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CA 2479454 A1 2006/02/28

(21) **2 479 454**

(12) **DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION**

(13) **A1**

(22) Date de dépôt/Filing Date: 2004/08/30

(41) Mise à la disp. pub./Open to Public Insp.: 2006/02/28

(51) Cl.Int./Int.Cl. *F15B 15/26* (2006.01),
G01N 7/00 (2006.01), *F16F 9/56* (2006.01),
B64C 25/00 (2006.01), *F15B 21/08* (2006.01)

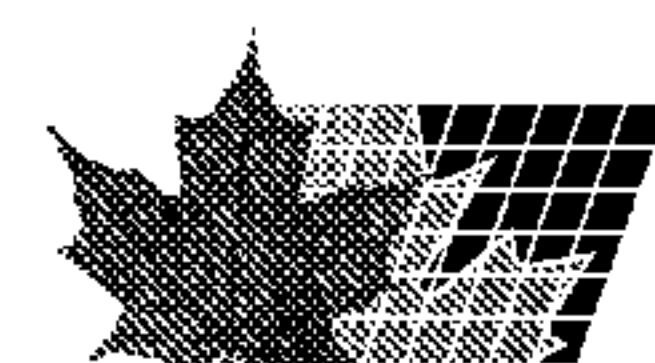
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(54) Title: INTERNALLY LOCKING ACTUATOR WITH DIRECT ACTING INTEGRAL LOCK SENSOR

