ABX Air Flight 1611
San Francisco, CA
June 28, 2008
DCA08MA076

ATTACHMENT 1
Door Operation
(14 Pages)

ENTRY/SERVICE DOORS - DESCRIPTION AND OPERATION

1. General

   A. The left side door is an entry door. The right side door is a service door. Both doors operate manually from inside or outside.

2. Component Details

   A. Entry/Service Doors (**Fig. 1**)

      (1) The doors open inward and upward to a position inside the fuselage. Each door is guided by rollers inside the upper and side tracks. A counterbalance provides the force to allow the door to be lifted to the open position.

   B. Entry/Service Door Mechanism (**Fig. 2**)

      (1) The entry/service door mechanism includes: operating handle, pushrods, overhead link, latch torque tubes, and a lockpin cable. The operating handle works the pushrods which connect to the latch torque tubes and ceiling panel torque tubes in overhead linkage. The lockpin flex cable actuates the lockpin to lock the door closed.

   C. Interior Handle Mechanism (**Fig. 3**)

      (1) The interior handle mechanism includes the operating handle, handle support casing, and arm/disarm lever. The handle rotates upward to unlock and unlatch the door.

      (2) The interior handle has a clutch mechanism where the handle attaches to the interior handle shaft. The clutch mechanism lets the interior handle stay in the latched position when the handle is lifted.

   D. Mode Select Mechanism (**Fig. 3**)

      (1) The mode select mechanism connects to the handle support casing. The secondary capture lever rotates inboard when the handle disconnect lever is rotated inboard. An overcenter spring holds the lever either in the captured (outboard) or uncaptured (inboard) position.

   E. Exterior Handle Mechanism (**Fig. 4**)

      (1) The exterior handle connects to the interior handle through the handle support. Pushing in the exterior primary capture lever, so that the external handle may be grasped, put the handle in an uncaptured position. The exterior handle, is lifted to unlock and unlatch the door.

   F. Latchpin Mechanism (**Fig. 5**)

      (1) The latchpin assembly includes the latchpin and flex cable. The flex cable connects the latchpin to the operating handle. The latchpin blocks the guide roller to prevent the door latching mechanism from back-driving in the event of negative cabin pressure. The latchpin also serves as a target to activate the door locked sensor when the entry/service door is latched closed.

   G. Latch Torque Tube (**Fig. 6**)

      (1) The latch torque tube transmits torque from the pushrods to the latch cam. The latch cam rotates against the cam rollers on the trolley to latch the door closed.

   H. Trolley (**Fig. 6**)

      (1) The trolley is attached to the door, and connected to the counterbalance cable. Four rollers, on the trolley, roll on the upper tracks to guide the door up into the fuselage. Latch cams engage the cam rollers to force the door into the cutout when the interior or exterior door handle is moved to the closed position.

I. Pulleys (**Fig. 7**)

(1) Two pulleys carry the cable from the counterbalance to the door trolley. A shock absorber is attached to one of the pulleys.

J. Upstop Snubber (**Fig. 7**)

(1) The upstop snubbers at the top of the side tracks absorb the shock of the door opening motion and stops the door in the overhead position.

K. Counterbalance Assembly (**Fig. 8**)

(1) The counterbalance provides a force to assist in lifting the door overhead. A cable from the counterbalance to the trolley wraps around the counterbalance cable drum to lift the door. The torsion springs provide the force to rotate the cable drum. The rigging handwheel adjusts the spring torsion. The centrifugal brake limits the closing speed of the door in case of torsion spring failure.

L. Lower Rollers (**Fig. 9**)

(1) The lower rollers at the bottom sides of the door are captive in the side tracks. The right side (looking inboard from outside) roller axle floats to allow for misalignment or irregularities in the side tracks.

M. Continuous Door Stop (**Fig. 9**)

(1) The continuous door stops are along the forward and aft edges of the door. The stops are made of torlon. The stops carry the pressure load from the door against the body stops on the fuselage.

N. Door Uplatch and Solenoid (**Fig. 10**)

(1) The uplatch protrudes through the side track to hold the door open. Lifting the door, then pushing and holding the uplatch release until the lower rollers pass below the uplatch, releases the door for closing.

3. Operation

A. Functional Description (Entry/Service Doors)

(1) The interior handle operates a pushrod linkage to the door latch torque tube. The door latch torque tube rotates to latch/unlatch the door.

B. Control

(1) Open the Entry/Service Door Externally

(a) Push the external primary capture lever fully to the uncaptured position.

(b) Slowly move the exterior handle to the unlatched position.

(c) To open the entry/service door, lift the door up until the uplatch is engaged.

(d) Turn the release roller, under the exterior handle, in the direction shown and lower the handle to the faired position.

NOTE: THE EXTERNAL PRIMARY CAPTURE LEVER STAYS IN THE DISARMED (INBOARD) POSITION.

(2) Close the Entry/Service Door Externally

(a) Make sure the interior handle is in the open (unlatched) position. Move the handle to the open position, if it is necessary.

NOTE: IF THE INTERIOR HANDLE IS NOT IN THE OPEN POSITION, YOU CANNOT CLOSE THE DOOR FULLY.

(b) Make sure the red external primary capture lever is fully in the captured position.

NOTE: IF THE PRIMARY CAPTURE LEVER IS NOT IN THE UNCAPTURED POSITION, YOU CANNOT FULLY CLOSE THE DOOR.

(c) Make sure the exterior handle is in the unlatched position.

WARNING: MAKE SURE THE AREA OF THE MOVEMENT FOR THE INTERIOR HANDLE IS CLEAR. THE INTERIOR HANDLE WILL MOVE DOWN WHEN THE DOOR IS CLOSED. THE SUDDEN MOVEMENT OF THE INTERIOR HANDLE CAN CAUSE INJURY TO PERSONS IN THE AIRPLANE.

(d) Make sure no persons are in the area of movement of the interior handle.

