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings |
| H01H 19/065 | . . . . {Casings hermetically closed by a diaphragm through which passes an actuating member (vacuum switches H01H 33/66)} |
| H01H 19/08 | . . Bases; Stationary contacts mounted thereon |
| H01H 19/10 | . . Movable parts; Contacts mounted thereon |
| H01H 19/11 | . . . With indexing means |
| H01H 19/115 | . . . . {using molded elastic parts only} |
| H01H 19/12 | . . . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing |
| H01H 19/14 | . . . Operating parts, e.g. turn knob |
| H01H 2019/143 | . . . . {having at least two concentric turn knobs} |
| H01H 2019/146 | . . . . {Roller type actuators} |
| H01H 19/16 | . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot |
| H01H 19/18 | . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift |
| H01H 19/183 | . . . . . {adapted for operation by the simultaneous action of two cam plates, rotating at different speeds} |
| H01H 19/186 | . . . . . {with travelling nuts} |
| H01H 19/20 | . . . Driving mechanisms allowing angular displacement of the operating part to be effective in either direction |
| H01H 19/22 | . . . . incorporating lost motion |
| H01H 19/24 | . . . . acting with snap action |
| H01H 19/26 | . . . . with means for introducing a predetermined time delay |
| H01H 19/28 | . . . Driving mechanisms allowing angular displacement of the operating part to be effective or possible in only one direction |

H01H 19/30 . . . . incorporating lost motion

H01H 19/32 . . . . acting with snap action

H01H 19/34 . . . . with means for introducing a predetermined time delay

H01H 19/36 . the operating part having only two operative positions, e.g. relatively displaced by 180 degrees

H01H 19/38 . . Change-over switches

H01H 19/40 . . . having only axial contact pressure

H01H 19/42 . . providing more than two electrically different conditions, e.g. for closing either or both of two circuits

H01H 19/44 . . . having only axial contact pressure

H01H 19/46 . the operating part having three operative positions, e.g. off/star/delta

H01H 19/48 . . having only axial contact pressure

H01H 19/50 . the operating part having four operative positions, e.g. off/two-in-series/one-only/two-in-parallel

H01H 19/52 . . having only axial contact pressure

H01H 19/54 . the operating part having at least five or an unspecified number of operative positions

H01H 19/56 . . Angularly-movable actuating part carrying contacts, e.g. drum switch

H01H 19/563 . . . {with an initial separation movement perpendicular to the switching movement}

H01H 19/566 . . . {in which the contact making surfaces are inclined, i.e. not perpendicular, to the axial or radial direction}

H01H 19/58 . . . having only axial contact pressure, e.g. disc switch, wafer switch

H01H 19/585 . . . . {provided with printed circuit contacts}

H01H 19/60 . . Angularly-movable actuating part carrying no contacts

H01H 19/605 . . . {in which the actuation of the contacts depends on the direction of rotation}

H01H 19/62 . . . Contacts actuated by radial cams

H01H 19/623 . . . . {Adjustable cams}

H01H 19/626 . . . . {actuating bridging contacts (H01H 19/623 takes precedence)}

H01H 19/63 . . . Contacts actuated by axial cams (H01H 19/6355 takes precedence)

H01H 19/635 . . . Contacts actuated by rectilinearly-movable member linked to operating part, e.g. by pin and slot

H01H 19/6355 . . . . {using axial cam devices for transforming the angular movement into linear movement along the axis of rotation}

H01H 19/64 . Encased switches adapted for ganged operation when assembled in a line with identical switches, e.g. stacked switches

**H01H 21/00** **Switches operated by an operating part in the form of a pivotable member acted upon directly by a solid body, e.g. by a hand** (tumbler or rocker switches H01H 23/00; switches having an operating part movable angularly in more than one plane H01H 25/04)

H01H 21/02 . Details

H01H 21/025 . . {Light-emitting indicators}

H01H 21/04 . . Cases; Covers

H01H 21/06 . . . interlocked with operating mechanism

H01H 21/08 . . . Dustproof, splashproof, drip-proof, waterproof, or flame-proof casings

H01H 21/085 . . . . {Casings hermetically closed by a diaphragm through which passes an actuating member (vacuum switches H01H 33/66)}

H01H 21/10 . . . Casing of switch constituted by a handle serving a purpose other than the actuation of the switch

H01H 21/12 . . Bases; Stationary contacts mounted thereon

H01H 21/14 . . Means for increasing contact pressure

H01H 21/16 . . Adaptation for built-in fuse

H01H 21/165 . . . {Fuses mounted on, or constituting the movable contact parts of, the switch}

H01H 21/18 . . Movable parts; Contacts mounted thereon

H01H 21/20 . . . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing

H01H 21/22 . . . Operating parts, e.g. handle

H01H 2021/225 . . . . {with push-pull operation, e.g. which can be pivoted in both directions by pushing or pulling on the same extremity of the operating member}

H01H 21/24 . . . . biased to return to normal position upon removal of operating force

H01H 21/245 . . . . . {the contact returning to its original state upon the next application of operating force}

H01H 21/26 . . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 21/28 . . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

H01H 21/282 . . . . . {for actuation by moving a closing member, e.g. door, cover (the switch controlling enclosed equipment H01H 9/226)}

H01H 21/285 . . . . . {having an operating arm actuated by the movement of the body and mounted on an axis converting its rotating movement into a rectilinear switch activating movement}

H01H 2021/287 . . . . . {with adjustable head, e.g. the actuator head can have different positions in relation to the limit switch itself}

H01H 21/30 . . . . not biased to return to a normal position upon removal of operating force

H01H 21/32 . . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 21/34 . . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

H01H 21/36 . . . Driving mechanisms

H01H 21/38 . . . . incorporating lost motion

H01H 21/40 . . . . having snap action

H01H 21/42 . . . . . produced by compression or extension of coil spring

H01H 21/44 . . . . . produced by flexing blade springs

H01H 21/46 . . . . . with two or more snap-action motions in succession

H01H 21/48 . . . . incorporating a ratchet mechanism

H01H 21/50 . . . . with indexing or latching means, e.g. indexing by ball and spring; with means to ensure stopping at intermediate operative positions

H01H 21/52 . . . . with means for introducing a predetermined time delay

H01H 21/54 . Lever switches with blade-type contact co-operating with one or two spring-clip contacts, e.g. knife switch

H01H 21/56 . . making contact in one position only

H01H 21/58 . . Change-over switches without stable intermediate position

H01H 21/60 . . Change-over switches with stable intermediate position

H01H 21/86 . Switches with abutting contact carried by operating part, e.g. telegraph tapping key

H01H 21/88 . . with intermediate position of rest

**H01H 23/00** **Tumbler or rocker switches, i.e. switches characterised by being operated by rocking an operating member in the form of a rocker button**

**NOTE**

In this group, the term "rocking" is defined as pivotal motion in one plane about an axis parallel to the switch faceplate and located substantially centrally between the ends of the rocker button

H01H 23/003 . {with more than one electrically distinguishable condition in one or both positions}

H01H 23/006 . {adapted for connection with printed circuit boards (connections to printed circuits in general H01H 1/5805)}

H01H 23/02 . Details

H01H 23/025 . . {Light-emitting indicators}

H01H 23/04 . . Cases; Covers

H01H 23/06 . . . Dustproof, splashproof, drip-proof, waterproof, or flame-proof casings

H01H 23/065 . . . . {Casings hermetically closed by a diaphragm through which passes an actuating member (vacuum switches H01H 33/66)}

H01H 23/08 . . Bases; Stationary contacts mounted thereon

H01H 23/10 . . Adaptation for built-in fuse

H01H 23/105 . . . {Fuses mounted on, or constituting the movable part of, the switch}

H01H 23/12 . . Movable parts; Contacts mounted thereon

H01H 23/14 . . . Tumblers

H01H 23/141 . . . . {provided with extensions, e.g. for actuation by a child}

H01H 23/143 . . . . {having a generally flat elongated shape}

H01H 23/145 . . . . . {the actuating surface having two slightly inclined areas extending from the middle outward}

H01H 23/146 . . . . {having a generally tubular or conical elongated shape, e.g. dolly}

H01H 23/148 . . . . {actuated by superimposed sliding element (H01H 23/141 takes precedence)}
H01H 23/16 . . . Driving mechanisms
H01H 23/162 . . . . {incorporating links interconnecting tumbler and contact arm}
H01H 23/164 . . . . {with rectilinearly movable member carrying the contacts}
H01H 23/166 . . . . {with positive action}
H01H 23/168 . . . . {using cams}
H01H 23/18 . . . . incorporating lost motion
H01H 23/20 . . . . having snap action
H01H 23/205 . . . . . {using a compression spring between tumbler and an articulated contact plate}
H01H 23/22 . . . . with means for introducing a predetermined time delay
H01H 23/24 . with two operating positions
H01H 23/26 . . one of which positions is unstable
H01H 23/28 . with three operating positions
H01H 23/30 . . with stable centre positions and one or both end positions unstable

**H01H 25/00 Switches with compound movement of handle or other operating part**
H01H 25/002 . {having an operating member rectilinearly slidable in different directions}
H01H 2025/004 . . {the operating member being depressable perpendicular to the other directions}
H01H 25/006 . {having an operating member slidable in a plane in one direction and pivotable around an axis located in the sliding plane perpendicular to the sliding direction}
H01H 25/008 . {Operating part movable both angularly and rectilinearly, the rectilinear movement being perpendicular to the axis of angular movement}
H01H 25/04 . Operating part movable angularly in more than one plane, e.g. joystick
H01H 25/041 . . {having a generally flat operating member depressible at different locations to operate different controls}
H01H 2025/043 . . . {the operating member being rotatable around wobbling axis for additional switching functions}
H01H 2025/045 . . . {having a rotating dial around the operating member for additional switching functions}
H01H 2025/046 . . . {having a spherical bearing between operating member and housing or bezel}
H01H 2025/048 . . {having a separate central push, slide or tumbler button which is not integral with the operating part that surrounds it}
H01H 25/06 . Operating part movable both angularly and rectilinearly, the rectilinear movement being along the axis of angular movement
H01H 25/065 . . {using separate operating parts, e.g. a push button surrounded by a rotating knob}

**H01H 27/00** **Switches operated by a removable member, e.g. key, plug, plate; Switches operated by setting members according to a single predetermined combination out of several possible settings** (locking switch parts to prevent operation H01H 9/28; combined with plug-and-socket connectors H01R; with current-carrying plug H01R 31/08)

H01H 27/002 . {wherein one single insertion movement of a key comprises an unlocking stroke and a switch actuating stroke, e.g. security switch for safety guards}

H01H 2027/005 . . {the key receiving part having multiple openings to allow keys from different directions to operate the switch}

H01H 27/007 . . {the switch being lockable by remote control, e.g. by electromagnet}

H01H 27/04 . Insulating plug or plate inserted between normally closed contacts

H01H 27/06 . Key inserted and then turned to effect operation of the switch {(IC integrated in key and connected by turning key E05B 49/004)}

H01H 27/063 . . {wherein the switch cannot be moved to a third position, e.g. start position, unless the preceding movement was from a first position to a second position, e.g. ignition position (starting of engines and safety devices F02N 11/00; safety means for electric spark ignition F02P 11/00)}

H01H 2027/066 . . {having anti-tamper provisions, e.g. avoiding the removal of the lock cylinder}

H01H 27/08 . . wherein the key cannot be removed until the switch is returned to its original position {(H01H 27/063, H01H 27/063 take precedence)}

H01H 27/10 . Switch operated by setting members according to a single predetermined combination out of several possible settings

**H01H 29/00** **Switches having at least one liquid contact** (solid contacts wetted or soaked with mercury H01H 1/08)

H01H 29/002 . {Inertia switches}

H01H 29/004 . {Operated by deformation of container}

H01H 29/006 . {Self interrupters, e.g. with periodic or other repetitive opening and closing of contacts}

H01H 2029/008 . {using micromechanics, e.g. micro mechanical liquid contact switches or [LIMMS]}

H01H 29/02 . Details

H01H 29/04 . . Contacts; Containers for liquid contacts

H01H 29/06 . . . Liquid contacts characterised by the material thereof

H01H 29/08 . . Means for introducing a predetermined time delay

H01H 29/10 . . . by constricting the flow of the contact liquid

H01H 29/12 . . Operating mechanisms adapted for operation by a part of the human body other than the hand, e.g. by foot

H01H 29/14 . . Operating mechanisms adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

H01H 29/16 . operated by dipping soil contact into stationary contact liquid

H01H 29/18 . with level of surface of contact liquid displaced by non-electrical contact-making plunger

H01H 29/20 . operated by tilting contact-liquid container (centrifugal mercury switches H01H 29/26)

H01H 29/22 . . wherein contact is made and broken between liquid and solid

H01H 29/24 . . wherein contact is made and broken between liquid and liquid

H01H 29/26 . with level of surface of contact liquid displaced by centrifugal action

H01H 29/28 . with level of surface of contact liquid displaced by fluid pressure

H01H 29/30 . with level of surface of contact liquid displaced by expansion or evaporation thereof

H01H 29/32 . with contact made by a liquid jet, e.g. earthing switch with contact made by jet of water (operated by direct electrodynamic action H01H 53/00)

**H01H 31/00** **Air-break switches for high tension without arc-extinguishing or arc-preventing means** (in combination with high tension or heavy-current switches with arc-extinguishing or arc-preventing means H01H 33/00; switching arrangements for the supply or distribution of electric power H02B)

H01H 31/003 . {Earthing switches (H01H 31/02 to H01H 31/26 take precedence; contact made by liquid jet H01H 29/32; for substations H02B 1/16, H02B 5/01; for withdrawable switchgear H02B 11/28; for gas-insulated switchgear H02B 13/075)}

H01H 31/006 . {adapted to be operated by a hot stick; Hot sticks therefor}

H01H 31/02 . Details

H01H 31/023 . . {Base and stationary contacts mounted thereon}

H01H 31/026 . . {Movable parts and contacts mounted thereon}

H01H 31/04 . . Interlocking mechanisms (for interlocking with high-tension or heavy-current switches having arc-extinguishing or arc-preventing means H01H 33/52)

H01H 31/06 . . . for interlocking between casing, cover, or protective shutter and mechanism for operating contacts

H01H 31/08 . . . for interlocking two or more parts of the mechanism for operating contacts

H01H 31/10 . . . for interlocking two or more switches (for interlocking with high-tension or heavy-current switches having arc-extinguishing or arc-preventing means H01H 33/52)

H01H 31/12 . . Adaptation for built-in fuse

H01H 31/122 . . . {Fuses mounted on, or constituting the movable contact parts of, the switch}

H01H 31/125 . . . . {with a pivotally supported fuse, hanging on a fixed contact in the open position of the switch (H01H 31/127 takes precedence)}

H01H 31/127 . . . . {Drop-out fuses}

H01H 31/14 . with bridging contact that is not electrically connected to either line contact in open position of switch

H01H 31/16 . . with angularly-movable bridging contact or contact-carrying member

H01H 31/18 . . . actuated through the movement of one or more insulators

H01H 31/20 . . . . at least one insulator being rotatable about its own geometrical axis

H01H 31/22 . . . wherein the contact or contacts are rectilinearly movable with respect to the carrying member

H01H 31/24 . . with rectilinearly-movable bridging contact

H01H 31/26 . with movable contact that remains electrically connected to one line in open position of switch

H01H 31/28 . . with angularly-movable contact

H01H 31/283 . . . {wherein the contact or contacts are rectilinearly movable with respect to the carrying member}

H01H 2031/286 . . . {wherein the contact is rotatable around its own longitudinal axis}

H01H 31/30 . . . actuated through the movement of one or more insulators

H01H 31/32 . . with rectilinearly-movable contact

H01H 31/34 . with movable contact adapted to engage an overhead transmission line, e.g. for branching

H01H 31/36 . . Contact moved by pantograph

**H01H 33/00 High-tension or heavy-current switches with arc-extinguishing or arc-preventing means**

H01H 33/002 . {Very heavy-current switches (H01H 33/02 to H01H 33/98 take precedence)}

H01H 33/004 . . {making use of superconducting contacts (power cryotrons H01L 39/20; current limitation using superconducting elements H02H 9/023)}

H01H 33/006 . {adapted for interrupting fault currents with delayed zero crossings}

H01H 33/008 . {Pedestal mounted switch gear combinations}

H01H 33/02 . Details

H01H 33/021 . . {Use of solid insulating compounds resistant to the contacting fluid dielectrics and their decomposition products, e.g. to $SF_6$ (insulators or insulating bodies characterised by the insulating materials, selection of materials for their insulating or dielectric properties per se H01B 3/00)}

H01H 33/022 . . {particular to three-phase circuit breakers (synchronous switching H01H 9/563)}

H01H 2033/024 . . . {with a triangular setup of circuit breakers}

H01H 33/025 . . {Terminal arrangements (for vacuum switches H01H 33/6606)}

H01H 33/027 . . {Integrated apparatus for measuring current or voltage}

H01H 2033/028 . . {the cooperating contacts being both actuated simultaneously in opposite directions}