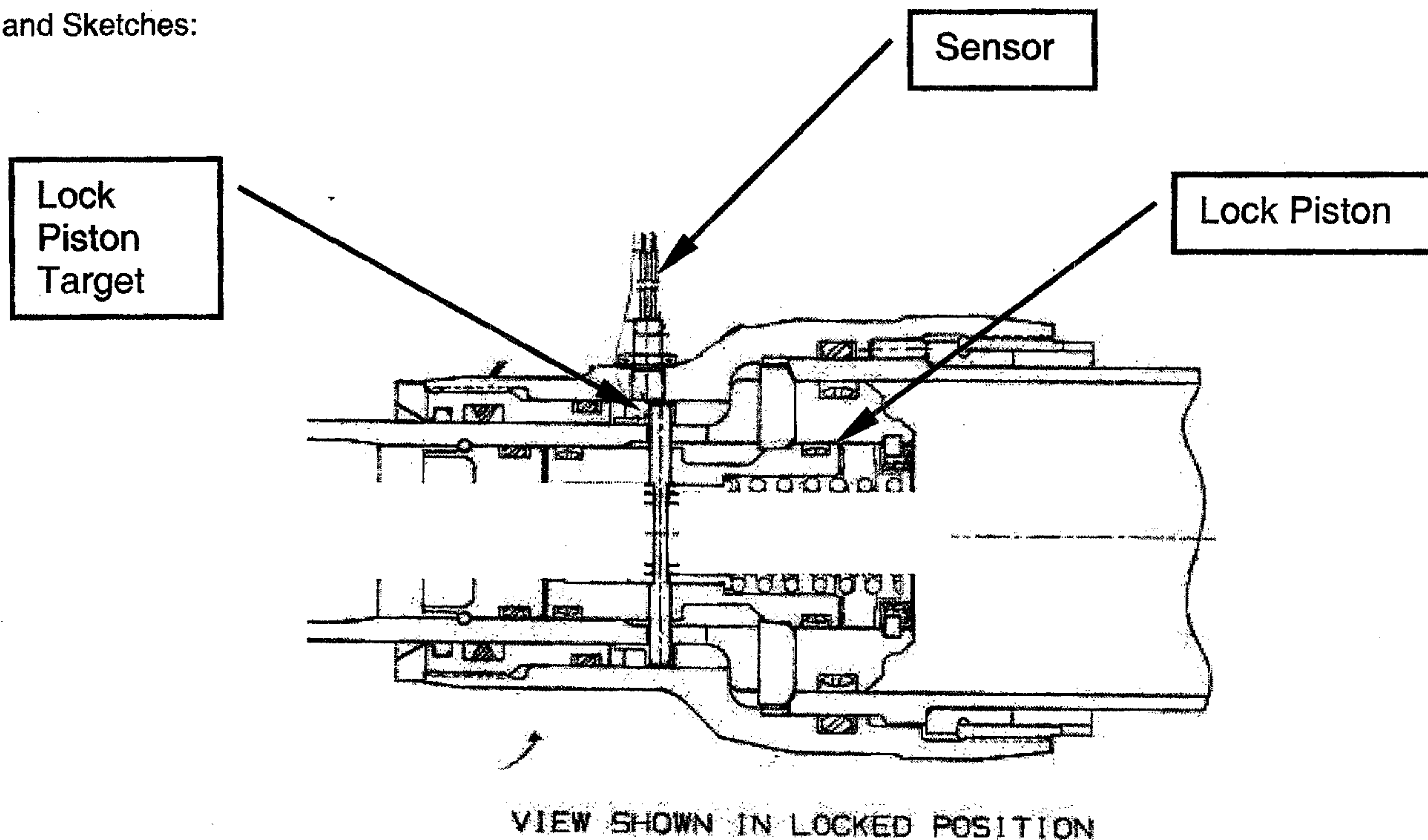




Invention Disclosure

Title: Internally Locking Actuator with direct acting integral lock sensor Project Number: _____

Description and Sketches:



A variable reluctance proximity sensor is mounted into a locking actuator pressure vessel where it monitors the state of a lock piston target position. The target is made of a ferromagnetic material. In the unlock position the target does not cover the sensor face and is in the "FAR" state. When the actuator is in the lock position the target partially covers the sensor face and is in the "NEAR state". The sensor impedance changes due to the presence of the target.

The sensor is shown with threads into a port. An alternate mounting arrangement can include a flange mounting sensor. This arrangement would allow axial adjustment of the sensor by the addition of a plurality of shims under the flange.

Due to production tolerances, it is imperative that a means of providing axial adjustment of the sensor is provided in order to calibration (rig) the sensor for standard operation – this allows field interchangeability of the actuator unit.

See additional page for cross section showing locked and unlocked configurations.



Additional Page - Invention Disclosure

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The existing lock sensing design is shown in the following figure:

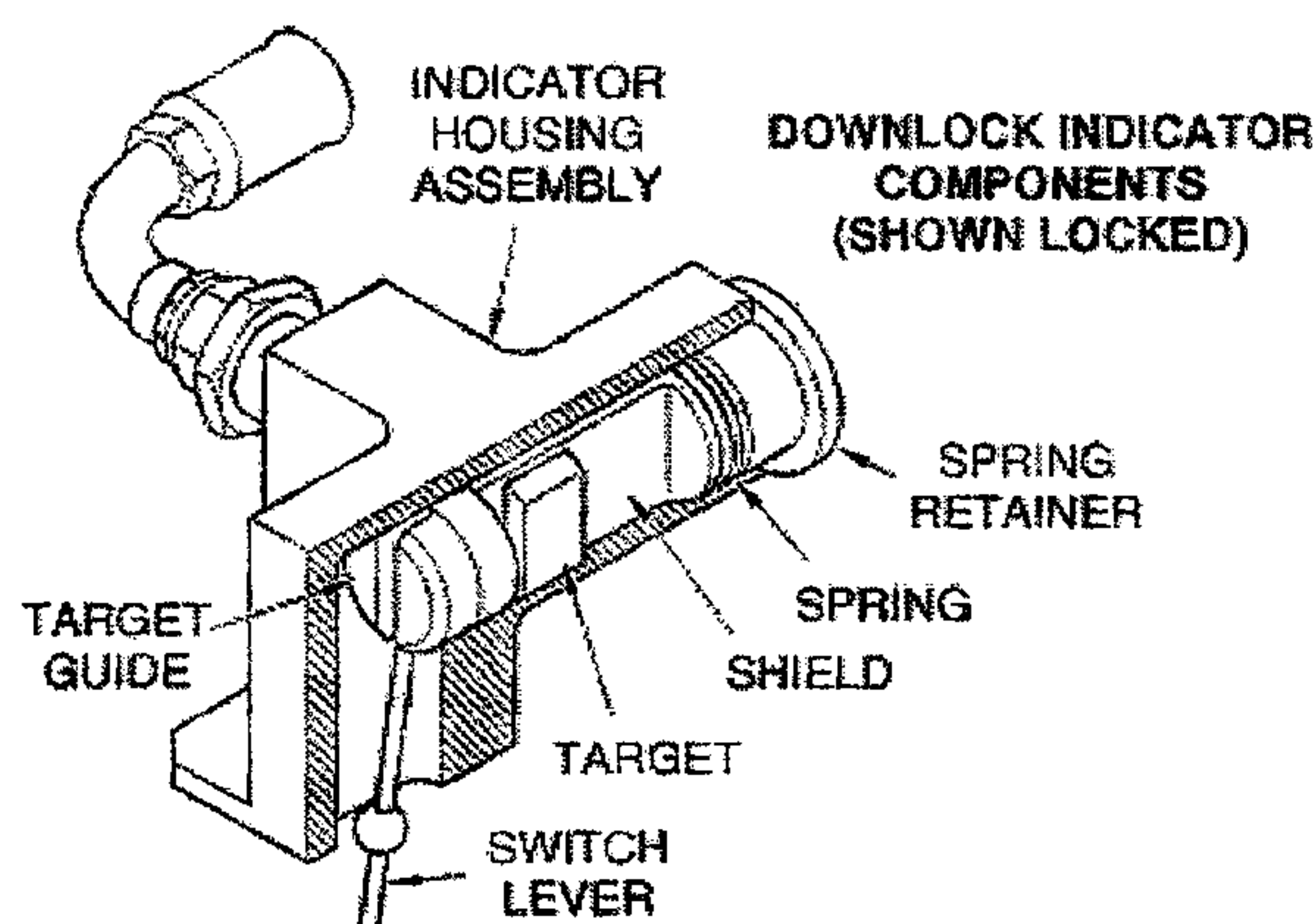


Figure A: Existing Lock Sensing Mechanism

The current lock sensing mechanism is activated when a lock indicator ring, connected to the locking mechanism in the piston, moves a switch lever magnifying a displacement on the other end of the lever. This magnified distance moves a target guide, which moves a target into proximity sensor range. The proximity sensors transmit a signal indicating that the piston is fully extended and locked.

The concept behind the side brace sensor project is to simplify the current lock sensing mechanism by using sensors specifically designed for hydraulic actuators with a 4700 PSIA impulse pressure. The sensor would install directly into the rod end cap of the