(e) To lower the crew/entry door manually, do these steps:

1) Lift the door to remove the load from the uplatch.

2) Push the uplatch button and pull the door down approximately three inches.

3) Release the uplatch button.

4) Pull the door down to the floor.

WARNING: USE THE PALM OF YOUR HAND TO MOVE THE EXTERIOR DOOR HANDLE DOWN AND DO NOT PUT YOUR FINGERS AROUND THE HANDLE. THE SUDDEN MOVEMENT OF THE INTERIOR HANDLE CAN CAUSE INJURY TO PERSONS IN THE AIRPLANE.

(f) Slowly move the exterior handle down to the faired position.

NOTE: THE RED EXTERNAL PRIMARY CAPTURE LEVER IS PULLED INTO THE FULLY FAIRED POSITION WHEN THE SECONDARY CAPTURE LEVER HANDLE IS MOVED TO THE CAPTURED POSITION.

(3) Open the Entry/Service Door Internally

(a) Pull the secondary capture lever handle to the uncaptured (inboard) position.

(b) Move the interior handle to the open position.

(c) To open the entry/service door manually, use the handholds on the door liner and lift the door up until the uplatch is engaged.

(4) Close the Entry/Service Door Internally

(a) Make sure the exterior handle and the red external primary capture lever are in one of these positions:

1) The exterior handle and the external primary capture lever are in the faired position.

2) The exterior handle is up and the external primary capture lever is in the uncaptured position.

NOTE: IF THE EXTERIOR HANDLE IS UP AND THE EXTERNAL PRIMARY CAPTURE LEVER IS IN THE CAPTURED POSITION, IT IS POSSIBLE THAT THE EXTERIOR HANDLE WILL NOT LATCH.

(b) To lower the entry/service door manually, do these steps:

1) Lift the door to remove the load from the uplatch.
2) Push the uplatch button and pull the door down approximately three inches.
3) Release the uplatch button.
4) Pull the door down to the floor.
5) Move the interior handle down to the latched position.
6) Push the release button and move the secondary capture lever handle to the captured position.

