

Title (en)

Operating mechanism for an electric switch with three positions.

Title (de)

Antrieb für einen elektrischen Dreistellungsschalter.

Title (fr)

Mécanisme de commande pour interrupteur électrique à trois positions.

Publication

**EP 0212427 A1 19870304 (DE)**

Application

**EP 86110816 A 19860805**

Priority

DE 3529617 A 19850819

Abstract (en)

1. Drive for an electric three-position switch, comprising : a switch shaft (1) a crank lever (2) combined with the switch shaft (1) a force-transmitting device a link pin (17, 18) connecting the crank lever (2) and the force-transmitting device a switch spring (4) in the form of a tension spring, and a further switch spring (5) a handle (6) an approximately hammer-shaped rocker arm (7) combined with the switch shaft (1), and a stop device consisting of a plurality of stop elements and two pawls (8, 9) which can each be rocked about a pin (12, 13) against a spring force, characterised by the features : a) the force-transmitting device consists of two four-bar chains symmetrically juxtaposed to one another, each of which comprises an outer link (14, 16; 15, 17) which is set at an angle before each switching action and consists of an outer component (14; 15), a centre component (16; 17) connected to the crank lever (2) by means of the link pin (3), and a further link pin which connects the outer component (14; 15) and the centre component (16; 17), as well as an outer pin (20; 21) which is fixedly mounted on a frame (22/23) common to the four-bar chains ; b) the centre components (16; 17) of the two four-bar chains are combined with one another by the link pin (3) ; c) the link pin (3) and the switch shaft (1) are points of articulation of the two four-bar chains ; d) the crank lever (2) is a common inner component of the two four-bar chains ; e) the further switch spring (5) is also a tension spring and is connected at one end, either directly or by means of an intermediate member (25), to the further link pin (19), while the other switch spring (4) is connected, symmetrically in relation thereto, to the other further link pin (18) ; f) the free ends of the switch springs (4; 5) each engage with a respective sliding support (30; 31) which is provided with a pawl stop (40; 41) and can be shifted in the frame (22, 23) for the purpose of tensioning the associated switch spring (4; 5) ; g) the handle (6) is divided, by a pivot pin (42) fixedly mounted in the frame (22/23), into a force arm (6a) and a load arm (6b) which is formed as a cross member at each end for shifting a sliding support (30; 31) ; h) the pawl stop (40; 41) of each sliding support (30; 31) is situated in the path of the rocking motion of the associated pawl until a predetermined tension of the associated switch spring (4; 5) is reached, but lies outside the path of the rocking motion of the associated pawl (8; 9) after the switch spring (4; 5) has reached the predetermined tension and an excess tension caused by an excess travel of the sliding support (30; 31) ; i) there is provided at one end of each pawl (8; 9) a driving pin (43; 44) which is flanked by two rod elements (45; 46; 47; 48) which are connected together by a draw spring (49; 50) and one of which extends from a stop element constructed as a circuit-opening halfshaft (51; 52), and the other from a stop element constructed as a circuit-closing half-shaft (53; 54) ; j) all the half-shafts (51 - 54) are disposed on an arc of a circle around the switch shaft (1), the two circuit-opening half-shafts (51, 52) being flanked by the circuit-closing half-shafts (53, 54) ; k) each circuit-closing half-shaft (53, 54) lies in the path of the rocking motion of the rocker arm (7) before and during a tensioning of the switch spring (4; 5) closer to it, but outside the path of the said motion at the beginning of a detensioning of the switch spring (4; 5) due to a moment of rotation (45; 48) exerted on its rod element by the driving pin (43; 44) of the associated pawl (8; 9) ; l) after detensioning of a switch spring (4; 5), its outer link (14, 16; 15, 17) occupies substantially an extended position and the switch shaft (1) occupies a circuit-closing position due to the moment of rotation exerted on the crank lever (2) by the respective centre component (16; 17) in the detensioning of the switch spring (4; 5), while the other outer link (14, 16; 15, 17) is set at an angle, the associated switch spring (4; 5) is tensioned and that circuit-opening half-shaft (51; 52) which lies closer to the detensioned switch spring (4; 5) is interlocked with the rocker arm (2) ; m) when the force arm (6a) of the handle (6) has been freed, a residual tension of the respective detensioned switch spring (4; 5) is available for cancelling the excess travel of the associated sliding support (30; 31) and available for a subsequent pawl-setting travel, at which that circuit-opening halfshaft (51; 52) which interlocks with the rocker arm (8) is rotated into a position in which it obstructs the return motion of the rocker arm (2) due to a moment of rotation imparted to it by the associated draw spring (49; 50) ; n) each pawl (8; 9) is provided with a return pin (55; 56) which is opposed to its driving pin (42; 43) and which forms a point of engagement for the spring force (10; 11), the said return pin being designed to rock the pawl (8; 9) out of its slip position by means of a lug (57; 58) on the load arm (6b) of the handle (6) ; o) each circuit-opening half-shaft (51; 52) can be actuated manually and/or by remote control.

Abstract (de)

Offenbart wird ein Antrieb für einen elektrischen Dreistellungsschalter. Im Antrieb sind zwei Schaltfedern (4; 5) von zwei Viergelenkketten übergriffen sowie mittels eines Lastarmes (6b) einer Handhabe (6) wechselweise spannbar. Jede Viergelenkkette weist einen Außenbolzen (20; 21), ein Außenglied (14; 15), ein Mittelglied (16; 17) und einen das Außenglied (14; 15) und das Mittelglied (16; 17) verbindenden Gelenkbolzen (18; 19) auf, an dem jeweils eine Schaltfeder (4; 5) angreift. Die Außenbolzen (20; 21) sind auf einem beiden Viergelenkketten gemeinsamen Gestell (22; 23) festgelegt. Ein Gelenkbolzen (3) durchgreift beide Mittelglieder (16; 17) und einen beiden Viergelenkketten gemeinsamen Kurbelhebel (2), der auf einer Schaltwelle (1) sitzt. Der Gelenkbolzen (3) und die Schaltwelle (1) sind beiden Viergelenkketten gemeinsam, ebenso der Kurbelhebel (2). Jede Schaltfeder (4; 5) ist durch eine Verriegelungseinrichtung (7, 53; 54) während eines Spannvorganges gegen Entspannen gesichert, nach Freigabe durch die Verriegelungseinrichtung (7, 53; 54) jedoch entspannbar. Hierbei wird durch Einknicken der zugeordneten Viergelenkkette die Schaltwelle (1) sprunghaft gedreht und die andere Schaltfeder (4; 5) durch Ausknicken der anderen Viergelenkkette für eine Folgeschaltung gespannt, die von Hand oder elektromechanisch auslösbar ist.

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CPC (source: EP)

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Citation (search report)

- [A] GB 794191 A 19580430 - ENGLISH ELECTRIC CO LTD
- [A] DE 1540089 A1 19690821 - LICENTIA GMBH
- [A] US 4446343 A 19840501 - GOLUB GREGORY J [US], et al
- [AD] DE 3239839 C1 19840301 - SIEMENS AG

Cited by

CN112002590A; CN112002591A; CN110406819A; CN113748476A; CN113811970A

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