H01H 33/04 . . Means for extinguishing or preventing arc between current-carrying parts (for switches in general H01H 9/30)

H01H 33/045 . . . {for arcs formed during closing}

H01H 33/06 . . . Insulating body insertable between contacts

H01H 33/08 . . . Stationary parts for restricting or subdividing the arc, e.g. barrier plate

H01H 2033/085 . . . . {using a flat arc chute, the width of arc chamber being only slightly greater then thickness of switch blade}

H01H 33/10 . . . . Metal parts

H01H 33/12 . . . Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing horns H01H 33/20)

H01H 33/121 . . . . {Load break switches}

H01H 33/122 . . . . . {both breaker and sectionaliser being enclosed, e.g. in $SF_6$-filled container}

H01H 33/123 . . . . . {in which the auxiliary contact pivots on the main contact-arm and performs a delayed and accelerated movement}

H01H 33/124 . . . . . {the auxiliary contact being a whip contact}

H01H 33/125 . . . . . {comprising a separate circuit breaker (H01H 33/122 takes precedence)}

H01H 33/126 . . . . . {being operated by the distal end of a sectionalising contact arm}

H01H 33/127 . . . . . {movable with a sectionalising contact arm and operated by such movement}

H01H 33/128 . . . . . {being operated by a separate mechanism interlocked with the sectionalising mechanism}

H01H 33/14 . . . Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc

H01H 33/143 . . . . {of different construction or type}

H01H 2033/146 . . . . {using capacitors, e.g. for the voltage division over the different switches}

H01H 33/16 . . . Impedances connected with contacts

H01H 33/161 . . . . {Variable impedances}

H01H 33/162 . . . . . {Liquid resistors}

H01H 2033/163 . . . . . {using PTC elements}

H01H 33/164 . . . . {the impedance being inserted in the circuit by blowing the arc onto an auxiliary electrode}

H01H 33/165 . . . . {Details concerning the impedances (H01H 33/161 takes precedence)}

H01H 33/166 . . . . {the impedance being inserted only while closing the switch}

H01H 33/167 . . . . {the impedance being inserted only while opening the switch}

H01H 33/168 . . . . {the impedance being inserted both while closing and while opening the switch}

H01H 33/18 . . . using blow-out magnet {(for vacuum switches H01H 33/664; pressure-generated arcs rotated by a magnetic field H01H 33/982)}

H01H 33/182 . . . . {using permanent magnets (H01H 33/187 takes precedence)}

H01H 33/185 . . . . {using magnetisable elements associated with the contacts (H01H 33/187 takes precedence)}

H01H 33/187 . . . . {comprising a hollow annular arc runner and a central contact between which a radially drawn arc rotates}

H01H 33/20 . . . using arcing horns (using blow-out magnet H01H 33/18; arcing horns per se H01T 4/14)

H01H 33/22 . . . Selection of fluids for arc-extinguishing

H01H 33/24 . . Means for preventing discharge to non-current-carrying parts, e.g. using corona ring

H01H 33/245 . . . {using movable field electrodes}

H01H 33/26 . . Means for detecting the presence of an arc or other discharge

H01H 33/28 . . Power arrangements internal to the switch for operating the driving mechanism

H01H 33/285 . . . {using electro-dynamic repulsion (assisting the movement of pistons by accelerating coil H01H 33/882)}

H01H 33/30 . . . using fluid actuator

H01H 33/302 . . . . {for fluid insulated switchgear, wherein the insulating fluid is also the working fluid}

H01H 33/304 . . . . {Working fluid supplies}

H01H 2033/306 . . . . {monitoring the pressure of the working fluid, e.g. for protection measures}

H01H 2033/308 . . . . {comprising control and pilot valves}

H01H 33/32 . . . . pneumatic

H01H 33/34 . . . . hydraulic

H01H 33/36 . . . using dynamo-electric motor (for storing energy in a spring motor H01H 33/40)

H01H 33/38 . . . using electromagnet (for storing energy in a spring motor H01H 33/40)

H01H 33/40 . . . using spring motor

H01H 33/42 . . Driving mechanisms

H01H 33/423 . . . {making use of an electromagnetic wave communication}

H01H 2033/426 . . . {Details concerning the connection of the isolating driving rod to a metallic part}

H01H 33/44 . . Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 33/59)

H01H 33/46 . . Interlocking mechanisms

H01H 33/48 . . . for interlocking between casing or cover and mechanism for operating contacts

H01H 33/50 . . . for interlocking two or more parts of the mechanism for operating contacts

H01H 33/52 . . . for interlocking two or more switches

H01H 33/53 . . Cases (for switchgear H02B 1/26); Reservoirs, tanks, piping or valves, for arc-extinguishing fluid; Accessories therefor, e.g. safety arrangements, pressure relief devices

H01H 33/55 . . . Oil reservoirs or tanks; Lowering means therefor (associated with withdrawal mechanism for isolation of switch H02B 11/08)

H01H 33/555 . . . . {Protective arrangements responsive to abnormal fluid pressure, liquid level or liquid displacement, e.g. Buchholz relays (circuits H02H 5/08; specially adapted for transformers H01F 27/402)}

H01H 33/56 . . . Gas reservoirs

H01H 33/561 . . . . {composed of different independent pressurised compartments put in communication only after their assemblage}

H01H 33/562 . . . . {Means for avoiding liquefaction or for disposing of liquefaction products}

H01H 33/563 . . . . {comprising means for monitoring the density of the insulating gas}

H01H 33/565 . . . . {Gas-tight sealings for moving parts penetrating into the reservoir}

H01H 2033/566 . . . . {Avoiding the use of $SF_6$}

H01H 2033/567 . . . . {Detection of decomposition products of the gas}

H01H 2033/568 . . . . {with overpressure release, e.g. rupture membranes}
H01H 33/57 . . . Recuperation of liquid or gas
H01H 33/58 . . . Silencers for suppressing noise of switch operation
H01H 33/59 . . Circuit arrangements not adapted to a particular application of the switch and not otherwise provided for, e.g. for ensuring operation of the switch at a predetermined point in the ac cycle
H01H 33/593 . . . {for ensuring operation of the switch at a predetermined point of the ac cycle (for multipolar switches H01H 9/563)}
H01H 33/596 . . . {for interrupting dc}
H01H 33/60 . Switches wherein the means for extinguishing or preventing the arc do not include separate means for obtaining or increasing flow of arc-extinguishing fluid
H01H 33/62 . . wherein the break is in air at atmospheric pressure, e.g. in open air
H01H 33/64 . . wherein the break is in gas (in air at atmospheric pressure H01H 33/62; vacuum switches H01H 33/66)
H01H 33/66 . . Vacuum switches
H01H 33/6606 . . . {Terminal arrangements}
H01H 2033/6613 . . . . {Cooling arrangements directly associated with the terminal arrangements}
H01H 33/662 . . . Housings or protective screens
H01H 33/66207 . . . . {Specific housing details, e.g. sealing, soldering or brazing}
H01H 2033/66215 . . . . . {Details relating to the soldering or brazing of vacuum switch housings}
H01H 2033/66223 . . . . . {Details relating to the sealing of vacuum switch housings}
H01H 2033/6623 . . . . . {Details relating to the encasing or the outside layers of the vacuum switch housings}
H01H 33/66238 . . . . {Specific bellows details}
H01H 2033/66246 . . . . . {Details relating to the guiding of the contact rod in vacuum switch belows}
H01H 2033/66253 . . . . . {Details relating to the prevention of unwanted rotation of the contact rod in vacuum switch bellows}
H01H 33/66261 . . . . {Specific screen details, e.g. mounting, materials, multiple screens or specific electrical field considerations}
H01H 2033/66269 . . . . . {Details relating to the materials used for screens in vacuum switches}
H01H 2033/66276 . . . . . {Details relating to the mounting of screens in vacuum switches}
H01H 2033/66284 . . . . . {Details relating to the electrical field properties of screens in vacuum switches}
H01H 2033/66292 . . . . . {Details relating to the use of multiple screens in vacuum switches}
H01H 33/664 . . . Contacts; Arc-extinguishing means, e.g. arcing rings
H01H 33/6641 . . . . {making use of a separate coil}
H01H 33/6642 . . . . {having cup-shaped contacts, the cylindrical wall of which being provided with inclined slits to form a coil}
H01H 33/6643 . . . . {having disc-shaped contacts subdivided in petal-like segments, e.g. by helical grooves}

H01H 33/6644 . . . . {having coil-like electrical connections between contact rod and the proper contact}

H01H 33/6645 . . . . . {in which the coil like electrical connections encircle at least once the contact rod}

H01H 33/6646 . . . . {having non flat disc-like contact surface}

H01H 33/6647 . . . . {having fixed middle contact and two movable contacts}

H01H 2033/6648 . . . . {Contacts containing flexible parts, e.g. to improve contact pressure}

H01H 33/666 . . . Operating arrangements

H01H 33/6661 . . . . {Combination with other type of switch, e.g. for load break switches (H01H 33/143, H01H 33/6662 take precedence)}

H01H 33/6662 . . . . {using bistable electromagnetic actuators, e.g. linear polarised electromagnetic actuators}

H01H 33/6664 . . . . {with pivoting movable contact structure}

H01H 2033/6665 . . . . {Details concerning the mounting or supporting of the individual vacuum bottles}

H01H 2033/6667 . . . . {Details concerning lever type driving rod arrangements}

H01H 2033/6668 . . . . {with a plurality of interruptible circuit paths in single vacuum chamber}

H01H 33/668 . . . Means for obtaining or monitoring the vacuum

H01H 33/6683 . . . . {by gettering}

H01H 2033/6686 . . . . {by emitting and receiving reflected sound or ultrasound signals}

H01H 33/68 . . Liquid-break switches, e.g. oil-break

H01H 33/70 . Switches with separate means for directing, obtaining, or increasing flow of arc-extinguishing fluid

H01H 33/7007 . . {wherein the flow is a function of the current being interrupted}

H01H 33/7015 . . {characterised by flow directing elements associated with contacts (electrical or mechanical properties of the contact system H01H 1/385)}

H01H 33/7023 . . . {characterised by an insulating tubular gas flow enhancing nozzle (H01H 33/7038 takes precedence)}

H01H 33/703 . . . . {having special gas flow directing elements, e.g. grooves, extensions}

H01H 33/7038 . . . {characterised by a conducting tubular gas flow enhancing nozzle}

H01H 33/7046 . . . . {having special gas flow directing elements, e.g. grooves, extensions (H01H 33/7053 takes precedence)}

H01H 33/7053 . . . . {having a bridging element around two hollow tubular contacts}

H01H 33/7061 . . . {characterised by use of special mounting means (H01H 33/7023 to H01H 33/7038 take precedence)}

H01H 33/7069 . . . {characterised by special dielectric or insulating properties or by special electric or magnetic field control properties (H01H 33/7023 to H01H 33/7061 take precedence)}

H01H 33/7076 . . . {characterised by the use of special materials (H01H 33/7023 to H01H 33/7069 take precedence)}

H01H 33/7084 . . . {characterised by movable parts influencing the gas flow (H01H 33/7023 to H01H 33/7076 take precedence)}

H01H 33/7092 . . . {characterised by several arcing chambers in series (H01H 33/7023 to H01H 33/7084 take precedence)}

H01H 33/72 . . having stationary parts for directing the flow of arc-extinguishing fluid, e.g. arc-extinguishing chamber

H01H 33/73 . . . wherein the break is in air at atmospheric pressure, e.g. in open air

H01H 33/74 . . . wherein the break is in gas (in air at atmospheric pressure H01H 33/73)

H01H 33/75 . . . Liquid-break switches, e.g. oil-break

H01H 33/76 . . wherein arc-extinguishing gas is evolved from stationary parts; Selection of material therefor

H01H 33/765 . . . {the gas-evolving material being incorporated in the contact material}

H01H 33/77 . . . wherein the break is in air at atmospheric pressure

H01H 33/78 . . . wherein the break is in gas (in air at atmospheric pressure H01H 33/77)

H01H 33/80 . . flow of arc-extinguishing fluid from a pressure source being controlled by a valve

H01H 33/82 . . . the fluid being air or gas

H01H 33/83 . . . . wherein the contacts are opened by the flow of air or gas

H01H 33/84 . . . the fluid being liquid, e.g. oil

H01H 33/85 . . . . wherein the contacts are opened by the flow of liquid

H01H 33/86 . . the flow of arc-extinguishing fluid under pressure from the contact space being controlled by a valve

H01H 33/88 . . the flow of arc-extinguishing fluid being produced or increased by movement of pistons or other pressure-producing parts

H01H 33/882 . . . {the movement being assisted by accelerating coils}

H01H 33/884 . . . {with variable-area piston}

H01H 33/886 . . . {by movement of rotating pistons}

H01H 2033/888 . . . {Deflection of hot gasses and arcing products}

H01H 33/90 . . . this movement being effected by or in conjunction with the contact-operating mechanism

H01H 33/901 . . . . {making use of the energy of the arc or an auxiliary arc}

H01H 2033/902 . . . . . {with the gases from hot space and compression volume following different paths to arc space or nozzle, i.e. the compressed gases do not pass through hot volume}

H01H 33/903 . . . . . {and assisting the operating mechanism}

H01H 33/904 . . . . {characterised by the transmission between operating mechanism and piston or movable contact}

H01H 33/905 . . . . {the compression volume being formed by a movable cylinder and a semi-mobile piston}

H01H 2033/906 . . . . {with pressure limitation in the compression volume, e.g. by valves or bleeder openings}

H01H 2033/907 . . . . {using tandem pistons, e.g. several compression volumes being modified in conjunction or sequential}

H01H 2033/908 . . . . {using valves for regulating communication between e.g. arc space, hot volume, compression volume, surrounding volume}

H01H 33/91 . . . . the arc-extinguishing fluid being air or gas

H01H 2033/912 . . . . . {Liquified gases, e.g. liquified $SF_6$}

H01H 33/92 . . . . the arc-extinguishing fluid being liquid, e.g. oil

H01H 33/94 . . . this movement being effected solely due to the pressure caused by the arc itself or by an auxiliary arc {(H01H 33/903 takes precedence)}

H01H 33/95 . . . . the arc-extinguishing fluid being air or gas

H01H 33/96 . . . . the arc-extinguishing fluid being liquid, e.g. oil

H01H 33/98 . . the flow of arc-extinguishing fluid being initiated by an auxiliary arc or a section of the arc, without any moving parts for producing or increasing the flow {(H01H 33/901 takes precedence)}

H01H 33/982 . . . {in which the pressure-generating arc is rotated by a magnetic field}

**H01H 35/00** **Switches operated by change of a physical condition** (operated by change of magnetic or electric field H01H 36/00; thermally-actuated switches H01H 37/00; time switches H01H 43/00; relays H01H 45/00 to H01H 61/00; sensing elements for providing continuous conversion of a variable into mechanical displacement G01)

**NOTE**

A switching device is classified according to that physical condition which, when changed, acts as input to the device, e.g. external explosion causing pressure wave to act upon switch is classified in group H01H 35/24, an explosion produced within the switch in group H01H 37/00 if initiated by heat, in group H01H 39/00 if initiated electrically, and in group H01H 35/14 if initiated by an external blow.