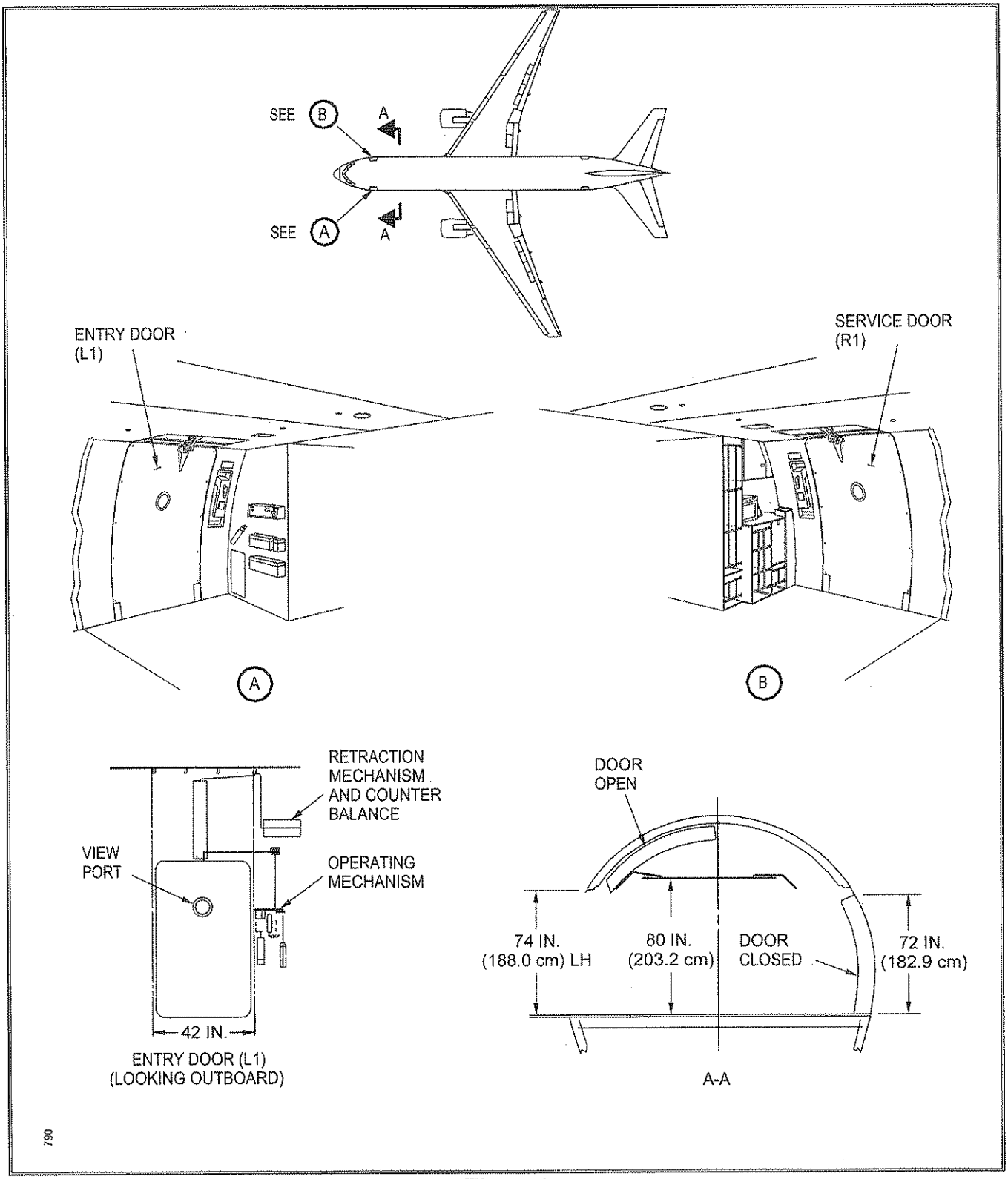

Figure 1
Sheet 1 - Entry/Service Doors

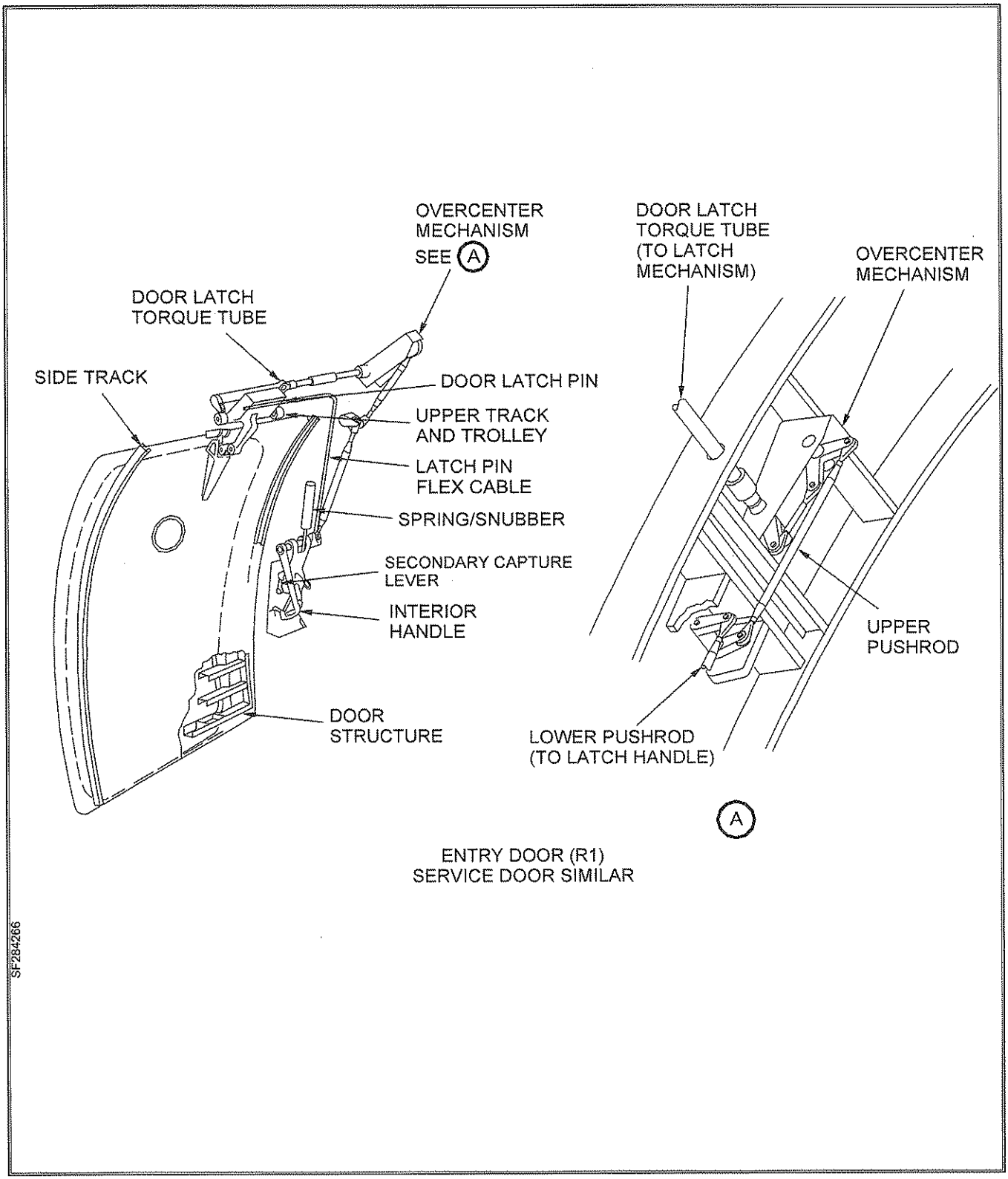

Figure 2
