3. APTA PR-IM-S-003-98, Rev. 1 Standard for Door System Periodic Inspection and Maintenance

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Abstract: This standard covers the basic procedures for the periodic inspection and maintenance of door systems on passenger rail equipment.

Key Words: doors, periodic maintenance

Introduction

(This introduction is not a part of APTA PR-IM-S-003-98, Rev. 1 Standard for Door System Periodic Inspection and Maintenance.)

This introduction provides some background on the rationale used to develop this standard. This information is meant to aid in the understanding and usage of this standard.

This standard describes the basic inspection functions for door systems on passenger rail equipment. It is intended for the following:

a) Individuals or organizations who inspect and maintain door systems on passenger rail equipment;

b) Individuals or organizations who contract with others for the inspection and maintenance of door systems on passenger rail equipment; or

c) Individuals or organizations who influence how door systems are inspected and maintained on passenger rail equipment

This standard should help individuals and organizations incorporate safety considerations during the inspection and maintenance process

This standard is intended to satisfy the following objectives:

– Identify those inspection criteria and maintenance practices that provide a high level of passenger safety.

– Identify those inspection criteria and maintenance practices that provide a high level of safety for operating crews and maintenance employees.

– Identify the skills and training requirements necessary for maintenance personnel to apply these standards.

Participants

The American Public Transportation Association greatly appreciates the contributions of the following individual(s), who provided the primary effort in the drafting of the *Standard for Door System Periodic Inspection and Maintenance:*

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Standard for Door System Periodic Inspection and Maintenance

1. Overview

This standard is divided into 5 sections. Section 1 provides the scope of this standard. Section 2 lists references to other standards that are useful in applying this standard. Section 3 provides definitions that are either not found in other standards, or have been modified for use with this standard. Section 4 lists the standard for manual doors. Section 5 lists the standard for powered doors.

1.1 Scope

This is a standard for performing periodic inspection and maintenance to door systems on passenger rail equipment. It provides a set of inspection and maintenance tasks that shall be applied during the maintenance process.

1.2 Purpose

The door system on passenger railcars provides access to both passengers and crew during normal operations. The door system also provides the most efficient and generally the safest means of passenger evacuation during an emergency situation.

This standard provides operating properties and their contractors with basic requirements to be used at the periodic inspection of door systems on passenger rail equipment.

This standard identifies those functions of the door system that are considered safety-critical.

2. References

This standard shall be used with the following publications. If the following publications are superseded by an approved revision, the revision shall apply.

Applicable federal, state, and local regulations including:

APTA PR-IM-S-013-98 Rev 1, Standard for Passenger Car Periodic Inspection and Maintenance.

APTA PR-CS-S-012-02, Standard for Door Systems for New and Rebuilt Passenger Cars.

Original Equipment Manufacturer's Door Manuals

3. Definitions

For the purposes of this standard, the following terms and definitions apply.

3.1.1 OEM: Original Equipment Manufacturer

3.1.2 periodic maintenance: The performance of selected inspection and maintenance actions on systems or sub-systems. The frequency of these actions may be set by regulatory agencies or the operating authority. The frequency may be expressed as a function of time (i.e. days, weeks, or months) or in mileage or cycles.

4. Frequency of conduct

The frequency of conduct of this task shall be as specified in and in compliance with the requirements of sections 4 and 5 of *APTA PR-IM-S-013-99, Rev. 1 Standard for Passenger Car Periodic Inspection and Maintenance.*[1]

5. Manual doors

5.1 Trap doors

Railcars intended for both high and low level platform operation, are equipped with stepwells covered by a trap door. This trap door is hinged in such a manner as to permit manual opening in an upward direction. Figure B.1 in Annex B depicts a typical trap door. Figure B.2 shows details on how traps are hinged.

Trap doors may be equipped with electrical interlocks that interface with powered doors and a power interruption circuit.

Trap doors may be equipped with electric heaters to prevent the buildup of ice and snow at the hinge point and door track for the side door.

Trap doors may be equipped with a latching arrangement to control the operation of a lower partial door enclosing the step well. Trap door may also be equipped with a linkage to operate an arrangement of folding steps.

5.1.1 Inspection/maintenance

The following inspection/maintenance practice shall be performed at the time of periodic maintenance.

a) Inspect trap door in the down position and assure it engages properly and does not mechanically obstruct the side doors or present a tripping hazard.

b) Inspect floor latch for proper operation (Figure B.1).

c) Inspect wiring to electric interlock and heaters for damage or unusual condition.

d) Perform appropriate test to assure electric interlock and heaters function as intended.

e) Inspect trap door hinge and spring for proper operation and level of tension as per manufacturer or maintenance specification (Figure B.2). Check that the trap door moves freely between positions.

[1] For references in Italics, see Section 2

f) Inspect trap door tongue and wall latch for wear, damage and proper alignment.

g) Verify that trap door latches securely in the up position.

h) Inspect trap door grab irons and steps for damage and proper securement.

i) If there is a latching mechanism to control the operation of a door or partial door, inspect this latch mechanism for wear, damage and partial alignment. Verify that it functions properly.