H01H 35/003 . {Switches operated by other part of human body than hands (push-button switches H01H 13/16; slide switches H01H 15/20; cord switches H01H 17/10; other switches H01H 19/16 and H01H 21/26)}

H01H 35/006 . {Switches operated by mechanical overload condition, e.g. transmitted force or torque becoming too high}

H01H 35/02 . Switches operated by change of position, inclination or orientation of the switch itself in relation to gravitational field (tilting mercury container H01H 29/20; change of position due to change of liquid level H01H 35/18; {specially adapted for electromechanical clocks or watches G04C 3/002})

H01H 35/022 . . {the switch being of the reed switch type}

H01H 35/025 . . {the switch being discriminative in different directions}

H01H 35/027 . . {the inertia mass activating the switch mechanically, e.g. through a lever}

H01H 35/06 . Switches operated by change of speed (operated by change of fluid flow H01H 35/24)

H01H 35/10 . . Centrifugal switches (level of mercury displaced by centrifugal action H01H 29/26)

H01H 35/12 . . operated by reversal of direction of movement

H01H 35/14 . Switches operated by change of acceleration, e.g. by shock or vibration, inertia switch {(wherein the liquid constitutes a contact of the switch H01H 29/002)}

H01H 35/141 . . {Details}

H01H 35/142 . . . {Damping means to avoid unwanted response}

H01H 35/143 . . . {Resetting means}

H01H 35/144 . . {operated by vibration}

H01H 35/145 . . {operated by a particular acceleration-time function}

H01H 35/146 . . {operated by plastic deformation or rupture of structurally associated elements}

H01H 35/147 . . {the switch being of the reed switch type}

H01H 35/148 . . {making use of a rolamite sensor}

H01H 35/18 . Switches operated by change of liquid level or of liquid density, e.g. float switch (wherein the liquid constitutes a contact of the switch H01H 29/00; by magnet carried on a float H01H 36/02)

H01H 35/183 . . {making use of a thermal switch}

H01H 35/186 . . {making use of a cable suspended floater containing an inclination sensing switch}

H01H 35/24 . Switches operated by change of fluid pressure, by fluid pressure waves, or by change of fluid flow (wherein the change of pressure is caused by change of temperature H01H 37/36)

H01H 35/242 . . {operated by one particular pressure-time function}

H01H 35/245 . . {actuated by the deformation of a body of elastic material}

H01H 35/247 . . {the switch being of the reed switch type}

H01H 35/26 . . Details

H01H 35/2607 . . . {Means for adjustment of "ON" or "OFF" operating pressure (means for adjustment of "ON" or "OFF" operating temperature of thermally actuated switches by varying bias on the thermal element due to a separate spring H01H 37/18)}

H01H 35/2614 . . . . {by varying the bias on the pressure sensitive element}

H01H 35/2621 . . . . . {the bias being magnetic}

H01H 35/2628 . . . . {by varying the relative position of switch-casing and pressure sensitive element}

H01H 35/2635 . . . . {by adjustment of a motion transmitting system}

H01H 35/2642 . . . . . {comprising a lost-motion connection}

H01H 35/265 . . . . {by adjustment of one of the co-operating contacts}

H01H 35/2657 . . . {with different switches operated at substantially different pressures}

H01H 35/2664 . . . . {making use of a balance plate pivoting about different axes}

H01H 35/2671 . . . {Means to detect leaks in the pressure sensitive element}

H01H 35/2678 . . . {Means to isolate oscillating component of pressure}

H01H 35/2685 . . . {Means to protect pressure sensitive element against over pressure}

H01H 35/2692 . . . {comprising pneumatic snap-action}

H01H 35/28 . . . Compensation for variation of ambient pressure or temperature

H01H 35/30 . . . Means for transmitting pressure to pressure-responsive operating part, e.g. by capsule and capillary tube

H01H 35/32 . . actuated by bellows

H01H 35/34 . . actuated by diaphragm

H01H 35/343 . . . {by snap acting diaphragm}

H01H 35/346 . . . {in which the movable contact is formed or directly supported by the diaphragm}

H01H 35/36 . . actuated by curled flexible tube, e.g. Bourdon tube

H01H 35/38 . . actuated by piston and cylinder

H01H 35/40 . . actuated by devices allowing continual flow of fluid, e.g. vane

H01H 35/405 . . . {the switch being of the reed switch type}

H01H 35/42 . Switches operated by change of humidity

**H01H 36/00** **Switches actuated by change of magnetic field or of electric field, e.g. by change of relative position of magnet and switch, by shielding {**(specially adapted for electromechanical clocks or watches G04C 3/004)**}**

H01H 36/0006 . {Permanent magnet actuating reed switches (H01H 35/147 takes precedence)}

H01H 36/0013 . . {characterised by the co-operation between reed switch and permanent magnet; Magnetic circuits}

H01H 36/002 . . . {Actuation by moving ferromagnetic material, switch and magnet being fixed}

H01H 36/0026 . . . {comprising a biasing, helping or polarising magnet}

H01H 36/0033 . . {Mountings; Housings; Connections}

H01H 36/004 . . {push-button-operated, e.g. for keyboards}

H01H 36/0046 . . {Limit switches, also fail-safe operation or anti-tamper considerations}

H01H 36/0053 . . {periodically operated}

H01H 36/006 . . {comprising a plurality of reed switches, e.g. selectors or joystick-operated}

H01H 36/0066 . . {magnet being removable, e.g. part of key pencil}

H01H 36/0073 . {actuated by relative movement between two magnets}

H01H 36/008 . {Change of magnetic field wherein the magnet and switch are fixed, e.g. by shielding or relative movements of armature (for reed switches H01H 36/002)}

H01H 2036/0086 . {Movable or fixed contacts formed by permanent magnets}

H01H 2036/0093 . {Micromechanical switches actuated by a change of the magnetic field}

H01H 36/02 . actuated by movement of a float carrying a magnet

**H01H 37/00** **Thermally-actuated switches** (electrothermal relays operated by electrical input H01H 61/00; protective switches with electrothermal release or actuation H01H 73/00 to H01H 83/00)

H01H 37/002 . {combined with protective means}

H01H 37/004 . {with thermal image}

H01H 37/006 . {with different switches operated at substantially different temperatures}

H01H 2037/008 . {Micromechanical switches operated thermally}

H01H 37/02 . Details

H01H 37/04 . . Bases; Housings; Mountings {(H01H 37/5427 takes precedence)}

H01H 37/043 . . . {Mountings on controlled apparatus}

H01H 2037/046 . . . {being soldered on the printed circuit to be protected}

H01H 37/06 . . . to facilitate replacement, e.g. cartridge housing

H01H 37/08 . . Indicators; Distinguishing marks

H01H 37/10 . . Compensation for variation of ambient temperature or pressure

H01H 37/12 . . Means for adjustment of "ON" or "OFF" operating temperature

H01H 37/14 . . . by anticipatory electric heater

H01H 37/16 . . . by varying the proportion of input heat received by the thermal element, e.g. by displacement of a shield

H01H 37/18 . . . by varying bias on the thermal element due to a separate spring

H01H 37/20 . . . by varying the position of the thermal element in relation to switch base or casing

H01H 37/22 . . . by adjustment of a member transmitting motion from the thermal element to contacts or latch

H01H 37/24 . . . by adjustment of position of the movable contact on its driving member

H01H 37/26 . . . by adjustment of abutment for "OFF" position of the movable contact

H01H 37/28 . . . by adjustment of the position of the fixed contact

H01H 37/30 . . . by varying the position of the contact unit in relation to switch base or casing

H01H 37/32 . . Thermally-sensitive members (temperature responsive elements in general G01K)

H01H 37/323 . . . {making use of shape memory materials (in thermal relays H01H 61/0107; release mechanism H01H 71/145; treatment of SMF alloys C22F 1/006; in general G01K 5/483, G12B 1/00; for control of temperature G05D 23/024)}

H01H 2037/326 . . . {with radiative heat transfer to the switch, e.g. special absorption surfaces}

H01H 37/34 . . . Means for transmitting heat thereto, e.g. capsule remote from contact member

H01H 37/36 . . . actuated due to expansion or contraction of a fluid with or without vaporisation (the fluid forming a contact of the switch H01H 29/04, H01H 29/30)

H01H 37/38 . . . . with bellows

H01H 37/40 . . . . with diaphragm

H01H 37/42 . . . . with curled flexible tube, e.g. Bourdon tube

H01H 37/44 . . . . with piston and cylinder

H01H 37/46 . . . actuated due to expansion or contraction of a solid (deflection of a bimetallic element H01H 37/52)

H01H 37/48 . . . . with extensible rigid rods or tubes

H01H 37/50 . . . . with extensible wires under tension

H01H 37/52 . . . actuated due to deflection of bimetallic element

H01H 37/521 . . . . {comprising a plurality of bimetals acting in the same direction}

H01H 2037/523 . . . . {using a corrugated bimetal}

H01H 2037/525 . . . . {Details of manufacturing of the bimetals, e.g. connection to non bimetallic elements or insulating coatings}

H01H 2037/526 . . . . {Materials for bimetals}

H01H 2037/528 . . . . {the bimetallic element being composed of more than two layers}

H01H 37/54 . . . . wherein the bimetallic element is inherently snap acting

H01H 37/5409 . . . . . {Bistable switches; Resetting means}

H01H 37/5418 . . . . . {using cantilevered bimetallic snap elements}

H01H 37/5427 . . . . . {encapsulated in sealed miniaturised housing}

H01H 37/5436 . . . . . {mounted on controlled apparatus}
H01H 2037/5445 . . . . . {with measures for avoiding slow break of contacts during the creep phase of the snap bimetal}
H01H 2037/5454 . . . . . {with separate spring biasing the bimetal snap element against the heat transfer surface}
H01H 2037/5463 . . . . . {the bimetallic snap element forming part of switched circuit}
H01H 2037/5472 . . . . . {having an omega form, e.g. the bimetallic snap element having a ring shape with a central tongue}
H01H 2037/5481 . . . . . {the bimetallic snap element being mounted on the contact spring}
H01H 2037/549 . . . . . {Details of movement transmission between bimetallic snap element and contact}
H01H 37/56 . . . . having spirally wound or helically wound bimetallic element
H01H 37/58 . . . actuated due to thermally controlled change of magnetic permeability
H01H 37/585 . . . . {the switch being of the reed switch type}
H01H 37/60 . . Means for producing snap action (inherent in bimetallic element H01H 37/54; caused by a magnet H01H 37/66)
H01H 37/62 . . Means other than thermal means for introducing a predetermined time delay
H01H 37/64 . . Contacts
H01H 37/66 . . . Magnetic reinforcement of contact pressure; Magnet causing snap action
H01H 37/68 . . . sealed in evacuated or gas-filled tube
H01H 37/70 . . . Resetting means {(H01H 37/5409 takes precedence)}
H01H 2037/705 . . . . {wherein the switch cannot be closed when the temperature is above a certain value}
H01H 37/72 . Switches in which the opening movement and the closing movement of a contact are effected respectively by heating and cooling or vice versa
H01H 37/74 . Switches in which only the opening movement or only the closing movement of a contact is effected by heating or cooling (for the electrical protection of electric lines or electric apparatus H01H 73/00 to H01H 83/00)
H01H 37/76 . . Contact member actuated by melting of fusible material, actuated due to burning of combustible material or due to explosion of explosive material (fuses H01H 85/00)
H01H 37/761 . . . {with a fusible element forming part of the switched circuit (H01H 37/767 takes precedence)}
H01H 2037/762 . . . . {using a spring for opening the circuit when the fusible element melts}
H01H 2037/763 . . . . . {the spring being a blade spring}
H01H 37/764 . . . {in which contacts are held closed by a thermal pellet}
H01H 37/765 . . . . {using a sliding contact between a metallic cylindrical housing and a central electrode}
H01H 37/766 . . . . {using a bridging contact}
H01H 37/767 . . . {Normally open}
H01H 2037/768 . . . {characterised by the composition of the fusible material}
H01H 2037/769 . . . {characterised by the composition of insulating fusible materials, e.g. for use in the thermal pellets}

**H01H 39/00** **Switching devices actuated by an explosion produced within the device and initiated by an electric current**

H01H 39/002 . {provided with a cartridge-magazine}

H01H 39/004 . {Closing switches}

H01H 39/006 . {Opening by severing a conductor}

H01H 2039/008 . {using the switch for a battery cutoff}

**H01H 41/00** **Switches providing a selected number of consecutive operations of the contacts by a single manual actuation of the operating part** (for telephone communication H04M 1/26)

H01H 41/04 . Switches without means for setting or mechanically storing a multidigit number

H01H 41/06 . . dial or slide operated

H01H 41/08 . . keyboard operated

H01H 41/10 . Switches with means for setting or mechanically storing a multidigit number

H01H 41/12 . . dial or slide operated

H01H 41/14 . . keyboard operated

**H01H 43/00** **Time or time-programme switches providing a choice of time intervals for executing one or more switching actions and automatically terminating their operations after the programme is completed** (clocks with attached or built-in means operating any device at preselected times or after preselected time-intervals G04C 23/00; {apparatus which can be set and started to measure-off predetermined intervals G04F 3/06}; programme-control systems G05B 19/00)

H01H 43/005 . {with timing of the actuation of contacts due to a part rotating at variable speed}

H01H 43/02 . Details

H01H 43/022 . . {Bases; Housings; Mountings}

H01H 43/024 . . {Terminal arrangements (in general H01H 1/58)}

H01H 43/026 . . {Contact arrangements}

H01H 43/028 . . {Means for manually actuating the contacts or interfering with the cooperation between timer mechanism and contacts}

H01H 43/04 . . Means for time setting

H01H 43/06 . . . comprising separately adjustable parts for each programme step, e.g. with tappets

H01H 43/065 . . . . {using cams or discs supporting a plurality of individually programmable elements (Schaltreiter)}

H01H 43/08 . . . comprising an interchangeable programme part which is common for all programme steps, e.g. with a punched card

H01H 43/10 . with timing of actuation of contacts due to a part rotating at substantially constant speed

H01H 43/101 . . {Driving mechanisms}

H01H 43/102 . . . {using a pawl and ratchet wheel mechanism}

H01H 43/103 . . {stopping automatically after one preselected time interval}

H01H 43/104 . . . {by mechanical coupling device}

H01H 43/105 . . . {by electromechanical coupling device}

H01H 43/106 . . {Manual programme selecting means}

H01H 2043/107 . . . {Bidirectional selecting means, e.g. the program selecting knob being turnable in both directions}

H01H 2043/108 . . {where at least some contacts of electromechanical timer give instructions to electronic timer and/or the timing motor is under control of electronic timer, e.g. hybrid timer}

H01H 43/12 . . stopping automatically after a single cycle of operation

H01H 43/121 . . . {using a drum}

H01H 43/122 . . . . {with provision for adjustment of the intervals by a non-rotating member}

H01H 43/124 . . . {using a disc}

H01H 43/125 . . . {using a cam}

H01H 43/127 . . . . {with provision for adjustment of the intervals by means carried by the cam}

H01H 43/128 . . . . {with provision for adjustment of the intervals by a non-rotating member}

H01H 43/14 . . . wherein repetition of operation necessitates resetting of time intervals

H01H 43/16 . . stopping automatically after a predetermined plurality of cycles of operation

H01H 43/24 . with timing of actuation of contacts due to a non-rotatable moving part

H01H 43/26 . . the actuation being produced by a substance flowing due to gravity, e.g. sand, water

H01H 43/28 . . the actuation being produced by a part, the speed of which is controlled by fluid-pressure means, e.g. by piston and cylinder

H01H 43/285 . . . {adjusting the time interval by means of an adjustable orifice, e.g. needle valve}

H01H 43/30 . with timing of actuation of contacts due to thermal action

H01H 43/301 . . {based on the expansion or contraction of a material (thermometers based on the expansion or contraction of a material G01K 5/00)}

H01H 43/302 . . . {of solid bodies}

H01H 43/303 . . . . {of one single solid body, e.g. hot wire}

H01H 43/304 . . . . {of two bodies expanding or contracting in a different manner, e.g. bimetallic elements}

H01H 43/305 . . . . . {actuating the contacts by commanding a mechanical device, e.g. thermal motor}

H01H 43/306 . . . {of liquids}

H01H 43/307 . . . {of gases}

H01H 43/308 . . {based on the change of electrical properties, e.g. thermistors (thermometers based on the use of electric or magnetic elements directly sensitive to heat G01K 7/00)}

H01H 43/309 . . {based on the change of magnetic properties (thermometers based on the use of electric or magnetic elements directly sensitive to heat G01K 7/00)}

H01H 43/32 . with timing of actuation of contacts due to electrolytic processes; with timing of actuation of contacts due to chemical processes

H01H 43/322 . . {Electrolytic decomposition of liquids, e.g. actuation of contacts due to action of the products of reaction}

H01H 43/325 . . {Electrolytic decomposition of solid bodies, e.g. action by rupture}

H01H 43/327 . . {acting by coulometric transfer of material}

**Relays**

**H01H 45/00** **Details of relays** (electric circuit arrangements H01H 47/00; of electromagnetic relays H01H 50/00; details of electrically-operated selector switches H01H 63/00; {testing of relays G01R 31/00; relays for emergency protective circuit arrangements H02H})

H01H 45/02 . Bases; Casings; Covers (frames for mounting two or more relays or for mounting a relay and another electric component H02B 1/01, H04Q 1/08, H05K)

H01H 45/04 . . Mounting complete relay or separate parts of relay on a base or inside a case

H01H 45/06 . . having windows; Transparent cases or covers

H01H 45/08 . Indicators; Distinguishing marks

H01H 45/10 . Electromagnetic or electrostatic shielding (casings H01H 45/02; {screening in general H05K 9/00})

H01H 45/12 . Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013)

H01H 45/14 . Terminal arrangements

**H01H 47/00** **Circuit arrangements not adapted to a particular application of the relay and designed to obtain desired operating characteristics or to provide energising current** (circuit arrangements for electro-magnets in general H01F 7/18)

H01H 47/001 . {Functional circuits, e.g. logic, sequencing, interlocking circuits}

H01H 47/002 . {Monitoring or fail-safe circuits}

H01H 2047/003 . . {Detecting welded contacts and applying weld break pulses to coil}

H01H 47/004 . . {using plural redundant serial connected relay operated contacts in controlled circuit}

H01H 47/005 . . . {Safety control circuits therefor, e.g. chain of relays mutually monitoring each other}

H01H 2047/006 . . {Detecting unwanted movement of contacts and applying pulses to coil for restoring to normal status}

H01H 47/007 . {with galvanic isolation between controlling and controlled circuit, e.g. transformer relay}

H01H 2047/008 . {with a drop in current upon closure of armature or change of inductance}

H01H 2047/009 . {with self learning features, e.g. measuring the attracting current for a relay and memorising it}