Sheet 1 - Entry/Service Door Mechanism

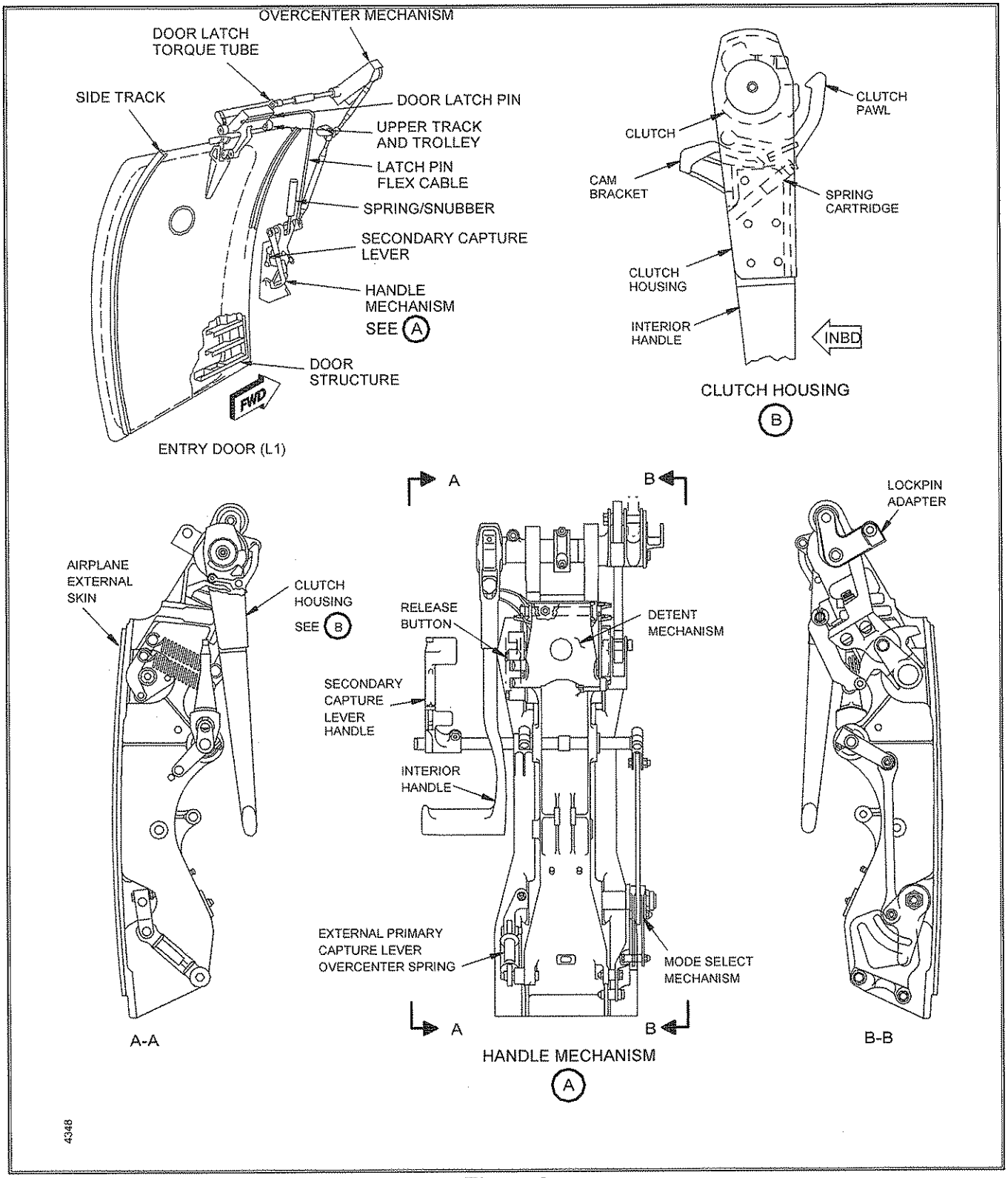

Figure 3
Sheet 1 - ENTRY DOOR (l1) Interior Handle Mechanism

