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[Continued on next page]

(54) **Title:** TELESCOPING LINEAR ACTUATOR WITH SCREW DRIVES

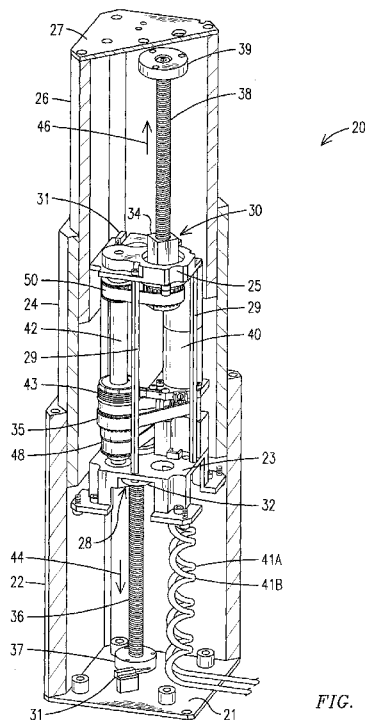
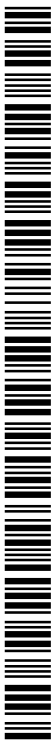


FIG. 1

(57) **Abstract:** A linear actuator (20) including three nested telescoping sections (22, 24, 26) actuated by two internal screw drives (28, 30). First and second screw drive nuts (32, 34) are rotatably mounted in the intermediate telescoping section (24) to linearly translate respective first and second screw shafts (36, 38), which are fixed to respective distal ends (21, 27) of the outer (22) and inner (26) telescoping sections. The drive nuts may be mounted at opposite ends of the intermediate section in a housing (23, 25, 29), and may be driven by a motor (40) therein via an idler shaft (42) that spans between the two drive nuts. The motor may be designed to serve alternately as a regenerative resistance brake (R1). A mechanical brake (43) may alternately or additionally be provided. Either or both brakes may be set to engage by default on power outage.





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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(8) - F16H 25/20 (2012.01) USPC - 74/89.35 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) USPC-74/89.35 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC-74/89.23, 89.32, 89.33, 89.34---See search terms below Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWest (PGPB,USPT,EPAB,JPAB), google, google patents Search terms-telescop\$, linear, actuator, three, motor, screw shafts, drive nuts, brake, drum, spring, idler shaft, solenoid, brake drum, brake spring, pulley, electrical, circuit		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y  Y  Y  Y	US 2002/0162410 A1 Zimmerman 7 November, 2002 (07.11.2002), entire document especially abstract; Figs. 1-6; paras [0020] and [0023]  US 2007/0295126 A1 Wang 27 December, 2007 (27.12.2007), abstract; Figs. 1, 8, and 9; paras [0024], [0025], and [0028]  US Re 26,484 A Bricker et al. 5 November, 1968 (05.11.1968), claims 1-8; Figs. 1-4; col 3, ln 8-23 and col 4, ln 36-44  US 3,947,740 A Tsuboi 30 March, 1976 (30.03.1976), abstract; Fig. 1	10, 11 ----- 1-9, 12-20  1-9, 12-20  2-4, 8, 15-18, 20  7, 8, 18, 20
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 31 May 2012 (31.05.2012)		Date of mailing of the international search report <p align="center" style="font-size: 1.5em; font-weight: bold;">20 JUN 2012</p>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: <p align="center" style="font-weight: bold;">Lee W. Young</p> PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	US 2006/0145044 A1	
A	US 6,401,565 B1	