H01H 47/02 . for modifying the operation of the relay

H01H 2047/025 . . {with taking into account of the thermal influences, e.g. change in resistivity of the coil or being adapted to high temperatures}

H01H 47/04 . . for holding armature in attracted position, e.g. when initial energising circuit is interrupted; for maintaining armature in attracted position, e.g. with reduced energising current {(with switching regulator H01H 47/325)}

H01H 47/043 . . . {making use of an energy accumulator (for bistable relays H01H 47/226)}

H01H 2047/046 . . . {with measuring of the magnetic field, e.g. of the magnetic flux, for the control of coil current}

H01H 47/06 . . . by changing number of serially-connected turns or windings

H01H 47/08 . . . by changing number of parallel-connected turns or windings

H01H 47/10 . . . by switching-in or -out impedance external to the relay winding

H01H 47/12 . . for biasing the electromagnet

H01H 47/14 . . for differential operation of the relay

H01H 47/16 . . for conjoint, e.g. additive, operation of the relay

H01H 47/18 . . for introducing delay in the operation of the relay (short-circuited conducting sleeves, bands or discs H01H 50/46)

H01H 47/20 . . for producing frequency-selective operation of the relay

H01H 47/22 . for supplying energising current for relay coil

H01H 47/223 . . {adapted to be supplied by AC}

H01H 47/226 . . {for bistable relays}

H01H 47/24 . . having light-sensitive input

H01H 47/26 . . having thermo-sensitive input

H01H 47/28 . . Energising current supplied by discharge tube

H01H 47/30 . . . by gas-filled discharge tube

H01H 47/32 . . Energising current supplied by semiconductor device

H01H 47/325 . . . {by switching regulator}

H01H 47/34 . . Energising current supplied by magnetic amplifier {(magnetic amplifiers H03F 9/00)}

H01H 47/36 . . Relay coil or coils forming part of a bridge circuit

**H01H 49/00** **Apparatus or processes specially adapted to the manufacture of relays or parts thereof**

**H01H 50/00** **Details of electromagnetic relays** ({H01H 51/28 takes precedence;} electric circuit arrangements H01H 47/00; details of electrically-operated select or switches H01H 63/00; {testing of relays G01R 31/00; electromagnets in general H01F 7/06; relays for emergency protective circuit arrangements H02H})

H01H 50/002 . {particular to three-phase electromagnetic relays (synchronous switching H01H 9/563)}

H01H 50/005 . {using micromechanics}

H01H 2050/007 . . {Relays of the polarised type, e.g. the MEMS relay beam having a preferential magnetisation direction}

H01H 50/02 . Bases; Casings; Covers (frames for mounting two or more relays or for mounting a relay and another electric component H02B 1/01, H04Q 1/08, H05K)

H01H 50/021 . . {structurally combining a relay and an electronic component, e.g. varistor, RC circuit (auxiliary switch inserting resistor during closure H01H 50/543)}

H01H 50/023 . . {Details concerning sealing, e.g. sealing casing with resin (in general H01H 9/04)}

H01H 2050/025 . . . {containing inert or dielectric gasses, e.g. $SF_6$, for arc prevention or arc extinction}

H01H 50/026 . . {Details concerning isolation between driving and switching circuit}

H01H 2050/028 . . {Means to improve the overall withstanding voltage, e.g. creepage distances}

H01H 50/04 . . Mounting complete relay or separate parts of relay on a base or inside a case

H01H 50/041 . . . {Details concerning assembly of relays}

H01H 50/042 . . . . {Different parts are assembled by insertion without extra mounting facilities like screws, in an isolated mounting part, e.g. stack mounting on a coil-support}

H01H 50/043 . . . . {Details particular to miniaturised relays (H01H 50/042 takes precedence)}

H01H 2050/044 . . . . . {Special measures to minimise the height of the relay}

H01H 50/045 . . . . {Details particular to contactors (H01H 50/042 takes precedence)}

H01H 2050/046 . . . . {Assembling parts of a relay by using snap mounting techniques}

H01H 50/047 . . . {Details concerning mounting a relays}

H01H 50/048 . . . . {Plug-in mounting or sockets}

H01H 2050/049 . . . {Assembling or mounting multiple relays in one common housing}

H01H 50/06 . . having windows; Transparent cases or covers

H01H 50/08 . Indicators; Distinguishing marks

H01H 50/10 . Electromagnetic or electrostatic shielding (casings H01H 50/02; {screening in general H05K 9/00})

H01H 50/12 . Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013)

H01H 50/14 . Terminal arrangements {(for coils H01H 50/443)}

H01H 50/16 . Magnetic circuit arrangements (cores, yokes, or armatures in general H01F 3/00; magnets in general H01F 7/00)

H01H 50/163 . . {Details concerning air-gaps, e.g. anti-remanence, damping, anti-corrosion}

H01H 2050/166 . . {wherein the magnetic circuit parts are molded in a magnetic plastic material}

H01H 50/18 . . Movable parts of magnetic circuits, e.g. armature

H01H 50/20 . . . movable inside coil and substantially lengthwise with respect to axis thereof; movable coaxially with respect to coil

H01H 50/22 . . . . wherein the magnetic circuit is substantially closed

H01H 2050/225 . . . . . {with yoke and armature formed by identical stacked laminates, e.g. punched in one and the same tool}

H01H 50/24 . . . Parts rotatable or rockable outside coil

H01H 50/26 . . . . Parts movable about a knife edge

H01H 50/28 . . . . Parts movable due to bending of a blade spring or reed

H01H 50/30 . . . Mechanical arrangements for preventing or damping vibration or shock, e.g. by balancing of armature

H01H 50/305 . . . . {damping vibration due to functional movement of armature (in air-gap H01H 50/163)}

H01H 50/32 . . . Latching movable parts mechanically

H01H 50/321 . . . . {the mechanical latch being controlled directly by the magnetic flux or part of it}

H01H 50/323 . . . . {for interlocking two or more relays (in general H01H 9/26)}

H01H 2050/325 . . . . . {Combined electrical and mechanical interlocking, e.g. usually for auxiliary contacts}

H01H 50/326 . . . . {with manual intervention, e.g. for testing, resetting or mode selection}

H01H 2050/328 . . . . . {with manual locking means having three positions, e.g. on-off-automatic}

H01H 50/34 . . . Means for adjusting limits of movement; Mechanical means for adjusting returning force

H01H 50/36 . . Stationary parts of magnetic circuit, e.g. yoke

H01H 2050/362 . . . {Part of the magnetic circuit conducts current to be switched or coil current, e.g. connector and magnetic circuit formed of one single part}

H01H 2050/365 . . . {formed from a single sheet of magnetic material by punching, bending, plying}

H01H 2050/367 . . . {Methods for joining separate core and L-shaped yoke}

H01H 50/38 . . . Part of main magnetic circuit shaped to suppress arcing between the contacts of the relay

H01H 50/40 . . . Branched or multiple-limb main magnetic circuits

H01H 50/42 . . . Auxiliary magnetic circuits, e.g. for maintaining armature in, or returning armature to, position of rest, for damping or accelerating movement

H01H 50/44 . Magnetic coils or winding (circuit arrangements H01H 47/00; in general H01F 5/00)

H01H 50/443 . . {Connections to coils}

H01H 2050/446 . . {Details of the insulating support of the coil, e.g. spool, bobbin, former}

H01H 50/46 . . Short-circuited conducting sleeves, bands, or discs {(for electromagnets H01F 7/1205)}

H01H 50/54 . Contact arrangements (contacts for switches in general H01H 1/00)

H01H 50/541 . . {Auxiliary contact devices (in general H01H 9/0066)}

H01H 50/543 . . . {Auxiliary switch inserting resistor during closure of contactor}

H01H 50/545 . . . {Self-contained, easily replaceable microswitches}

H01H 50/546 . . {for contactors having bridging contacts}

H01H 50/548 . . {for miniaturised relays}

H01H 50/56 . . Contact spring sets

H01H 50/58 . . . Driving arrangements structurally associated therewith; Mounting of driving arrangements on armature

H01H 50/60 . . moving contact being rigidly combined with movable part of magnetic circuit {(for polarised relays H01H 51/2254, H01H 51/2281)}

H01H 50/62 . . Co-operating movable contacts operated by seperate electrical actuating means

H01H 50/64 . Driving arrangements between movable part of magnetic circuit and contact (structurally associated with contact spring sets H01H 50/58)

H01H 50/641 . . {intermediate part performing a rectilinear movement (H01H 50/645, H01H 50/66 to H01H 50/74 take precedence)}

H01H 50/642 . . . {intermediate part being generally a slide plate, e.g. a card}

H01H 50/643 . . {intermediate part performing a rotating or pivoting movement (H01H 50/645, H01H 50/66 to H01H 50/74 take precedence)}

H01H 50/644 . . . {having more than one rotating or pivoting part}

H01H 50/645 . . {intermediate part making a resilient or flexible connection (H01H 50/66 to H01H 50/74 take precedence)}

H01H 50/646 . . . {intermediate part being a blade spring}

H01H 50/647 . . {intermediate part comprising interlocking means for different contact pairs (H01H 50/66 to H01H 50/74 take precedence; for two separate relays H01H 50/323; for ratchets H01H 51/08)}

H01H 50/648 . . {intermediate part being rigidly combined with armature (H01H 50/66 to H01H 50/74 take precedence)}

H01H 50/66 . . with lost motion

H01H 50/68 . . with snap action

H01H 50/70 . . operating contact momentarily during stroke of armature

H01H 50/72 . . for mercury contact

H01H 50/74 . . Mechanical means for producing a desired natural frequency of operation of the contacts, e.g. for self-interrupter

H01H 50/76 . . . using reed or blade spring

H01H 50/78 . . . using diaphragm; using stretched wire or ribbon vibrating sideways

H01H 50/80 . . . using torsionally-vibrating member, e.g. wire, strip

H01H 50/82 . . . using spring-loaded pivoted inertia member

H01H 50/84 . . . with means for adjustment of frequency or of make-to-break ratio

H01H 50/86 . Means for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts (circuit arrangements for introducing delay H01H 47/18; short-circuited conducting sleeves, bands, or discs H01H 50/46)

H01H 50/88 . . Mechanical means, e.g. dash-pot

H01H 50/90 . . . the delay effective in both directions of operation

H01H 50/92 . . Thermal means (inherent in electrothermal relays H01H 61/00)

**H01H 51/00** **Electromagnetic relays** (relays using the dynamo-electric effect H01H 53/00)

H01H 51/005 . {Inversing contactors (H01H 50/323 takes precedence)}

H01H 51/01 . Relays in which the armature is maintained in one position by a permanent magnet and freed by energisation of a coil producing an opposing magnetic field {(H01H 51/02 to H01H 51/26 take precedence)}

H01H 51/02 . Non-polarised relays

H01H 51/04 . . with single armature; with single set of ganged armatures

H01H 51/06 . . . Armature is movable between two limit positions of rest and is moved in one direction due to energisation of an electromagnet and after the electromagnet is de-energised is returned by energy stored during the movement in the first direction, e.g. by using a spring, by using a permanent magnet, by gravity {(motors with armature moved one way and returned by spring in general H02K 33/02)}

H01H 51/065 . . . . {Relays having a pair of normally open contacts rigidly fixed to a magnetic core movable along the axis of a solenoid, e.g. relays for starting automobiles (details H01H 50/20)}

H01H 51/08 . . . . Contacts alternately opened and closed by successive cycles of energisation and de-energisation of the electromagnet, e.g. by use of a ratchet

H01H 51/082 . . . . . {using rotating ratchet mechanism}

H01H 51/084 . . . . . {with axial ratchet elements}

H01H 51/086 . . . . . {with radial ratchet elements}

H01H 51/088 . . . . . {moved alternately in opposite directions}

H01H 51/10 . . . . Contacts retained open or closed by a latch which is controlled by an electromagnet

H01H 51/12 . . . Armature is movable between two limit positions of rest and is moved in both directions due to the energisation of one or the other of two electromagnets without the storage of energy to effect the return movement {(motors with armature moved one way and returned by spring in general H02K 33/02)}

H01H 51/14 . . . . without intermediate neutral position of rest

H01H 51/16 . . . . with intermediate neutral position of rest

H01H 51/18 . . . Armature is rotatable through an unlimited number of revolutions

H01H 51/20 . . with two or more independent armatures

H01H 51/22 . Polarised relays {(H01H 51/28 takes precedence)}

H01H 51/2209 . . {with rectilinearly movable armature}

H01H 2051/2218 . . . {having at least one movable permanent magnet}

H01H 51/2227 . . {in which the movable part comprises at least one permanent magnet, sandwiched between pole-plates, each forming an active air-gap with parts of the stationary magnetic circuit (H01H 51/2209 takes precedence)}

H01H 51/2236 . . {comprising pivotable armature, pivoting at extremity or bending point of armature (H01H 51/2227 takes precedence)}

H01H 51/2245 . . . {Armature inside coil}

H01H 51/2254 . . . . {Contact forms part of armature}

H01H 51/2263 . . {comprising rotatable armature, rotating around central axis perpendicular to the main plane of the armature (H01H 51/2227 takes precedence)}

H01H 51/2272 . . {comprising rockable armature, rocking movement around central axis parallel to the main plane of the armature (H01H 51/2227 takes precedence)}

H01H 51/2281 . . . {Contacts rigidly combined with armature}

H01H 51/229 . . . . {Blade-spring contacts alongside armature}

H01H 51/24 . . without intermediate neutral position of rest

H01H 51/26 . . with intermediate neutral position of rest

H01H 51/27 . Relays with armature having two stable magnetic states and operated by change from one state to the other

H01H 51/28 . Relays having both armature and contacts within a sealed casing outside which the operating coil is located, e.g. contact carried by a magnetic leaf spring or reed (H01H 51/27 takes precedence)

H01H 51/281 . . {Mounting of the relay; Encapsulating; Details of connections}

H01H 51/282 . . {Constructional details not covered by H01H 51/281}

H01H 51/284 . . {Polarised relays (polarised relays in general H01H 51/22)}

H01H 51/285 . . . {for latching of contacts}

H01H 51/287 . . {Details of the shape of the contact springs}

H01H 51/288 . . {Freely suspended contacts}

H01H 51/29 . Relays having armature, contacts, and operating coil within a sealed casing (H01H 51/27 takes precedence)

H01H 51/30 . specially adapted for actuation by alternating current

H01H 51/32 . . Frequency relays; Mechanically-tuned relays {(switched devices for electric time devices G04C; electromechanical resonaters H03H 9/00; telegraph circuits with oscillating relay H04L 25/205; mechanical means for producing a desired natural frequency of operation of the contacts H01H 50/74)}

H01H 51/34 . Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts

H01H 51/36 . . wherein the make-to-break ratio is varied by hand setting or current strength

**H01H 53/00** **Relays using the dynamo-electric effect, i.e. relays in which contacts are opened or closed due to relative movement of current-carrying conductor and magnetic field caused by force of interaction between them**

H01H 53/01 . Details

H01H 53/015 . . Moving coils; Contact-driving arrangements associated therewith

H01H 53/02 . Electrodynamic relays, i.e. relays in which the interaction is between two current-carrying conductors

H01H 53/04 . . Ferrodynamic relays, i.e. relays in which the magnetic field is concentrated in ferromagnetic parts

H01H 53/06 . Magnetodynamic relays, i.e. relays in which the magnetic field is produced by a permanent magnet

H01H 53/08 . wherein a mercury contact constitutes the current-carrying conductor

H01H 53/10 . Induction relays, i.e. relays in which the interaction is between a magnetic field and current induced thereby in a conductor {(parts of protective circuit arrangements H02H 1/00)}

H01H 53/12 . . Ferraris relays

H01H 53/14 . Contacts actuated by an electric motor through fluid-pressure transmission, e.g. using a motor-driven pump {(switches using dynamo-electric motor H01H 3/26)}

**WARNING**

Not complete, see also H01H 9/00

**H01H 55/00** **Magnetostrictive relays**

**H01H 57/00** **Electrostrictive relays; Piezo-electric relays**

H01H 2057/003 . {the relay being latched in actuated position by magnet}

H01H 2057/006 . {Micromechanical piezoelectric relay}

**H01H 59/00** **Electrostatic relays; Electro-adhesion relays** ({electrostatic measuring instruments G01R 5/28}; clutches in general using the Johnson-Rahbek effect H02N 13/00; {electrostatic transducers H04R 19/00; systems for preventing the formation of electrostatic charges H05F})

H01H 59/0009 . {making use of micromechanics}

H01H 2059/0018 . . {Special provisions for avoiding charge trapping, e.g. insulation layer between actuating electrodes being permanently polarised by charge trapping so that actuating or release voltage is altered}

H01H 2059/0027 . . {Movable electrode connected to ground in the open position, for improving isolation}

H01H 2059/0036 . . {Movable armature with higher resonant frequency for faster switching}

H01H 2059/0045 . . {with s-shaped movable electrode, positioned and connected between two driving fixed electrodes, e.g. movable electrodes moving laterally when driving voltage being applied}