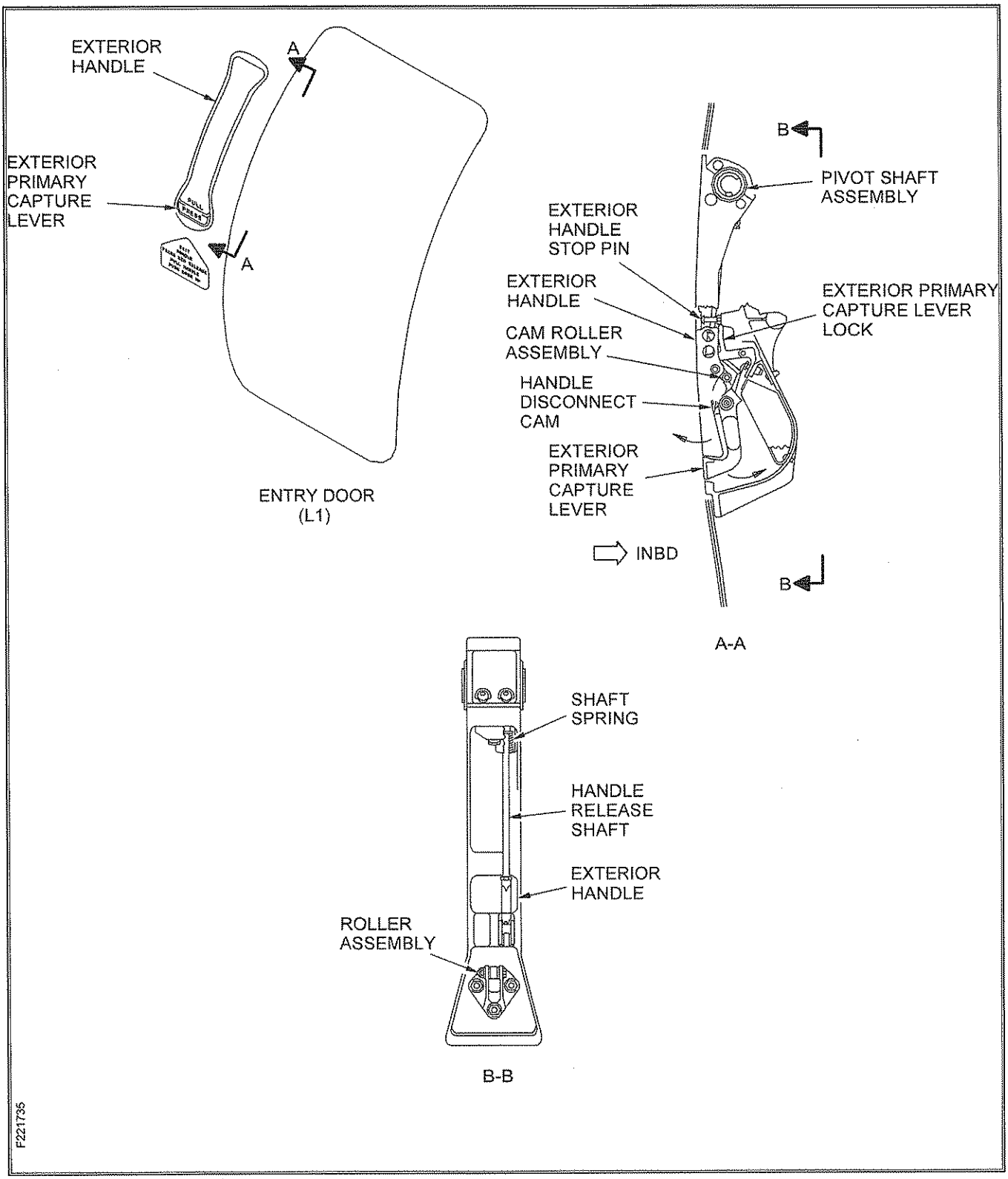

Figure 4
Sheet 1 - Exterior Handle Mechanism

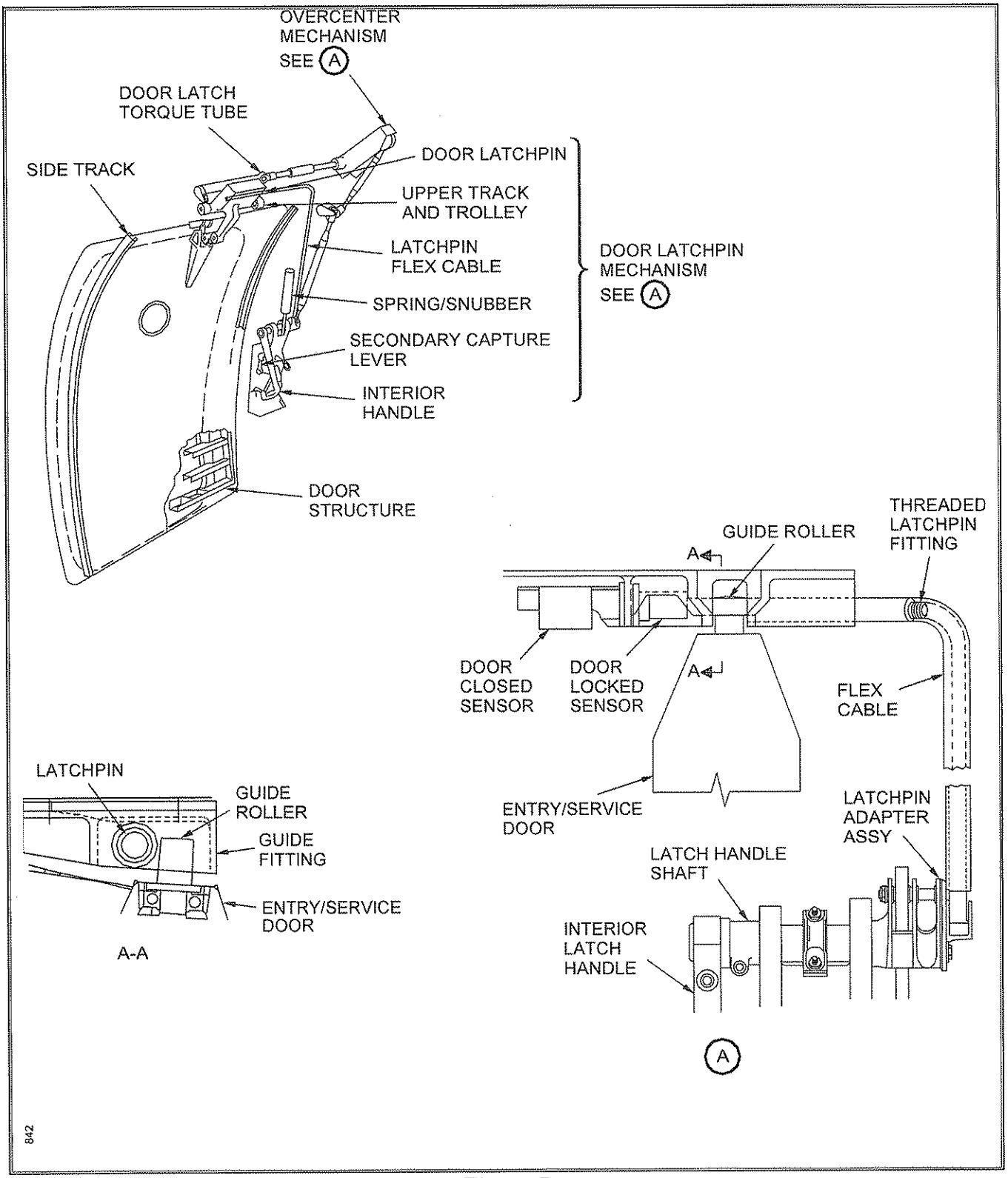

Figure 5
