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Olsson

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(54) **DOUBLE-ACTING ELECTROMAGNETIC ACTUATOR**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

1,066,081 7/1913 Coleman .

1,711,285	4/1929	Petersen .	
1,792,512	*	2/1931 Siegmund .	
2,736,843	*	2/1956 Douglas et al.	317/156
2,989,668	*	6/1961 Parisoe	317/176
3,524,111	*	8/1970 Maecker et al.	317/155.5
3,585,458	*	6/1971 Yoshimura	335/149
4,032,823	*	6/1977 Arvisenet et al.	361/194
4,598,178	*	7/1986 Rollins	179/115.5 VC

* cited by examiner

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(57) **ABSTRACT**

The invention relates to an electromagnetic actuator for a rapid linear motion with a limited length of stroke. The electromagnetic actuator includes a stationary arranged first coil (1, 6) and a second movable coil (2), with the winding of the stationary coil connected to controllable power source (7) and the winding of the movable coil is short-circuited without any galvanic connection to an external power source. The ends of the winding of the movable coil of the electromagnetic actuator is short-circuited via a rectifier element (9), preferably a diode. The diode allows a current to be developed in one direction only in the winding of the second coil, said current being induced from an electromagnetic field generated by a current through the first coil. In this manner is a double-acting electromagnetic actuator with very low weight obtained, resulting in very rapid response and high reliability, due to the lack of any external electrical connections to the movable coil.

7 Claims, 3 Drawing Sheets