H01H 2059/0054 . . {Rocking contacts or actuating members}

H01H 2059/0063 . . {with stepped actuation, e.g. actuation voltages applied to different sets of electrodes at different times or different spring constants during actuation}

H01H 2059/0072 . . {with stoppers or protrusions for maintaining a gap, reducing the contact area or for preventing stiction between the movable and the fixed electrode in the attracted position}

H01H 2059/0081 . . {with a tapered air-gap between fixed and movable electrodes}

H01H 2059/009 . {using permanently polarised dielectric layers}

**H01H 61/00** **Electrothermal relays** (thermal switches not operated by electrical input, thermal switches with anticipating electrical input H01H 37/00; thermally-sensitive members H01H 37/32)

H01H 61/002 . {Structural combination of a time delay electrothermal relay with an electrothermal protective relay, e.g. a start relay}

H01H 2061/004 . . {PTC resistor in series with start winding. e.g. adapted for being switched off after starting for limiting power dissipation}

H01H 2061/006 . {Micromechanical thermal relay}

H01H 2061/008 . . {Micromechanical actuator with a cold and a hot arm, coupled together at one end}

H01H 61/01 . Details

H01H 61/0107 . . {making use of shape memory materials (in general H01H 37/323)}

H01H 2061/0115 . . . {Shape memory alloy [SMA] actuator formed by coil spring}

H01H 2061/0122 . . . {Two SMA actuators, e.g. one for closing or resetting contacts and one for opening them}

H01H 61/013 . . Heating arrangements for operating relays

H01H 61/017 . . . Heating by glow discharge or arc in confined space

H01H 61/02 . wherein the thermally-sensitive member is heated indirectly, e.g. resistively, inductively

H01H 61/04 . wherein the thermally-sensitive member is only heated directly

H01H 61/06 . Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts

H01H 61/063 . . {making use of a bimetallic element}

H01H 61/066 . . {making use of an extensible wire, rod or strips}

H01H 61/08 . . wherein the make-to-break ratio is varied by hand setting or current strength

**Selectors**

| | |
|---|---|
| **H01H 63/00** | **Details of electrically-operated selector switches** (details of relays H01H 45/00) |
| H01H 63/02 | . Contacts; Wipers; Connections thereto |
| H01H 63/04 | . . Contact-making or contact-breaking wipers; Position indicators therefor |
| H01H 63/06 | . . Contact banks |
| H01H 63/08 | . . . cylindrical |
| H01H 63/10 | . . . plane |
| H01H 63/12 | . . Multiplying connections to contact banks, e.g. using ribbon cables |
| H01H 63/14 | . . . without soldering |
| H01H 63/16 | . Driving arrangements for multi-position wipers |
| H01H 63/18 | . . with step-by-step motion of wiper to a selector position |
| H01H 63/20 | . . . using stepping magnet and ratchet |
| H01H 63/22 | . . . using step-by-step electromagnetic drive without ratchet, e.g. self-interrupting driving magnet |
| H01H 63/24 | . . with continuous motion of wiper until a selected position is reached |
| H01H 63/26 | . . . with an individual clutch-drive from a shaft common to more than one selector switch |
| H01H 63/28 | . . . with an individual motor for each selector switch |
| H01H 63/30 | . . . . Pneumatic motor for moving wiper to selected position |
| H01H 63/32 | . . . . Spring motor for moving wiper to selected position |
| H01H 63/33 | . Constructional details of co-ordinate-type selector switches not having relays at cross-points |
| H01H 63/34 | . Bases; Cases; Covers; Mountings (racks for mounting selectors with or without other exchange equipment H04Q 1/04); Mounting of fuses on selector switch |
| H01H 63/36 | . Circuit arrangements for ensuring correct or desired operation and not adapted to a particular application of the selector switch |
| H01H 63/38 | . . for multi-position wiper switches |
| H01H 63/40 | . . for multi-position switches without wipers |
| H01H 63/42 | . . . for co-ordinate-type selector switches not having relays at cross-points |
| **H01H 65/00** | **Apparatus or processes specially adapted to the manufacture of selector switches or parts thereof** |
| **H01H 67/00** | **Electrically-operated selector switches** (details thereof H01H 63/00; selecting in general H04Q) |
| H01H 67/02 | . Multi-position wiper switches |
| H01H 67/04 | . . having wipers movable only in one direction for purpose of selection |
| H01H 67/06 | . . . Rotary switches, i.e. having angularly movable wipers |
| H01H 67/08 | . . . . with wiper selection |
| H01H 67/10 | . . . . with coarse and fine positioning of wipers |
| H01H 67/12 | . . . Linear-motion switches |

H01H 67/14 . . having wipers movable in two mutually perpendicular directions for purpose of selection

H01H 67/16 . . . one motion being rotary and the other being parallel to the axis of rotation, e.g. Strowger or "up and around" switches

H01H 67/18 . . . one motion being rotary and the other being perpendicular to the axis of rotation, e.g. "round and in" switches

H01H 67/20 . . . both motions being linear

H01H 67/22 . Switches without multi-position wipers

H01H 67/24 . . Co-ordinate-type relay switches having an individual electromagnet at each cross-point

H01H 67/26 . . Co-ordinate-type selector switches not having relays at cross-points but involving mechanical movement, e.g. cross-bar switch, code-bar switch

H01H 67/30 . . Co-ordinate-type selector switches with field of co-ordinate coil acting directly upon magnetic leaf spring or reed-type contact member

H01H 67/32 . . having a multiplicity of interdependent armatures operated in succession by a single coil and each controlling one contact or set of contacts, e.g. counting relay

**Emergency protective devices**

**H01H 69/00** **Apparatus or processes for the manufacture of emergency protective devices** (manufacture of switches in general H01H 11/00; manufacture of relays in general H01H 49/00)

H01H 69/01 . for calibrating or setting of devices to function under predetermined conditions (measuring electric values G01R)

H01H 2069/013 . . {with calibrating screws in trip bar}

H01H 2069/016 . . {with single separate parts mountable or insertable in different orientations or positions, e.g. to obtain desired trip conditions}

H01H 69/02 . Manufacture of fuses

H01H 69/022 . . {of printed circuit fuses}

H01H 2069/025 . . {using lasers}

H01H 2069/027 . . {using ultrasonic techniques}

**H01H 71/00** **Details of the protective switches or relays covered by groups H01H 73/00 to H01H 83/00**

H01H 71/002 . {with provision for switching the neutral conductor}

H01H 2071/004 . . {with a tripping or current sensing device in the neutral wire, e.g. for third harmonics in a three fase system}

H01H 2071/006 . {Provisions for user interfaces for electrical protection devices}

H01H 2071/008 . {Protective switches or relays using micromechanics}

H01H 71/02 . Housings; Casings; Bases; Mountings

H01H 71/0207 . . {Mounting or assembling the different parts of the circuit breaker}

H01H 71/0214 . . . {Housing or casing lateral walls containing guiding grooves or special mounting facilities (H01H 71/0221 takes precedence)}

H01H 71/0221 . . . {Majority of parts mounted on central frame or wall}

H01H 71/0228 . . . {having provisions for interchangeable or replaceable parts}

H01H 71/0235 . . . {Contacts and the arc extinguishing space inside individual separate cases, which are positioned inside the housing of the circuit breaker (Casettes for rotating bridges see H01H 1/2058)}

H01H 2071/0242 . . . {Assembling parts of a circuit breaker by using snap mounting techniques}

H01H 71/025 . . {Constructional details of housings or casings not concerning the mounting or assembly of the different internal parts}

H01H 71/0257 . . . {Strength considerations}

H01H 71/0264 . . {Mountings or coverplates for complete assembled circuit breakers, e.g. snap mounting in panel}

H01H 71/0271 . . . {Mounting several complete assembled circuit breakers together (interconnected mechanisms H01H 71/1009)}

H01H 2071/0278 . . . . {with at least one of juxtaposed casings dedicated to an auxiliary device, e.g. for undervoltage or shunt trip}

H01H 2071/0285 . . . . {Provisions for an intermediate device between two adjacent circuit breakers having the same general contour but an auxiliary function, e.g. cooling, isolation, wire guiding, magnetic isolation or screening}

H01H 2071/0292 . . {Housing or frames containing grooves or slots for guiding movable parts}

H01H 71/04 . Means for indicating condition of the switching device {(by means of an auxiliary contact H01H 71/46)}

H01H 2071/042 . . {with different indications for different conditions, e.g. contact position, overload, short circuit or earth leakage}

H01H 2071/044 . . {Monitoring, detection or measuring systems to establish the end of life of the switching device, can also contain other on-line monitoring systems, e.g. for detecting mechanical failures}

H01H 2071/046 . . {exclusively by position of operating part, e.g. with additional labels or marks but no other movable indicators}

H01H 2071/048 . . {containing non-mechanical switch position sensor, e.g. HALL sensor}

H01H 71/06 . Distinguishing marks, e.g. colour coding

H01H 71/08 . Terminals; Connections (in general H01R)

H01H 71/082 . . {Connections between juxtaposed circuit breakers}

H01H 2071/084 . . {specially adapted for avoiding decalibration of trip unit, e.g. bimetal, when fixing conductor wire to connector}

H01H 2071/086 . . {Low power connections for auxiliary switches, e.g. shunt trip}

H01H 2071/088 . . {Terminals for switching devices which make the devices interchangeable, e.g. with fuses}

H01H 71/10 . Operating or release mechanisms

H01H 71/1009 . . {Interconnected mechanisms (H01H 71/1045 takes precedence; operated by excess current and other electrical conditions H01H 83/20)}

H01H 71/1018 . . . {with only external interconnections}

H01H 71/1027 . . . {comprising a bidirectional connecting member actuated by the opening movement of one pole to trip a neighbour pole}

H01H 2071/1036 . . . {having provisions for four or more poles}

H01H 71/1045 . . {Multiple circuits-breaker, e.g. for the purpose of dividing current or potential drop}

H01H 71/1054 . . {Means for avoiding unauthorised release}

H01H 2071/1063 . . . {making use of an equilibrating mass}

H01H 71/1072 . . {Release mechanisms which are reset by opening movement of contacts}

H01H 71/1081 . . {Modifications for selective or back-up protection; Correlation between feeder and branch circuit breaker (circuits H02H 3/06, H02H 7/26)}

H01H 2071/109 . . {with provisions for selecting between automatic or manual reset}

H01H 71/12 . . Automatic release mechanisms with or without manual release

H01H 71/121 . . . {Protection of release mechanisms (with auxiliary contact H01H 71/48)}

H01H 71/122 . . . {actuated by blowing of a fuse}

H01H 71/123 . . . {using a solid-state trip unit (circuits H02H)}

H01H 2071/124 . . . . {with a hybrid structure, the solid state trip device being combined with a thermal or a electromagnetic trip}

H01H 71/125 . . . . {characterised by sensing elements, e.g. current transformers (for differential protection H01H 83/144)}

H01H 71/126 . . . {actuated by dismounting of circuit breaker or removal of part of circuit breaker}

H01H 71/127 . . . {using piezoelectric, electrostrictive or magnetostrictive trip units}

H01H 71/128 . . . {Manual release or trip mechanisms, e.g. for test purposes (two similar push buttons for closing or resetting and opening or tripping H01H 71/58; test switches for earth fault circuit breakers H01H 83/04)}

H01H 71/14 . . . Electrothermal mechanisms {(combined with a electro-thermal time delay relay H01H 61/002)}

H01H 71/142 . . . . {actuated due to change of magnetic permeability}

H01H 71/145 . . . . {using shape memory materials (H01H 71/16 takes precedence; in general H01H 37/323)}

H01H 2071/147 . . . . {Thermal release by expansion of a fluid}

H01H 71/16 . . . . with bimetal element {(combined with detection of imbalance of two or more currents H01H 83/223)}

H01H 71/161 . . . . . {with helically or spirally wound bimetal}

H01H 71/162 . . . . . {with compensation for ambient temperature}

H01H 71/164 . . . . . {Heating elements}

H01H 2071/165 . . . . . . {the bimetal being inductively heated, e.g. load current does not pass through bimetal}

H01H 2071/167 . . . . . {Multiple bimetals working in parallel together, e.g. laminated together}

H01H 2071/168 . . . . . {Provisions for avoiding permanent deformation and thus decalibration of bimetal, e.g. due to overheating or action of a magnet}

H01H 71/18 . . . . with expanding rod, strip, or wire

H01H 71/20 . . . . with fusible mass

H01H 71/205 . . . . . {using a ratchet wheel kept against rotation by solder}

H01H 71/22 . . . . with compensation for variation of ambient temperature {(H01H 71/162 takes precedence)}

H01H 71/24 . . . Electromagnetic mechanisms

H01H 71/2409 . . . . {combined with an electromagnetic current limiting mechanism}

H01H 71/2418 . . . . {combined with an electrodynamic current limiting mechanism}

H01H 2071/2427 . . . . . {with blow-off movement tripping mechanism, e.g. electrodynamic effect on contacts trips the traditional trip device before it can unlatch the spring mechanism by itself}

H01H 71/2436 . . . . {with a holding and a releasing magnet, the holding force being limited due to saturation of the holding magnet}

H01H 71/2445 . . . . {using a reed switch (reed switches in general H01H 51/28; for current measuring G01R 19/16509)}

H01H 71/2454 . . . . {characterised by the magnetic circuit or active magnetic elements}

H01H 71/2463 . . . . {with plunger type armatures}

H01H 71/2472 . . . . {with rotatable armatures}

H01H 71/2481 . . . . {characterised by the coil design}

H01H 2071/249 . . . . {with part of the magnetic circuit being in the normal current path in the circuit breaker, e.g. yoke, fixed contact and arc-runner are made out of one single conductive element}

H01H 71/26 . . . . with windings acting in opposition {(H01H 71/2436 takes precedence)}

H01H 71/28 . . . . with windings acting in conjunction

H01H 71/30 . . . . having additional short-circuited winding

H01H 71/32 . . . . having permanently magnetised part

H01H 71/321 . . . . . {characterised by the magnetic circuit or active magnetic elements}

H01H 71/322 . . . . . . {with plunger type armature}

H01H 71/323 . . . . . . {with rotatable armature}

H01H 71/325 . . . . . {Housings, assembly or disposition of different elements in the housing}

H01H 71/326 . . . . . . {Sealed housings}

H01H 71/327 . . . . . {Manufacturing or calibrating methods, e.g. air gap treatments}

H01H 2071/328 . . . . . {using a spring for having minimal force on armature while maximal force on trip pin}

H01H 71/34 . . . . having two or more armatures controlled by a common winding

H01H 71/345 . . . . . {having a delayed movable core and a movable armature}

H01H 71/36 . . . . frequency selective

H01H 71/38 . . . . wherein the magnet coil also acts as arc blow-out device

H01H 71/40 . . . Combined electrothermal and electromagnetic mechanisms

H01H 71/402 . . . . {in which the thermal mechanism influences the magnetic circuit of the electromagnetic mechanism}

H01H 71/405 . . . . {in which a bimetal forms the inductor for the electromagnetic mechanism}

H01H 2071/407 . . . . {the thermal element being heated by the coil of the electromagnetic mechanism}

H01H 71/42 . . . Induction-motor, induced-current, or electrodynamic release mechanisms

H01H 71/43 . . . . Electrodynamic release mechanisms

H01H 71/44 . . . having means for introducing a predetermined time delay (by short-circuited winding H01H 71/30; by additional armature H01H 71/34)

H01H 71/443 . . . . {with dash-pot}

H01H 71/446 . . . . {making use of an inertia mass}

H01H 71/46 . . . having means for operating auxiliary contacts additional to the main contacts

H01H 71/462 . . . . {housed in a separate casing, juxtaposed to and having the same general contour as the main casing (for neutral conductor H01H 71/002)}

H01H 71/465 . . . . {Self-contained, easily replaceable microswitches}

H01H 2071/467 . . . . {with history indication, e.g. of trip and/or kind of trip, number of short circuits etc.}

H01H 71/48 . . . . with provision for short-circuiting the electrical input to the release mechanism after release of the switch, e.g. for protection of heating wire

H01H 71/50 . . Manual reset mechanisms {which may be also used for manual release}

H01H 71/501 . . . {Means for breaking welded contacts; Indicating contact welding or other malfunction of the circuit breaker}

H01H 2071/502 . . . . {with direct contact between manual operator and welded contact structure}

H01H 71/503 . . . {Means for increasing the opening stroke of the contacts}

H01H 71/504 . . . {provided with anti-rebound means (for switches in general H01H 1/50)}

H01H 71/505 . . . {Latching devices between operating and release mechanism}

H01H 2071/506 . . . . {using balls or rollers in the latching device}

H01H 2071/507 . . . . {being collapsible, e.g. yielding elastically, when the opening force is higher than a predetermined value}

H01H 2071/508 . . . . {with serial latches, e.g. primary latch latched by secondary latch for requiring a smaller trip force}

H01H 71/52 . . . actuated by lever

H01H 71/521 . . . . {Details concerning the lever handle}

H01H 71/522 . . . . {comprising a cradle-mechanism}

H01H 71/523 . . . . . {the contact arm being pivoted on cradle and mechanism spring acting between handle and contact arm}