Sheet 1 - Door Latchpin Mechanism

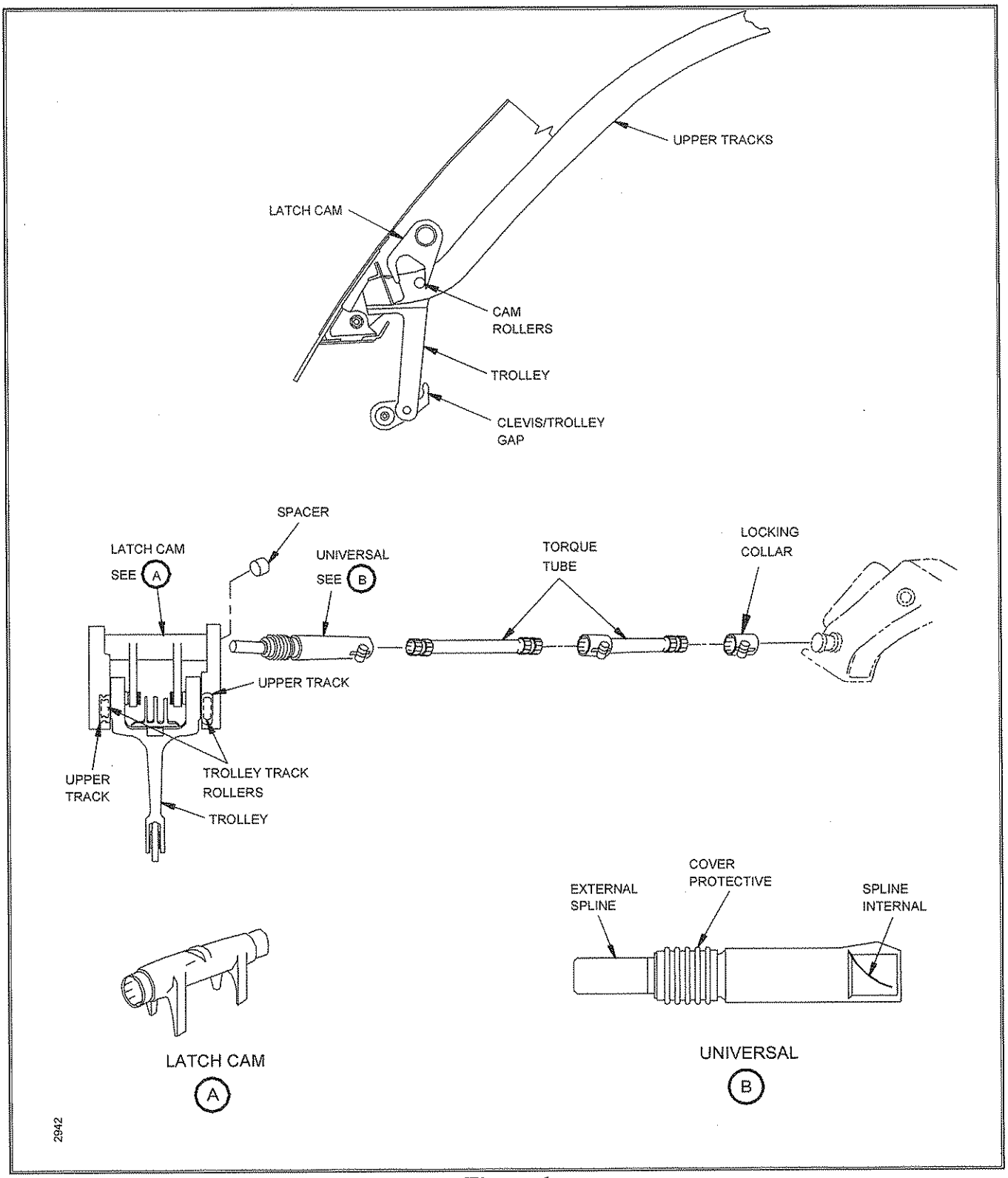

Figure 6
Sheet 1 - Door Latch Mechanism

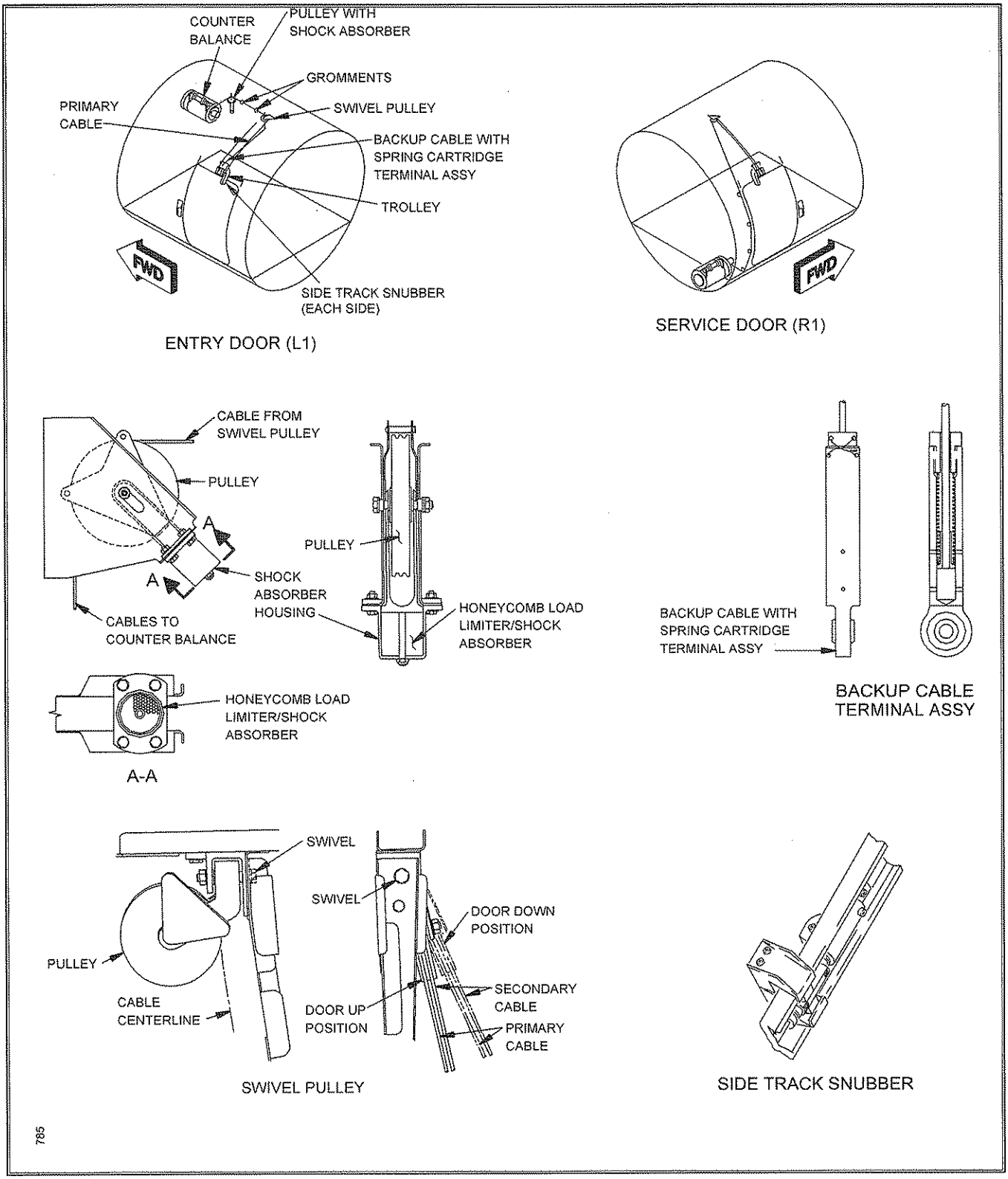