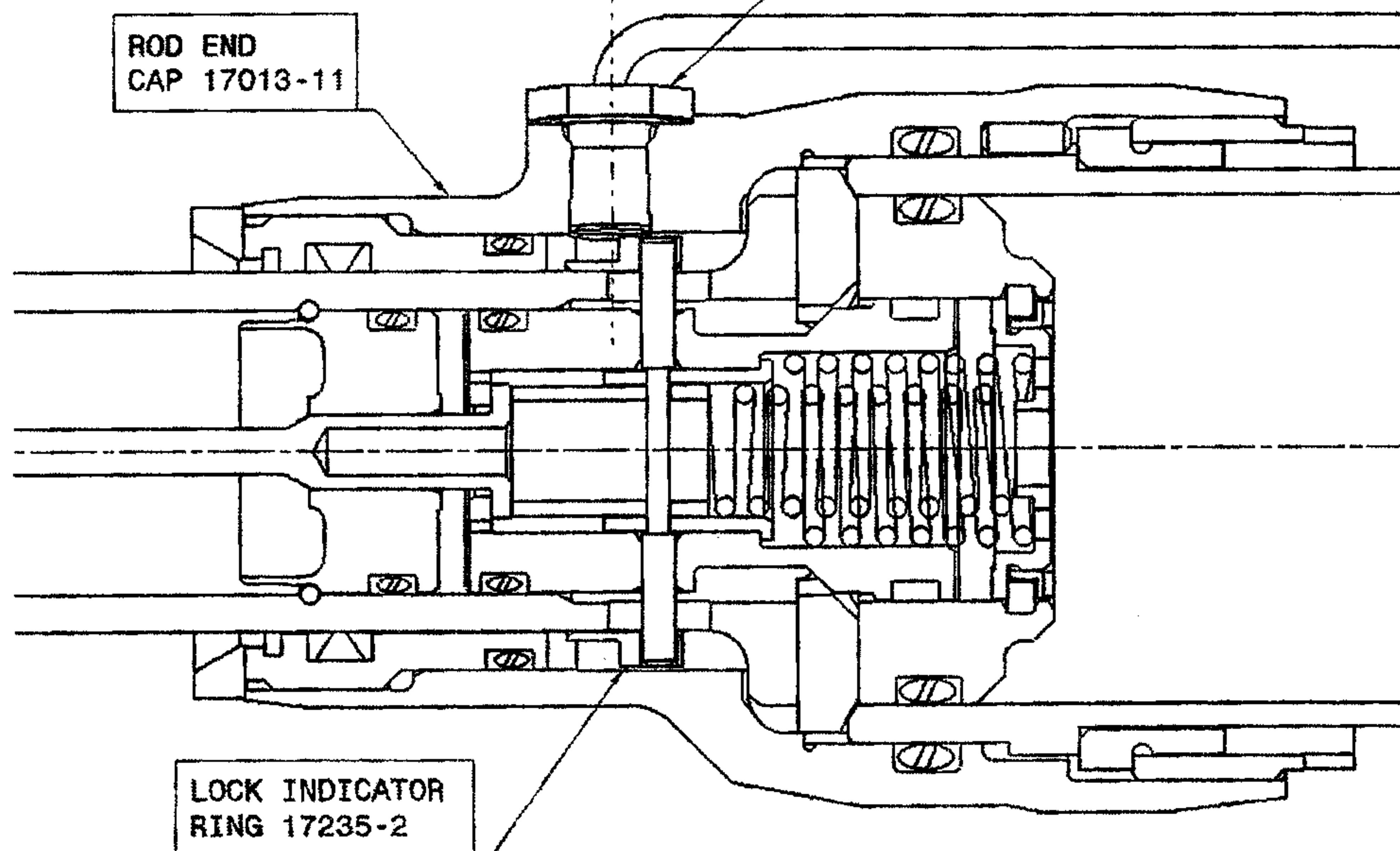


Figure B: Actuator Side Brace in the Fully Extended Locked Position



Messier-Dowty
sneema group

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When the piston is fully extended, hydraulic pressure forces the piston lock to move within the piston head forcing the lock segments between the cylinder and rod end cap, locking the side brace in the fully extended position. In turn, the pin will move the lock indicator ring target pass a sensor (or sensors). When the sensor inductance reaches greater than or equal to 5.12mH, it will then transmit a signal indicating the piston is fully extended and locked. To ensure the locking condition the lock indicator ring has been modified to improve the tolerance stack-up for the side brace.

To retract the piston, hydraulic fluid is applied at the retract port. This pressure is greater than the lock spring pressure causing the lock piston to move back. By doing so the lock segments collapse within the piston head pulling the pin and lock indicating ring back toward the cylinder. When the target is out of proximity sensor range, the sensor inductance drops to less than or equal to 4.89 mH, transmitting a signal indicating the piston is fully unlocked.