H01H 71/524 . . . . . {the contact arm being pivoted on handle and mechanism spring acting between cradle and contact arm}

H01H 71/525 . . . . . {comprising a toggle between cradle and contact arm and mechanism spring acting between handle and toggle knee}

H01H 71/526 . . . . {the lever forming a toggle linkage with a second lever, the free end of which is directly and releasably engageable with a contact structure}

H01H 71/527 . . . . {making use of a walking beam with one extremity latchable, the other extremity actuating or supporting the movable contact and an intermediate part co-operating with the actuator}

H01H 71/528 . . . . {comprising a toggle or collapsible link between handle and contact arm, e.g. sear pin mechanism}

H01H 71/529 . . . . {comprising an electroresponsive element forming part of the transmission chain between handle and contact arm}

H01H 71/54 . . . actuated by tumbler

H01H 71/56 . . . actuated by rotatable knob or wheel

H01H 2071/565 . . . . {using a add on unit, e.g. a separate rotary actuator unit, mounted on lever actuated circuit breakers}

H01H 71/58 . . . actuated by push-button, pull-knob, or slide

H01H 71/60 . . . actuated by closure of switch casing

H01H 71/62 . . . with means for preventing resetting while abnormal condition persists, e.g. loose handle arrangement

H01H 71/64 . . . . incorporating toggle linkage

H01H 71/66 . . Power reset mechanisms

H01H 2071/665 . . . {the reset mechanism operating directly on the normal manual operator, e.g. electromagnet pushes manual release lever back into "ON" position}

H01H 71/68 . . . actuated by electromagnet

H01H 71/685 . . . . {in which the excitation of the electromagnet is interrupted by abnormal conditions}

H01H 71/70 . . . actuated by electric motor

H01H 71/72 . . . actuated automatically a limited number of times

H01H 71/74 . Means for adjusting the conditions under which the device will function to provide protection

H01H 71/7409 . . {Interchangeable elements}

H01H 71/7418 . . {Adjusting both electrothermal and electromagnetic mechanism}

H01H 71/7427 . . {Adjusting only the electrothermal mechanism}

H01H 71/7436 . . . {Adjusting the position (or prestrain) of the bimetal (H01H 71/7445 takes precedence)}

H01H 71/7445 . . . {Poly-phase adjustment}

H01H 2071/7454 . . . {with adjustable axis of transmission lever between bimetal element and trip lever}

H01H 71/7463 . . {Adjusting only the electromagnetic mechanism}

H01H 2071/7472 . . {with antitamper means for avoiding unauthorised setting}

H01H 2071/7481 . . {with indexing means for magnetic or thermal tripping adjustment knob}

H01H 2071/749 . . {with a shunt element connected in parallel to magnetic or thermal trip elements, e.g. for adjusting trip current}

**H01H 73/00 Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of a hand reset mechanism**

H01H 73/02 . Details

H01H 73/04 . . Contacts

H01H 73/045 . . . {Bridging contacts (specific details for the contacting bridge per se H01H 1/20 and subgroups, e.g. rotating bridge H01H 1/2041)}

H01H 73/06 . . Housings; Casings; Bases; Mountings

H01H 73/08 . . . Plug-in housings {(for a plurality of juxtaposed housings H02B 1/056)}

H01H 73/10 . . . Cartridge housings, e.g. screw-in housing

H01H 73/12 . . Means for indicating condition of the switch {(by means of an auxiliary contact H01H 71/46)}

H01H 73/14 . . . Indicating lamp structurally associated with the switch

H01H 73/16 . . Distinguishing marks, e.g. colour coding

H01H 73/18 . . Means for extinguishing or suppressing arc {(in general H01H 9/30 to H01H 9/46; magnet coil acting as blow-out device H01H 71/38)}

H01H 73/20 . . Terminals; Connections (in general H01R)

H01H 73/22 . having electrothermal release and no other automatic release (cartridge type H01H 73/62)

H01H 73/24 . . reset by lever

H01H 73/26 . . reset by tumbler

H01H 73/28 . . reset by rotatable knob or wheel

H01H 73/30 . . reset by push-button, pull-knob or slide

H01H 73/303 . . . {with an insulating body insertable between the contacts when released by a bimetal element}

H01H 73/306 . . . {the push-button supporting pivotally a combined contact-latch lever}

H01H 73/32 . . reset by closure of switch casing

H01H 73/34 . . reset action requiring replacement or reconditioning of a fusible or explosive part

H01H 73/36 . having electromagnetic release and no other automatic release (cartrigde type H01H 73/64)

H01H 73/38 . . reset by lever

H01H 73/40 . . reset by tumbler

H01H 73/42 . . reset by rotatable knob or wheel

H01H 73/44 . . reset by push-button, pull-knob or slide

H01H 73/46 . . reset by closure of switch casing

H01H 73/48 . having both electrothermal and electromagnetic automatic release (cartridge type H01H 73/66)

H01H 73/50 . . reset by lever

H01H 73/52 . . reset by tumbler

H01H 73/54 . . reset by rotatable knob or wheel

H01H 73/56 . . reset by push-button, pull-knob or slide

H01H 73/58 . . reset by closure of switch casing

H01H 73/60 . Cartridge type, e.g. screw-in cartridge

H01H 73/62 . . having only electrothermal release

H01H 73/64 . . having only electromagnetic release

H01H 73/66 . . having combined electrothermal and electromagnetic release

**H01H 75/00** **Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of power reset mechanism**

H01H 75/02 . Details

H01H 75/04 . . Reset mechanisms for automatically reclosing a limited number of times (circuit arrangements H02H 3/06)

H01H 75/06 . . . effecting one reclosing action only

H01H 75/08 . having only electrothermal release

H01H 75/10 . having only electromagnetic release

H01H 75/12 . having combined electrothermal and electromagnetic release

**H01H 77/00** **Protective overload circuit-breaking switches operated by excess current and requiring separate action for resetting** (H01H 73/00, H01H 75/00 take precedence)

H01H 77/02 . in which the excess current itself provides the energy for opening the contacts, and having a separate reset mechanism

H01H 2077/025 . . {with pneumatic means, e.g. by arc pressure}

H01H 77/04 . . with electrothermal opening

H01H 77/06 . . with electromagnetic opening {(combined with electromagnetic release mechanism H01H 71/2409)}

H01H 77/08 . . . retained closed by permanent or remanent magnetism and opened by windings acting in opposition

H01H 77/10 . . with electrodynamic opening {(combined with electromagnetic release mechanism H01H 71/2418)}

H01H 77/101 . . . {with increasing of contact pressure by electrodynamic forces before opening}

H01H 77/102 . . . {characterised by special mounting of contact arm, allowing blow-off movement}

H01H 77/104 . . . . {with a stable blow-off position}

H01H 77/105 . . . . {whereby the blow-off movement unlatches the contact from a contact holder}

H01H 77/107 . . . {characterised by the blow-off force generating means, e.g. current loops}

H01H 77/108 . . . . {comprising magnetisable elements, e.g. flux concentrator, linear slot motor}

**H01H 79/00** **Protective switches in which excess current causes the closing of contacts, e.g. for short-circuiting the apparatus to be protected {**(H01H 39/004 takes precedence)**}**

**H01H 81/00** **Protective switches in which contacts are normally closed but are repeatedly opened and reclosed as long as a condition causing excess current persists, e.g. for current limiting**

H01H 81/02 . electrothermally operated

H01H 81/04 . electromagnetically operated

**H01H 83/00** **Protective switches, e.g. circuit-breaking switches, or protective relays operated by abnormal electrical conditions otherwise than solely by excess current**

H01H 83/02 . operated by earth fault currents (H01H 83/14 takes precedence)

H01H 83/04 . . with testing means for indicating the ability of the switch or relay to function properly

H01H 2083/045 . . . {Auxiliary switch opening testing circuit in synchronism with the main circuit}

H01H 83/06 . operated by current falling below a predetermined value

H01H 83/08 . operated by reversal of dc

H01H 83/10 . operated by excess voltage, e.g. for lightning protection

H01H 83/12 . operated by voltage falling below a predetermined value, e.g. for no-volt protection

H01H 83/14 . operated by unbalance of two or more currents or voltages, e.g. for differential protection

H01H 83/142 . . {with bimetal elements}

H01H 83/144 . . {with differential transformer}

H01H 2083/146 . . . {Provisions for avoiding disadvantages of having asymetrical primaries, e.g. induction of a magnetic field even by zero difference current}

H01H 2083/148 . . . {with primary windings formed of rigid copper conductors}

H01H 83/16 . operated by abnormal ratio of voltage and current, e.g. distance relay

H01H 83/18 . operated by abnormal product of, or abnormal phase angle between, voltage and current, e.g. directional relay

H01H 83/20 . operated by excess current as well as by some other abnormal electrical condition

H01H 2083/201 . . {the other abnormal electrical condition being an arc fault}

H01H 2083/203 . . {with shunt trip circuits, e.g. NC contact in an undervoltage coil circuit}

H01H 2083/205 . . {having shunt or UVR tripping device with integrated mechanical energy accumulator}

H01H 2083/206 . . {with thermal shunt trip}

H01H 2083/208 . . {Converting under voltage release [UVR] and shunt release}

H01H 83/22 . . the other condition being unbalance of two or more currents or voltages

H01H 83/223 . . . {with bimetal elements}

H01H 83/226 . . . {with differential transformer}

**H01H 85/00** **Protective devices in which the current flows through a part of fusible material and this current is interrupted by displacement of the fusible material when this current becomes excessive** (switches actuated by melting of fusible material H01H 37/76; automatic release of protective switches due to fusion of a mass H01H 73/00 to H01H 83/00; disposition or arrangement of fuses on boards H02B 1/18)

H01H 2085/0004 . {making use of shape-memory material}

H01H 2085/0008 . {making use of heat shrinkable material}

H01H 85/0013 . {Means for preventing damage, e.g. by ambient influences to the fuse}

H01H 85/0017 . . {due to vibration or other mechanical forces, e.g. centrifugal forces}
H01H 85/0021 . . {water or dustproof devices}
H01H 85/0026 . . . {casings for the fuse and its base contacts}
H01H 85/003 . . . {casings for the fusible element}
H01H 2085/0034 . . . {with molded casings}
H01H 85/0039 . {Means for influencing the rupture process of the fusible element}
H01H 85/0043 . . {Boiling of a material associated with the fusible element, e.g. surrounding fluid}
H01H 85/0047 . . {Heating means}
H01H 85/0052 . . . {Fusible element and series heating means or series heat dams}
H01H 85/0056 . . . {Heat conducting or heat absorbing means associated with the fusible member, e.g. for providing time delay}
H01H 85/006 . . . {Heat reflective or insulating layer on the casing or on the fuse support}
H01H 85/0065 . . . {Heat reflective or insulating layer on the fusible element}
H01H 85/0069 . . . {Heat reflective or insulating filler, support, or block forming the casing}
H01H 85/0073 . . {Expansion or rupture of the insulating support for the fusible element}
H01H 85/0078 . {Security-related arrangements}
H01H 85/0082 . . {preventing explosion of the cartridge}
H01H 85/0086 . . . {use of a flexible body, e.g. inside the casing}
H01H 85/0091 . . {providing disconnection of the neutral line}
H01H 85/0095 . . {Earthing means}
H01H 85/02 . Details (electrical connections in general H01R)
H01H 85/0208 . . {Tools for inserting and removing fuses}
H01H 2085/0216 . . {Tools for controlling fuses or the line associated with the fuses}
H01H 2085/0225 . . {Means for preventing discharge, e.g. corona ring}
H01H 2085/0233 . . {with common casing for fusible elements inserted in more than one phase or more than one circuit}
H01H 85/0241 . . {Structural association of a fuse and another component or apparatus (switches with built-in fuses H01H 9/10, spark-gap arresters H01H 85/44, transformers and inductances H01F 27/402, capacitors H01G 2/14, lamps H01K 1/66, semiconductors H01L 23/5256 or H01L 23/62)}
H01H 2085/025 . . . {Structural association with a binding post of a storage battery}
H01H 2085/0258 . . . {Structural association of a fuse or a fuse holder with a bimetallic element}
H01H 2085/0266 . . . {Structural association with a measurement device, e.g. a shunt}
H01H 2085/0275 . . . {Structural association with a printed circuit board}
H01H 2085/0283 . . . {Structural association with a semiconductor device}
H01H 2085/0291 . . . {Structural association with a current transformer}
H01H 85/04 . . Fuses, i.e. expendable parts of the protective device, e.g. cartridges
H01H 85/041 . . . characterised by the type
H01H 85/0411 . . . . {Miniature fuses}
H01H 2085/0412 . . . . . {specially adapted for being mounted on a printed circuit board}

H01H 2085/0414 . . . . . {Surface mounted fuses}

H01H 85/0415 . . . . . {cartridge type}

H01H 85/0417 . . . . . {with parallel side contacts}

H01H 85/0418 . . . . . {with ferrule type end contacts}

H01H 85/042 . . . . General constructions or structure of high voltage fuses, i.e. above 1000 V

H01H 85/044 . . . . General constructions or structure of low voltage fuses, i.e. below 1000 V, or of fuses where the applicable voltage is not specified (H01H 85/046 to H01H 85/048 take precedence)

H01H 85/0445 . . . . . fast or slow type (H01H 85/045 to H01H 85/048 take precedence)

**WARNING**

Not complete, see also H01H 85/044

H01H 85/045 . . . . . cartridge type

H01H 85/0452 . . . . . {with parallel side contacts}

H01H 85/0454 . . . . . {with screw-in type contacts}

H01H 85/0456 . . . . . {with knife-blade end contacts}

H01H 85/0458 . . . . . {with ferrule type end contacts}

H01H 85/046 . . . . Fuses formed as printed circuits

H01H 85/047 . . . . Vacuum fuses

H01H 85/048 . . . . Fuse resistors

H01H 2085/0483 . . . . . {with temperature dependent resistor, e.g. thermistor}

H01H 2085/0486 . . . . . {with voltage dependent resistor, e.g. varistor}

H01H 85/05 . . . Component parts thereof

H01H 85/055 . . . . Fusible members

H01H 2085/0555 . . . . . {Input terminal connected to a plurality of output terminals, e.g. multielectrode}

H01H 85/06 . . . . . characterised by the fusible material (H01H 85/11 takes precedence)

H01H 85/08 . . . . . characterised by the shape or form of the fusible member

H01H 85/10 . . . . . with constriction for localised fusing (H01H 85/11 takes precedence)

H01H 85/11 . . . . . with applied local area of a metal which, on melting, forms a eutectic with the main material of the fusible member, i.e. M-effect devices

H01H 85/12 . . . . . Two or more separate fusible members in parallel

H01H 85/143 . . . . Electrical contacts; Fastening fusible members to such contacts

H01H 85/147 . . . . . Parallel-side contacts

H01H 85/15 . . . . . Screw-in contacts

H01H 85/153 . . . . . Knife-blade-end contacts

H01H 85/157 . . . . . Ferrule-end contacts

H01H 85/165 . . . . Casings (electrical contacts H01H 85/143; fillings H01H 85/18)

H01H 85/17 . . . . . characterised by the casing material

H01H 85/175 . . . . . characterised by the casing shape or form

H01H 85/1755 . . . . . {composite casing}

H01H 85/18 . . . . Casing fillings, e.g. powder

H01H 85/185 . . . . . {Insulating members for supporting fusible elements inside a casing, e.g. for helically wound fusible elements}

H01H 85/20 . . Bases for supporting the fuse; Separate parts thereof (bases, casings for connectors, in general H01R)

H01H 85/2005 . . . {for use with screw-in type fuse}

H01H 85/201 . . . {for connecting a fuse in a lead and adapted to be supported by the lead alone}

H01H 85/2015 . . . {for plug-in type fuses}

H01H 85/202 . . . {for fuses with ferrule type end contacts}

H01H 85/2025 . . . {for fuses with conical end contacts, e.g. fuses used on motor vehicles}

H01H 85/203 . . . {for fuses with blade type terminals}

H01H 85/2035 . . . . {for miniature fuses with parallel side contacts}

H01H 85/204 . . . . {for low voltage fuses with knife-blade end contacts}

H01H 85/2045 . . . {Mounting means or insulating parts of the base, e.g. covers, casings}

H01H 85/205 . . . {Electric connections to contacts on the base}

H01H 2085/2055 . . . . {Connections to bus bars in an installation with screw in type fuses or knife blade fuses}

H01H 2085/206 . . . . {being tappable, e.g. terminals on the fuse or base being arranged so as to permit an additional connector to be engaged therewith}

H01H 2085/2065 . . . {with base contacts adapted or adaptable to fuses of different lenghts; bases with self-aligning contacts; intermediate adaptation pieces}

H01H 2085/207 . . . {Bases adapted to fuses with different end contacts or to other components, e.g. circuit breakers; intermediate adaptation pieces}

H01H 2085/2075 . . . {Junction box, having holders integrated with several other holders in a particular wiring layout}