Figure 7
Sheet 1 - Door Lift System

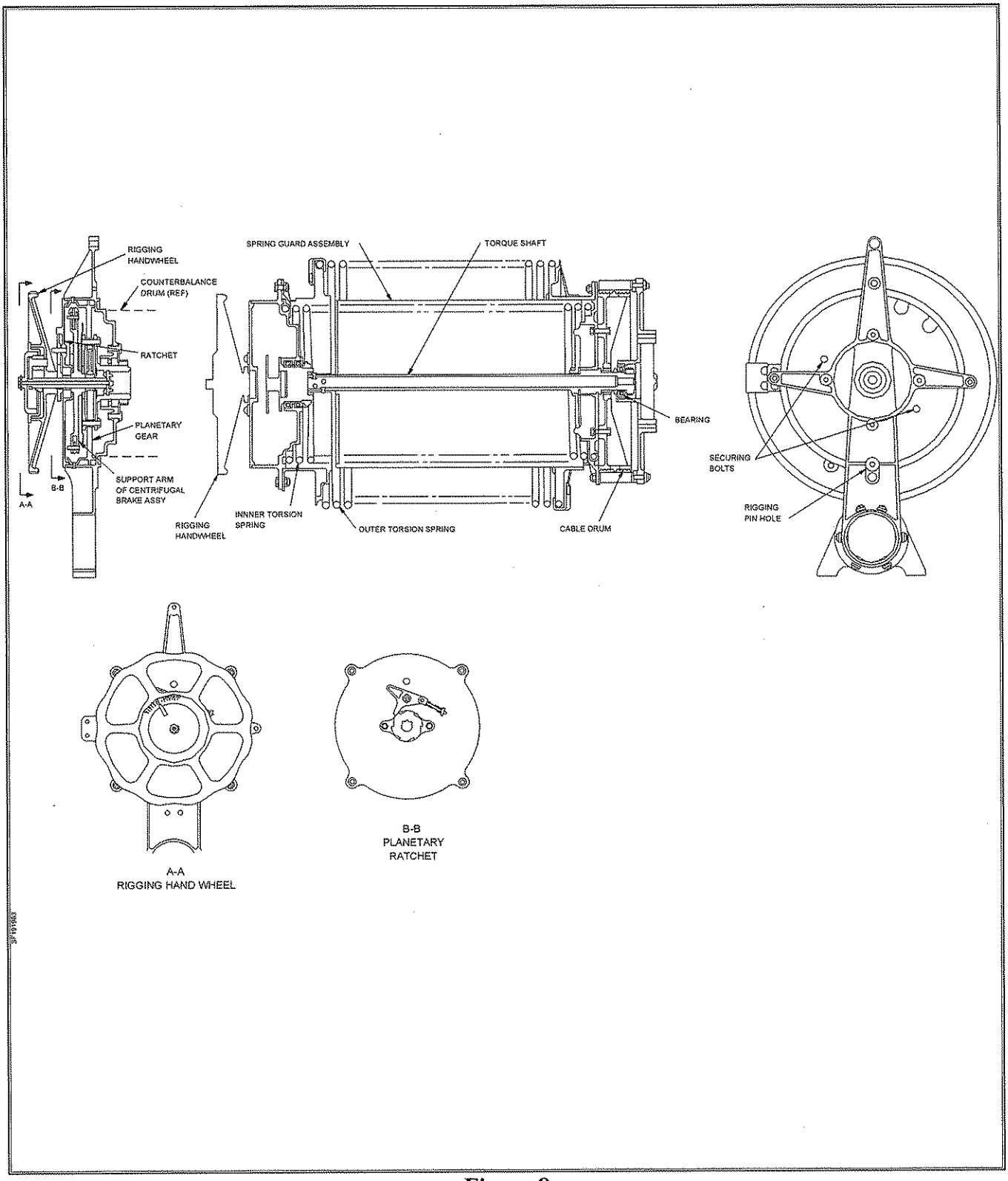

Figure 8
Sheet 1 - Counterbalance