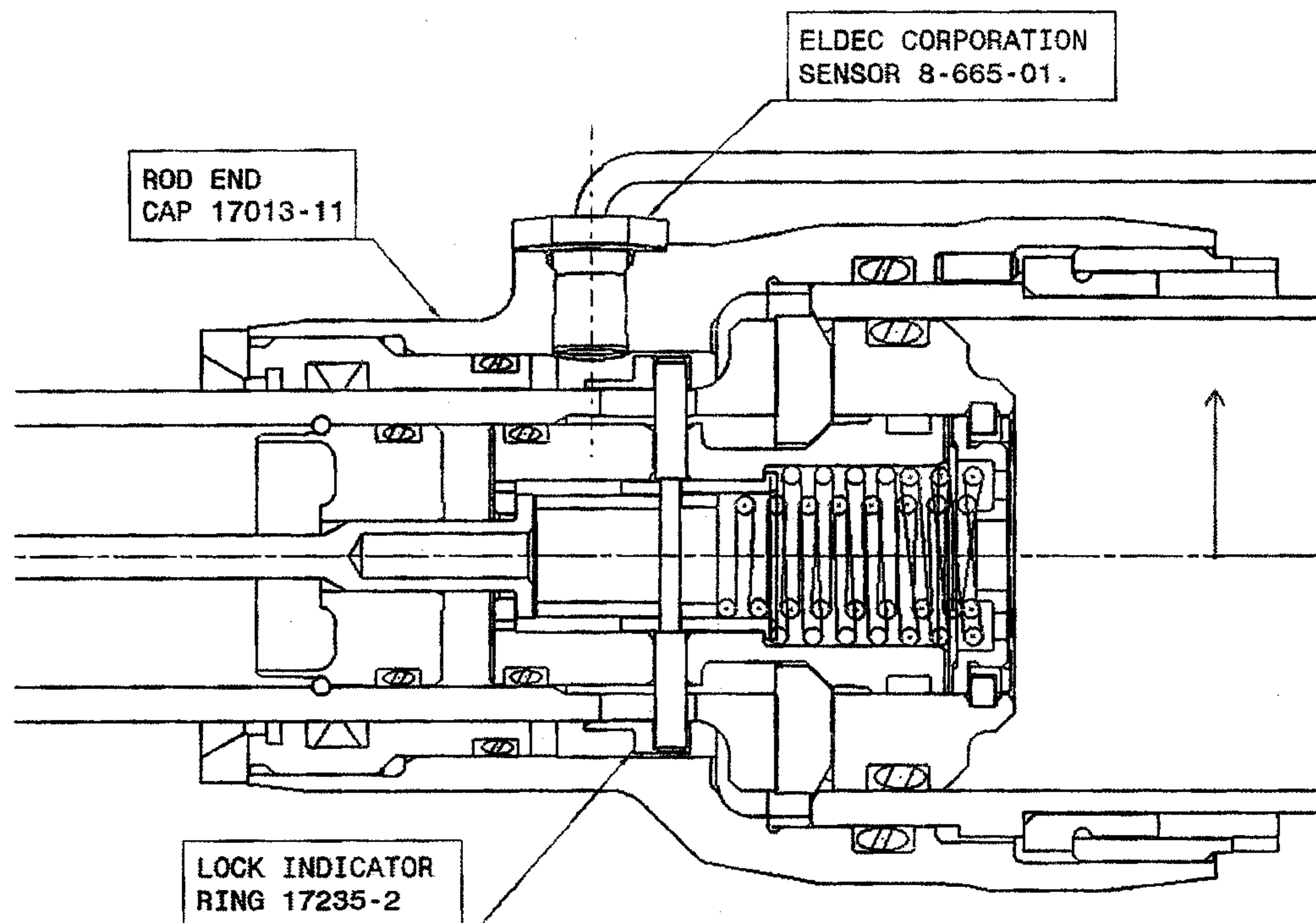


Figure C: Actuator Side Brace in the Fully Unlocked Position