H01H 2085/208 . . . . {specially adapted for vehicles}

H01H 2085/2085 . . . {Holders for mounting a fuse on a printed circuit}

H01H 2085/209 . . . {Modular assembly of fuses or holders, e.g. side by side; combination of a plurality of identical fuse units}

H01H 2085/2095 . . . {Triangular setup of fuses, e.g. for space saving}

H01H 85/22 . . Intermediate or auxiliary parts for carrying, holding, or retaining fuse, cooperating with base or fixed holder, and removable therefrom for renewing the fuse

H01H 85/24 . . Means for preventing insertion of incorrect fuse

H01H 85/25 . . Safety arrangements preventing or inhibiting contact with live parts, including operation of isolation on removal of cover (interlocking between casing or protective shutter of a switch and mechanism for operating its contacts H01H 9/22)

H01H 85/26 . . Magazine arrangements

H01H 85/263 . . . {with spare printed circuit fuse}

H01H 2085/266 . . . {with replacement of a fuse which is part of a printed circuit}

H01H 85/28 . . . effecting automatic replacement
H01H 85/30 . . Means for indicating condition of fuse structurally associated with the fuse
H01H 85/303 . . . {Movable indicating elements}
H01H 85/306 . . . . {acting on an auxiliary switch or contact}
H01H 85/32 . . . Indicating lamp structurally associated with the protective device
H01H 85/34 . . Distinguishing marks, e.g. colour coding
H01H 85/36 . . Means for applying mechanical tension to fusible member
H01H 85/38 . . Means for extinguishing or suppressing arc (by powder filling H01H 85/18; by mechanical tension applied to fusible member H01H 85/36)
H01H 2085/381 . . . {with insulating body insertable between the end contacts of the fusible element}
H01H 2085/383 . . . {with insulating stationary parts}
H01H 2085/385 . . . {Impedances connected with the end contacts of the fusible element}
H01H 2085/386 . . . {with magnetic or electrodynamic arc-blowing}
H01H 2085/388 . . . {using special materials}
H01H 85/40 . . . using an arc-extinguishing liquid (characterised by the composition of the liquid H01H 33/22)
H01H 85/42 . . . using an arc-extinguishing gas (characterised by the composition of the gas H01H 33/22)
H01H 85/43 . . Means for exhausting or absorbing gases liberated by fusing arc, or for ventilating excess pressure generated by heating
H01H 85/44 . . Structural association with a spark-gap arrester
H01H 85/46 . . Circuit arrangements not adapted to a particular application of the protective device
H01H 85/463 . . . {with printed circuit fuse}
H01H 2085/466 . . . {with remote controlled forced fusing}
H01H 85/47 . . Means for cooling
H01H 85/48 . Protective devices wherein the fuse is carried or held directly by the base
H01H 85/485 . . {the fuse being provided with bayonet-type locking means}
H01H 85/50 . . the fuse having contacts at opposite ends for co-operation with the base
H01H 85/52 . . the fuse being adapted for screwing into the base
H01H 85/54 . Protecting devices wherein the fuse is carried, held or retained by an intermediate or auxiliary part removable from the base, or used as sectionalisers
H01H 85/542 . . {the intermediate or auxiliary part being provided with bayonet-type locking means}
H01H 85/545 . . {with pivoting fuse carrier (tumbler switch with built-in fuse H01H 23/10)}
H01H 85/547 . . {with sliding fuse carrier}
H01H 85/56 . . the intermediate or auxiliary part having side contacts for plugging into the base, e.g. bridge-carrier type
H01H 85/58 . . . with intermediate or auxiliary part and base shaped to interfit and thereby enclose the fuse

H01H 85/60 . . the intermediate or auxiliary part having contacts at opposite ends for co-operation with the base

H01H 85/62 . . the intermediate or auxiliary part being adapted for screwing into the base

**H01H 87/00 Protective devices in which a current flowing through a liquid or solid is interrupted by the evaporation of the liquid or by the melting and evaporation of the solid when the current becomes excessive, the circuit continuity being reestablished on cooling**

**H01H 89/00 Combinations of two or more different basic types of electric switches, relays, selectors and emergency protective devices, not covered by a single one of the preceding main groups**

H01H 2089/005 . {Multi-purpose combinations, e.g. LS/DI, LS/FI, of normal protective circuit breakers with known other forms of protection, e.g. earthfaults, differential, unbalance}

H01H 89/02 . Combination of a key operated switch with a manually operated switch, e.g. ignition and lighting switches

H01H 89/04 . Combination of a thermally actuated switch with a manually operated switch

H01H 89/06 . Combination of a manual reset circuit breaker with a contactor, i.e. the same circuit controlled by both a protective and a remote control device

H01H 2089/065 . . {Coordination between protection and remote control, e.g. protection job repartition, mutual assistance or monitoring}

H01H 89/08 . . with both devices using the same contact pair

H01H 89/10 . . . with each device controlling one of the two

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**H01H 2201/00 Contacts**

H01H 2201/002 . bounceless

H01H 2201/004 . Wiping action

H01H 2201/006 . self-aligning

H01H 2201/008 . Both contacts movable

H01H 2201/01 . Protective enclosure

H01H 2201/012 . . Inert gas in contact space

H01H 2201/014 . . Conductive gas

H01H 2201/016 . Roughened contact surface, e.g. anti-adhering

H01H 2201/018 . transparent

H01H 2201/02 . Piezo element

H01H 2201/022 . Material

H01H 2201/024 . . precious

H01H 2201/026 . . non precious

H01H 2201/028 . . . Indium tin oxide [ITO]

H01H 2201/03 . . Composite

H01H 2201/032 . . Conductive polymer; Rubber

H01H 2201/034 . . . anisotropic; Zebra

H01H 2201/036 . . . Variable resistance

H01H 2201/038 . Contact lubricant

**Emergency protective devices**

**H01H 2203/00 Form of contacts**

H01H 2203/002 . Raised edge
H01H 2203/004 . Rivet
H01H 2203/006 . Staples
H01H 2203/008 . Wires
H01H 2203/0085 . . Layered switches integrated into garment, clothes or textile
H01H 2203/01 . . Woven wire screen
H01H 2203/012 . Microprotrusions
H01H 2203/014 . . Grains; Microspheres
H01H 2203/016 . universal; modular
H01H 2203/018 . binary coded
H01H 2203/02 . Interspersed fingers
H01H 2203/022 . Helical networks
H01H 2203/024 . Convex contact surface
H01H 2203/026 . on different planes
H01H 2203/028 . embedded in layer material
H01H 2203/03 . printed on casing
H01H 2203/032 . Metal foil
H01H 2203/034 . Common bus
H01H 2203/036 . to solve particular problems
H01H 2203/038 . . to be bridged by a dome shaped contact
H01H 2203/04 . . to facilitate connections
H01H 2203/042 . . to avoid cross-overs
H01H 2203/044 . . to achieve a predetermined sequence of switching
H01H 2203/046 . . to save ink
H01H 2203/048 . . to facilitate application
H01H 2203/05 . . to avoid damage by deformation of layers
H01H 2203/052 . . for backlighted keyboards
H01H 2203/054 . . for redundancy, e.g. several contact pairs in parallel
H01H 2203/056 . Cuts or depressions in support, e.g. to isolate contacts
H01H 2203/058 . Contact area function of position on layered keyboard

**H01H 2205/00 Movable contacts**

H01H 2205/002 . fixed to operating part
H01H 2205/004 . fixed to substrate
H01H 2205/006 . mounted on spacer

H01H 2205/008 . . Hollow rivet
H01H 2205/01 . mounted on flap cut out and bend out of layer
H01H 2205/012 . mounted on both sides of layer
H01H 2205/014 . fixed by mechanical deformation
H01H 2205/016 . Separate bridge contact
H01H 2205/018 . . Support points upwardly concave
H01H 2205/02 . . avoiding rotation
H01H 2205/022 . . Conductive rubber
H01H 2205/024 . . Means to facilitate positioning
H01H 2205/026 . . . Adhesive sheet
H01H 2205/028 . . . Protuberances on substrate
H01H 2205/03 . . . Apertured plate
H01H 2205/032 . Several contacts formed in one plate or layer
H01H 2205/034 . . with snap action
H01H 2205/036 . . Helicoidal cuts
H01H 2205/038 . . Cutting of connecting areas

**H01H 2207/00 Connections**
H01H 2207/002 . Conductive rubber; Zebra
H01H 2207/004 . Printed circuit tail
H01H 2207/006 . Upraised portions
H01H 2207/008 . Adhesive means; Conductive adhesive
H01H 2207/01 . from bottom to top layer
H01H 2207/012 . via underside of substrate
H01H 2207/014 . . Plated through holes
H01H 2207/016 . Jumpers; Cross-overs
H01H 2207/018 . . Spacer elements
H01H 2207/02 . Solder
H01H 2207/022 . Plug
H01H 2207/024 . . in top layer
H01H 2207/026 . Pressure contact
H01H 2207/028 . on spacer
H01H 2207/03 . via return spring
H01H 2207/032 . Surface mounted component
H01H 2207/034 . sealed
H01H 2207/036 . Crimping connector
H01H 2207/038 . Conductive paste
H01H 2207/04 . Details of printed conductors
H01H 2207/042 . . Covering maximal area of layer
H01H 2207/044 . . Resist layer

H01H 2207/046 . . Non overlapping lower and upper conductors
H01H 2207/048 . Inductive or infrared coupling

**H01H 2209/00 Layers**
H01H 2209/002 . Materials
H01H 2209/0021 . . with metallic appearance, e.g. polymers with dispersed particles to produce a metallic appearance
H01H 2209/004 . Depressions or protrusions on switch sites
H01H 2209/006 . Force isolators
H01H 2209/01 . Increasing rigidity; Anti-creep
H01H 2209/012 . avoiding too large deformation or stress
H01H 2209/014 . composed of different layers; Lubricant in between
H01H 2209/016 . Protection layer, e.g. for legend, anti-scratch
H01H 2209/018 . flat, smooth or ripple-free
H01H 2209/02 . UV or light sensitive
H01H 2209/022 . Velvet; Mat finish
H01H 2209/024 . Properties of the substrate
H01H 2209/026 . . metallic
H01H 2209/028 . . Paper
H01H 2209/03 . . elastomeric
H01H 2209/032 . . non elastomeric
H01H 2209/034 . . Conductive rubber
H01H 2209/036 . . with memory properties
H01H 2209/038 . . transparent
H01H 2209/04 . . . Glass
H01H 2209/042 . . Trellis; Lattice
H01H 2209/044 . . ceramic
H01H 2209/046 . Properties of the spacer
H01H 2209/048 . . metallic
H01H 2209/05 . . Paper
H01H 2209/052 . . elastomeric
H01H 2209/054 . . non elastomeric
H01H 2209/056 . . Conductive rubber
H01H 2209/058 . . with memory properties
H01H 2209/06 . . transparent
H01H 2209/062 . . . Glass
H01H 2209/064 . . Trellis; Lattice
H01H 2209/066 . . ceramic
H01H 2209/068 . Properties of the membrane
H01H 2209/07 . . metallic
H01H 2209/072 . . Paper

H01H 2209/074 . . elastomeric
H01H 2209/076 . . non elastomeric
H01H 2209/078 . . Conductive rubber
H01H 2209/08 . . with memory properties
H01H 2209/082 . . transparent
H01H 2209/084 . . . Glass
H01H 2209/086 . . Trellis; Lattice
H01H 2209/088 . . ceramic

**H01H 2211/00 Spacers**
H01H 2211/002 . Fluid or inflatable keyboards
H01H 2211/004 . Adhesive
H01H 2211/006 . Individual areas
H01H 2211/008 . . Spring loaded pins
H01H 2211/01 . . Ink
H01H 2211/012 . . . Successive layers, one being conductive
H01H 2211/014 . . universal
H01H 2211/016 . . Wires
H01H 2211/018 . . on printed conductors only
H01H 2211/02 . . Pins forming part of substrate
H01H 2211/022 . for larger actuation area
H01H 2211/024 . Peripheral edge deformable
H01H 2211/026 . without separate element
H01H 2211/028 . . Contacts in depressions of layers
H01H 2211/03 . . Ridges on layers
H01H 2211/032 . . Pressure sensitive layer on contacts
H01H 2211/034 . . Fixed contacts on different planes
H01H 2211/036 . . Convexly bowed membrane

**H01H 2213/00 Venting**
H01H 2213/002 . with external pressure
H01H 2213/004 . . Scavenger; Filter
H01H 2213/006 . . Labyrinth
H01H 2213/008 . . Flaps cut out forming valves
H01H 2213/01 . with internal pressure of other switch sites
H01H 2213/012 . . Open-cell foam
H01H 2213/014 . . Accumulator chamber
H01H 2213/016 . in adhesive layer

**H01H 2215/00 Tactile feedback**
H01H 2215/002 . Longer travel

H01H 2215/004 . Collapsible dome or bubble
H01H 2215/006 . . Only mechanical function
H01H 2215/008 . . Part of substrate or membrane
H01H 2215/01 . . Part of spacer
H01H 2215/012 . . Positioning of individual dome
H01H 2215/014 . . Avoiding permanent dome inversion
H01H 2215/016 . . Collapsing to second stable position
H01H 2215/018 . . unstressed in open position of switch
H01H 2215/02 . . Reversed domes
H01H 2215/022 . . Asymmetric; Elliptic; Square
H01H 2215/024 . . . Spider
H01H 2215/026 . . Eccentric actuation
H01H 2215/028 . alterable
H01H 2215/03 . Sound
H01H 2215/032 . . Resonance space
H01H 2215/034 . Separate snap action
H01H 2215/036 . . Metallic disc
H01H 2215/038 . . Resilient conductive tracks
H01H 2215/04 . . Contact making part moved through contact supporting plane
H01H 2215/042 . . Permanent magnets
H01H 2215/044 . Light
H01H 2215/046 . Inflatable bubble or cell
H01H 2215/048 . Vent
H01H 2215/05 . electromechanical
H01H 2215/052 . . piezoelectric
H01H 2215/054 . common to all switch sites

**H01H 2217/00 Facilitation of operation; Human engineering**
H01H 2217/002 . actuable from both sides
H01H 2217/004 . Larger or different actuating area
H01H 2217/006 . Different feeling for different switch sites
H01H 2217/008 . Pretravel to avoid inadvertent switching
H01H 2217/01 . Off centre actuation
H01H 2217/012 . Two keys simultaneous considerations
H01H 2217/014 . handicapped
H01H 2217/016 . Pressure reduction membrane; Spreader layer
H01H 2217/018 . Indication of switch sites
H01H 2217/02 . After travel
H01H 2217/022 . Part of keyboard not operable
H01H 2217/024 . Profile on actuator

H01H 2217/026 . Pencil operated
H01H 2217/028 . on planes with different or alterable inclination, e.g. convex plane
H01H 2217/03 . . Concave plane
H01H 2217/032 . Feedback about selected symbol, e.g. display
H01H 2217/033 . . by speech
H01H 2217/034 . Support for hands or arms
H01H 2217/036 . Plural multifunctional miniature keys for one symbol
H01H 2217/038 . Prompting
H01H 2217/04 . Mimics of controlled apparatus or symbol
H01H 2217/042 . Higher keytops
H01H 2217/044 . Repetitive strain injury [RSI] considerations
H01H 2217/046 . Enhanced legend space by smaller actuators
H01H 2217/048 . adapted for operation by left- and right-handed

**H01H 2219/00 Legends**
H01H 2219/002 . replaceable; adaptable
H01H 2219/0023 . . Images formed with electrophoretic technology, e.g. by charged pigment particles rearranged by applied electric field, e.g. electronic paper or e-paper, active ink, gyricon
H01H 2219/0026 . . having outer surface of housing of electronic apparatus programmable as display and/or input device
H01H 2219/004 . . Magnet
H01H 2219/006 . . Snap mounting
H01H 2219/008 . . Adhesive
H01H 2219/01 . . Liquid crystal
H01H 2219/011 . . . with integrated photo- or thermovoltaic cell as power supply
H01H 2219/012 . . . programmable
H01H 2219/014 . . LED
H01H 2219/016 . . . programmable
H01H 2219/018 . . Electroluminescent panel
H01H 2219/02 . . . programmable
H01H 2219/022 . . Plasma display
H01H 2219/024 . . . programmable
H01H 2219/026 . . with programming switches
H01H 2219/028 . Printed information
H01H 2219/03 . . in transparent keyboard
H01H 2219/032 . . photographic
H01H 2219/034 . . Coloured areas
H01H 2219/036 . Light emitting elements
H01H 2219/037 . . using organic materials, e.g. organic LED
H01H 2219/038 . . ambient light dependent