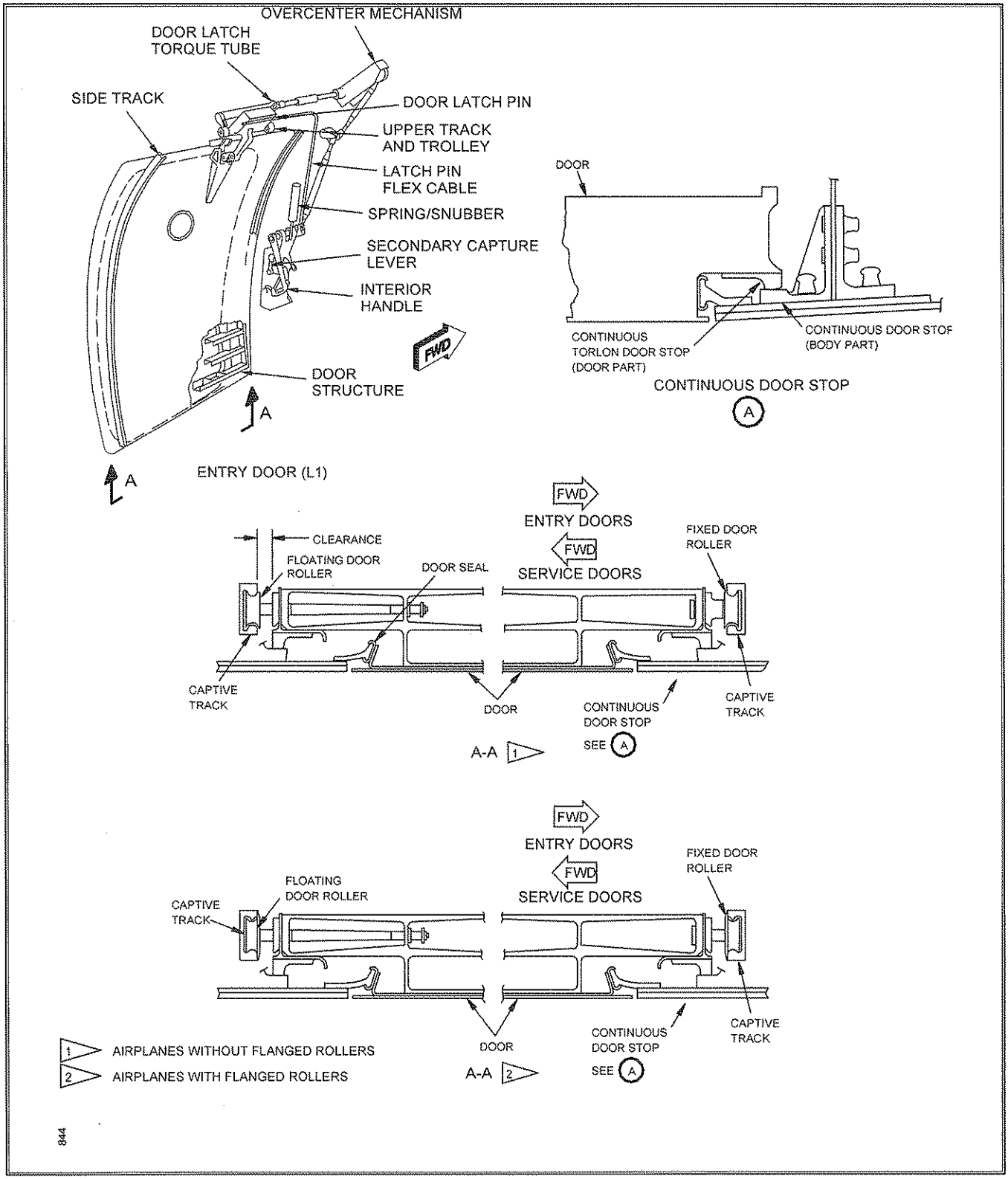

Figure 9
Sheet 1 - Side Rollers and Stop

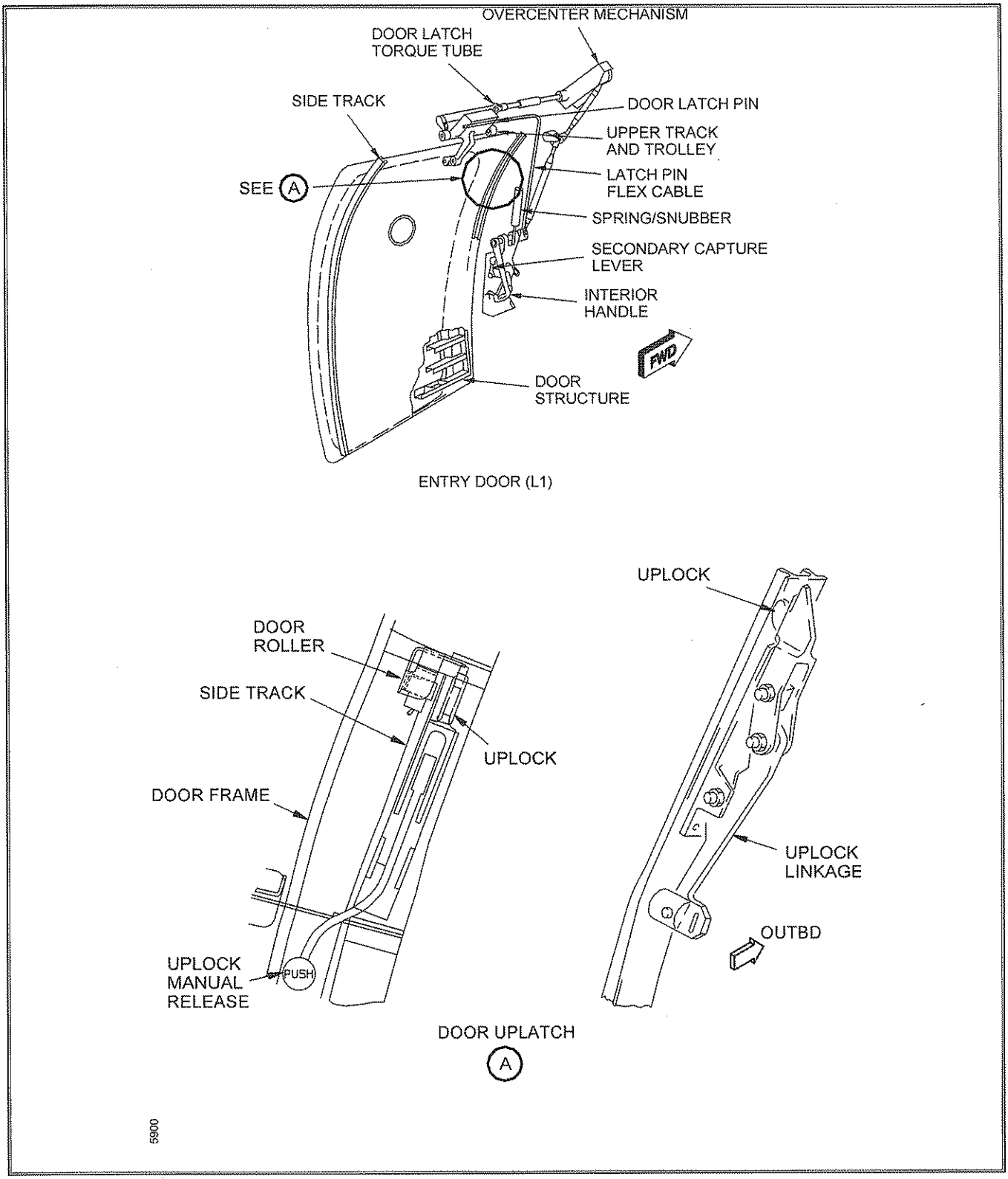

Figure 10
Sheet 1 - Door Uplatch