H01H 2219/039 . . Selective or different modes of illumination
H01H 2219/04 . . Attachments; Connections
H01H 2219/042 . . replaceable
H01H 2219/044 . . Edge lighting of layer
H01H 2219/046 . . above switch site
H01H 2219/048 . . Constituting key
H01H 2219/05 . . Key offset in relation to switch site
H01H 2219/052 . . Phosphorescence
H01H 2219/053 . . protected by inert gas
H01H 2219/054 . Optical elements
H01H 2219/056 . . Diffuser; Uneven surface
H01H 2219/058 . . Optical grid, collimator or microlouver
H01H 2219/06 . . Reflector
H01H 2219/062 . . Light conductor
H01H 2219/0621 . . . Optical fiber light conductor
H01H 2219/0622 . . . only an illuminated ring around keys
H01H 2219/064 . . Optical isolation of switch sites
H01H 2219/066 . . Lens

**H01H 2221/00 Actuators**
H01H 2221/002 . integral with membrane
H01H 2221/004 . . U-shaped openings surrounding keys
H01H 2221/006 . . Adhesive
H01H 2221/008 . other then push button
H01H 2221/01 . . also rotatable
H01H 2221/012 . . Joy stick type
H01H 2221/014 . . Slide selector
H01H 2221/016 . . Lever; Rocker
H01H 2221/018 . . Tumbler
H01H 2221/02 . . pneumatic
H01H 2221/022 . . electromagnetic
H01H 2221/024 . Transmission element
H01H 2221/026 . . Guiding or lubricating nylon
H01H 2221/028 . . . Telescopic guiding
H01H 2221/03 . . Stoppers for on or off position
H01H 2221/032 . adjustable
H01H 2221/034 . . Coded keys
H01H 2221/036 . Return force
H01H 2221/038 . . Fluid
H01H 2221/04 . . magnetic

H01H 2221/042 . . Foam
H01H 2221/044 . . Elastic part on actuator or casing
H01H 2221/046 . bistable
H01H 2221/048 . . magnetic
H01H 2221/05 . Force concentrator; Actuating dimple
H01H 2221/052 . interlocked
H01H 2221/054 . connected by flexible webs
H01H 2221/056 . Modular conception
H01H 2221/058 . to avoid tilting or skewing of contact area or actuator
H01H 2221/06 . to avoid sticking in on position
H01H 2221/062 . Damping vibrations
H01H 2221/064 . Limitation of actuating pressure
H01H 2221/066 . replaceable
H01H 2221/068 . having a not operable condition
H01H 2221/07 . transparent
H01H 2221/0702 . . Transparent key containing three dimensional (3D) element
H01H 2221/072 . Stroke amplification
H01H 2221/074 . One molded piece
H01H 2221/076 . Protruding in cavity covered by membrane
H01H 2221/078 . Different operating parts on a bigger one
H01H 2221/08 . composed of different parts
H01H 2221/082 . . Superimposed actuators
H01H 2221/084 . made at least partly of elastic foam
H01H 2221/088 . actuable from different directions
H01H 2221/09 . Flexible integral part of housing

**H01H 2223/00 Casings**
H01H 2223/002 . sealed
H01H 2223/003 . . Membrane embracing all keys
H01H 2223/004 . . Evacuation of penetrating liquid
H01H 2223/006 . . Purge gas
H01H 2223/008 . metallic
H01H 2223/01 . Mounting on appliance
H01H 2223/012 . . Snap mounting
H01H 2223/014 . . located in recess
H01H 2223/016 . . magnetic
H01H 2223/018 . . rotatably
H01H 2223/02 . . mounted on raised part
H01H 2223/022 . . Adhesive
H01H 2223/024 . . Screw

H01H 2223/026 . . Hook and loop
H01H 2223/028 . . detachable
H01H 2223/03 . Separate key housing
H01H 2223/032 . . with formations for assembling similar housings
H01H 2223/034 . Bezel
H01H 2223/0345 . . with keys positioned directly next to each other without an intermediate bezel or frame
H01H 2223/036 . . forming chamfered apertures for keys
H01H 2223/038 . transparent
H01H 2223/04 . portable; hand held
H01H 2223/042 . mounted in conventional keyboard
H01H 2223/044 . Protecting cover
H01H 2223/046 . convertible
H01H 2223/048 . . assembled by removable part
H01H 2223/05 . . composed of hingedly connected sections
H01H 2223/052 . . reductible in size, e.g. for transportation
H01H 2223/054 . Mounting of key housings on same printed circuit
H01H 2223/056 . Mounting of key housings on same frame
H01H 2223/058 . flush mounted
H01H 2223/06 . freestanding
H01H 2223/062 . Inflatable

**H01H 2225/00 Switch site location**

H01H 2225/002 . superimposed
H01H 2225/004 . in different planes to increase density
H01H 2225/006 . more then one pole
H01H 2225/008 . Two different sites for one circuit, e.g. for safety
H01H 2225/01 . Different switch sites under one actuator in same plane
H01H 2225/012 . normally closed
H01H 2225/014 . normally closed combined with normally open
H01H 2225/016 . Make break
H01H 2225/018 . Consecutive operations
H01H 2225/02 . Push-push
H01H 2225/022 . other then row-column disposition
H01H 2225/024 . Common site to all actuators, e.g. auxiliary
H01H 2225/026 . above actuator
H01H 2225/028 . perpendicular to base of keyboard
H01H 2225/03 . Different type of switches

**H01H 2227/00 Dimensions; Characteristics**

H01H 2227/002 . Layer thickness

H01H 2227/004 . . Membrane
H01H 2227/006 . . Spacer
H01H 2227/008 . . Substrate
H01H 2227/01 . . Adhesive
H01H 2227/012 . . Conductive rubber
H01H 2227/014 . . . Conductive particles
H01H 2227/016 . Switch site protrusions; Force concentrators
H01H 2227/018 . Printed contacts; Metal foil
H01H 2227/02 . Vent opening
H01H 2227/022 . Collapsable dome
H01H 2227/024 . Spacer elements
H01H 2227/026 . Separate dome contact
H01H 2227/0261 . . with an aperture in contact making centre of dome
H01H 2227/028 . Key stroke
H01H 2227/03 . Hardness
H01H 2227/032 . Operating force
H01H 2227/034 . . Regulation of operating force
H01H 2227/036 . Minimise height

**H01H 2229/00 Manufacturing**
H01H 2229/002 . Screen printing
H01H 2229/004 . . Conductive ink
H01H 2229/006 . Pad transfer printing
H01H 2229/008 . Die stamping
H01H 2229/01 . Foil transfer process
H01H 2229/012 . Vacuum deposition
H01H 2229/014 . Electro deposition
H01H 2229/016 . Selective etching
H01H 2229/018 . Testing
H01H 2229/02 . Laser
H01H 2229/022 . Modular assembly
H01H 2229/024 . Packing between substrate and membrane
H01H 2229/026 . . Riveting
H01H 2229/028 . . Adhesive
H01H 2229/03 . . Laminating
H01H 2229/032 . . Screw
H01H 2229/034 . Positioning of layers
H01H 2229/036 . ultrasonic
H01H 2229/038 . Folding of flexible printed circuit
H01H 2229/04 . Solder problems

H01H 2229/042 . Snap coupling; Snap mounting
H01H 2229/044 . Injection moulding
H01H 2229/046 . . Multi-colour or double shot injection moulding
H01H 2229/047 . . Preformed layer in mould
H01H 2229/048 . . Insertion moulding
H01H 2229/05 . Forming; Half-punching
H01H 2229/052 . Thermoplastic bonding foil
H01H 2229/054 . CAD
H01H 2229/056 . Laminating
H01H 2229/058 . Curing or vulcanising of rubbers
H01H 2229/06 . Tempering
H01H 2229/062 . Maintenance or repair facilities
H01H 2229/064 . Eliminating tolerances
H01H 2229/066 . Z-axis assembly
H01H 2229/068 . Extrusion

**H01H 2231/00 Applications**
H01H 2231/002 . Calculator, computer
H01H 2231/004 . CRT
H01H 2231/006 . Bank automat; Cash register; Vending machine
H01H 2231/008 . Video game
H01H 2231/01 . Toy
H01H 2231/012 . Household appliance
H01H 2231/014 . Sewing machine
H01H 2231/016 . Control panel; Graphic display; Programme control
H01H 2231/018 . Musical instrument
H01H 2231/022 . Telephone handset
H01H 2231/024 . Dispensing machine
H01H 2231/026 . Car
H01H 2231/028 . Watch
H01H 2231/03 . Elevator
H01H 2231/032 . Remote control
H01H 2231/034 . Coordinate determination
H01H 2231/036 . Radio; TV
H01H 2231/038 . Level sensing or limit switch
H01H 2231/04 . Robot
H01H 2231/042 . Briefcase; Note-book
H01H 2231/044 . Under water
H01H 2231/046 . Camera
H01H 2231/048 . Tools; Drilling machines

H01H 2231/05 . Card, e.g. credit card
H01H 2231/052 . Selectors, e.g. dimmers

**H01H 2233/00 Key modules**
H01H 2233/002 . joined to form button rows
H01H 2233/004 . . One molded part
H01H 2233/006 . . . Separating individual keys after mounting
H01H 2233/008 . Laykey mounted on assembled key modules
H01H 2233/01 . mounted on laykey
H01H 2233/012 . . Locating pins
H01H 2233/014 . . Snap coupling
H01H 2233/016 . . . with limited freedom
H01H 2233/018 . . One degree of freedom
H01H 2233/02 . . captured between assembled parts of support
H01H 2233/022 . . . with limited freedom
H01H 2233/024 . . Riveting
H01H 2233/026 . . Inserting
H01H 2233/028 . . connected by spring
H01H 2233/03 . mounted on support plate or frame
H01H 2233/032 . . Locating pins
H01H 2233/034 . . Snap coupling
H01H 2233/036 . . . with limited freedom
H01H 2233/038 . . One degree of freedom
H01H 2233/04 . . captured between assembled parts of support
H01H 2233/042 . . . with limited freedom
H01H 2233/044 . . Riveting
H01H 2233/046 . . Inserting
H01H 2233/048 . . connected by spring
H01H 2233/05 . Actuator part on body
H01H 2233/052 . . Locating pins
H01H 2233/054 . . Snap coupling
H01H 2233/056 . . . with limited freedom
H01H 2233/058 . . One degree of freedom
H01H 2233/06 . . captured between assembled parts of support
H01H 2233/062 . . . with limited freedom
H01H 2233/064 . . Riveting
H01H 2233/066 . . Inserting
H01H 2233/068 . . connected by spring
H01H 2233/07 . Cap or button on actuator part
H01H 2233/072 . . Locating pins

H01H 2233/074 . . Snap coupling
H01H 2233/076 . . . with limited freedom
H01H 2233/078 . . One degree of freedom
H01H 2233/08 . . captured between assembled parts of support
H01H 2233/082 . . . with limited freedom
H01H 2233/084 . . Riveting
H01H 2233/086 . . Inserting
H01H 2233/088 . . connected by spring
H01H 2233/09 . Actuating striker on actuator part
H01H 2233/092 . . Locating pins
H01H 2233/094 . . Snap coupling
H01H 2233/096 . . . with limited freedom
H01H 2233/098 . . One degree of freedom
H01H 2233/10 . . captured between assembled parts of support
H01H 2233/102 . . . with limited freedom
H01H 2233/104 . . Riveting
H01H 2233/106 . . Inserting
H01H 2233/108 . . connected by spring

**H01H 2235/00 Springs**
H01H 2235/002 . Linear coil spring combined with dome spring
H01H 2235/004 . Two parallel coil springs
H01H 2235/006 . Elastic arms producing non linear counter force
H01H 2235/008 . Rubber spring
H01H 2235/01 . Spiral spring
H01H 2235/012 . Euler spring
H01H 2235/014 . . with positive buckling force or action
H01H 2235/016 . Preloading
H01H 2235/018 . Spring seat
H01H 2235/02 . between contact and substrate
H01H 2235/022 . Actuating striker
H01H 2235/024 . . formed by knee or dimple of leaf spring
H01H 2235/026 . . forming part of return spring
H01H 2235/028 . Blade spring
H01H 2235/03 . Two serial springs

**H01H 2237/00 Mechanism between key and laykey**
H01H 2237/002 . Bell crank
H01H 2237/004 . Cantilever
H01H 2237/006 . Guided plunger or ball
H01H 2237/008 . Plunger guided by flexible arms

**H01H 2239/00** **Miscellaneous**

H01H 2239/002 . Conductive track to monitor integrity
H01H 2239/004 . High frequency adaptation or shielding
H01H 2239/006 . Containing a capacitive switch or usable as such
H01H 2239/008 . Static electricity considerations
H01H 2239/01 . combined with other elements on the same substrate
H01H 2239/012 . . Decoding impedances
H01H 2239/014 . . on both sides
H01H 2239/016 . combined with start switch, discrete keyboard
H01H 2239/018 . Ground conductor
H01H 2239/02 . Other elements in moving part
H01H 2239/022 . with opto-electronic switch
H01H 2239/024 . with inductive switch
H01H 2239/026 . Internal encoding, e.g. validity bit
H01H 2239/03 . Avoiding erroneous switching
H01H 2239/032 . Anti-tamper
H01H 2239/034 . Environmental protection
H01H 2239/036 . . Heating, e.g. against condensation
H01H 2239/038 . Anti-vandalism
H01H 2239/04 . Gadget
H01H 2239/042 . Unmixable liquids inside
H01H 2239/044 . High voltage application
H01H 2239/046 . Getter
H01H 2239/048 . comprising microphone or speaker
H01H 2239/05 . Mode selector switch, e.g. shift, or indicator
H01H 2239/052 . Strain gauge
H01H 2239/054 . Acoustic pick-up, e.g. ultrasonic
H01H 2239/056 . Keyboard or overlay identification features
H01H 2239/058 . Containing a battery
H01H 2239/06 . Temperature sensitive
H01H 2239/062 . Disposable
H01H 2239/064 . Simulating the appearance of touch panel
H01H 2239/066 . Duplication of control panel, e.g. duplication of some keys
H01H 2239/068 . 3D
H01H 2239/07 . UV or IR detection, e.g. of human body
H01H 2239/072 . High temperature considerations
H01H 2239/074 . Actuation by finger touch
H01H 2239/076 . Key stroke generating power
H01H 2239/078 . Variable resistance by variable contact area or point

**H01H 2300/00** **Orthogonal indexing scheme relating to electric switches, relays, selectors or emergency protective devices covered by H01H**

H01H 2300/002 . Application electric motor braking, e.g. pole reversal of rotor, shorting motor coils, also for field discharge

H01H 2300/004 . Application hearing aid

H01H 2300/006 . Application power roofs

H01H 2300/008 . Application power seats

H01H 2300/01 . Application power window

H01H 2300/012 . Application rear view mirror

H01H 2300/014 . Application surgical instrument

H01H 2300/016 . Application timepiece

H01H 2300/018 . Application transfer; between utility and emergency power supply (circuits in H02J 9/04)

H01H 2300/02 . Application transmission, e.g. for sensing the position of a gear selector or automatic transmission

H01H 2300/022 . Application wake up; switches or contacts specially provided for the wake up or standby shift of a circuit

H01H 2300/024 . Avoid unwanted operation

H01H 2300/026 . Application dead man switch: power must be interrupted on release of operating member

H01H 2300/028 . Application dead man switch, i.e. power being interrupted by panic reaction of operator, e.g. further pressing down push button

H01H 2300/03 . Application domotique, e.g. for house automation, bus connected switches, sensors, loads or intelligent wiring

H01H 2300/032 . . using RFID technology in switching devices

H01H 2300/034 . using magnetic shape memory [MSM] also an austenite-martensite transformation, but then magnetically controlled

H01H 2300/036 . Application nanoparticles, e.g. nanotubes, integrated in switch components, e.g. contacts, the switch itself being clearly of a different scale, e.g. greater than nanoscale

H01H 2300/038 . Preselection, i.e. the output of a switch depends on a particular preselection, e.g. a particular position of another switch

H01H 2300/04 . Programmable interface between a set of switches and a set of functions, e.g. for reconfiguration of a control panel

H01H 2300/042 . Application rejection, i.e. preventing improper installation of parts

H01H 2300/044 . Application rejection 1: coded interacting surfaces, polarising e.g. to avoid insertion of a circuit breaker or fuse or relay or rating plug of the wrong caliber or in the wrong direction

H01H 2300/046 . using snap closing mechanisms

H01H 2300/048 . . Snap closing by latched movable contact, wherein the movable contact is held in a minimal distance from the fixed contact during first phase of closing sequence in which a closing spring is charged

H01H 2300/05 . . Snap closing with trip, wherein the contacts are locked open during charging of mechanism and unlocked by separate trip device, e.g. manual, electromagnetic etc.

H01H 2300/052 . Controlling, signalling or testing correct functioning of a switch (see also H01H 2300/056 to H01H 2300/066 and H01H 11/0062)

H01H 2300/054 . Application timeslot: duration of actuation or delay between or combination of subsequent actuations determines selected function

H01H 2300/056 . Tools for actuating a switch

H01H 2300/058 . . using apparatus with a spring motor or a snap-acting mechanism for actuating any one of a number of circuit breakers

H01H 2300/06 . using tools as locking means

H01H 2300/062 . . for locking a charged spring

H01H 2300/064 . . . by means of removable member

H01H 2300/066 . . for locking a switch in a test or an "installation" position