5.1.2 Tools

Tools generally carried by maintenance personnel are sufficient. Where resistance or voltage measurements are to be made, a volt-ohm-millimeter is to be used. The volt-ohm-millimeter shall be calibrated in accordance with railroad instructions or its manufacturer's recommendations.

5.1.3 Training requirements

Railroads and their contractors shall develop and execute training programs that equip employees with the knowledge and skills necessary to safely and effectively perform the tasks outlined in this standard.

5.2 Sliding pocket and hinged doors

Passenger railcars are typically equipped with both side doors and end doors. These doors may be of the sliding pocket or the hinged swinging type. Figure B.3 shows a typical hinged door arrangement.

These doors may also be equipped with dampening devices to control the closing forces.

The proper functioning of these doors is of importance in order to prevent passenger and crew injury. These doors also provide emergency egress, and as such a degradation in operation could hamper the timely evacuation of the railcar.

5.2.1 Inspection/maintenance

The following inspection/maintenance tasks shall be performed as part of each periodic inspection/maintenance:

a) Inspect door pockets, tracks, and drains to verify they are free of any debris that could impede the door operation.

b) Inspect door hinges and/or tracks. Door should operate easily. Lubricate hinges and tracks as per OEM or operating requirements.

c) Inspect latches (if equipped) for wear and verify that they engage, release, and function properly. Lubricate per OEM instructions.

d) Verify that movable windows within doors are secured and operate properly

e) Inspect weather stripping for damage and excessive wear.

f) Inspect dampening device for door closure force. Adjust dampener for proper closing force as per OEM instructions or maintenance specification.

g) Inspect dampening device to ensure that door opens easily (opening force must be within OEM or maintenance specifications) and that excessive force is not required to open door. Inspect to ensure that when the door is released from the open position, it closes fully with the proper dampening and latches.

5.2.2 Tools

Tools generally carried by maintenance personnel are sufficient. Where force measurements are to be taken, a tension gauge should be used. The tension gauge shall be calibrated in accordance with railroad instructions or its manufacturer's recommendations.

5.2.3 Training requirements

Railroads and their contractors shall develop and execute training programs that equip employees with the knowledge and skills necessary to safely and effectively perform the tasks outlined in this standard.

6. Powered doors

Powered doors are those doors operated by electrical, pneumatic or other form of power. Figure B.1 shows a typical powered door operator mechanism.

Powered door operation may be controlled locally or centrally through trainline circuits. The control is generally electrical, using relays, electronic control including microprocessors, or a combination of such devices.

Powered doors may be exterior or interior. They may be of the sliding pocket type, plug type, folding or other type.

Control systems generally include local and/or trainlined indications to show when doors are closed and locked.

They may also provide a traction interlock function to prevent a train from moving until doors are closed and locked.

Control systems may also include a "zero speed" or "no motion" function to prevent door opening until the train is detected as having stopped.

Powered doors may also be equipped with obstruction sensing functions or devices, or with pushback features, to avoid passenger injuries.

Powered doors may be equipped with a mechanical lock to secure a door in the closed position when it has been deactivated or cut out.

Powered doors may also be equipped with a manual override to permit passengers or crew to

override the powered door system and open the doors in an emergency situation (Refer to Section 5.2).

6.1 Inspection/maintenance (general)

The following inspection/maintenance tasks shall be performed at the time of periodic maintenance:

a) Functionally test all doors for proper operation.

b) Inspect doors for binding, rubbing and proper securement of door to track.

c) Inspect door seals, mechanical linkages and devices for worn parts and damage.

d) Inspect relays and wiring for chafing, burnt or loose connections.

e) If equipped, inspect door pockets and door pocket drains for dirt and debris. Clean as required.

f) If equipped, inspect door pockets and door track heaters for proper operation.

g) Perform functional check of traction interrupt circuit on each door leaf.

h) Perform functional check of door indicator circuit on each door leaf.

i) Perform functional check of "zero speed" circuit.

j) If equipped, inspect operation of obstruction sensing or push back circuit.

k) Check opening and closing speed, adjust as necessary.

l) Inspect pneumatic devices (if equipped) for air leaking.

m) Inspect door seals for damage and proper function.

n) Perform a functional check of local and trainlined indication circuits.

o) Verify over-center mechanism is properly adjusted so the door locks when closed.

p) Verify operation of mechanical cutout lock to ensure it engages and the door leaf closes properly.

q) Verify correct door travel on opening and closing.

6.2 Emergency operation

Powered doors are equipped with manual override for use in emergency situations, such as when evacuation of the railcar is necessary and the powered door system is nonfunctional.

Inspection/maintenance

The following inspection/maintenance tasks shall be performed at the time of periodic maintenance.

a) Inspect emergency door operation instructions. Verify that all instructions are in place and legible.

b) Inspect and test all doors for proper emergency operation. Utilize both interior and exterior openers to verify that doors open easily with no binding or rubbing.

c) Inspect interior emergency door operating mechanism for damage or wear. Lubricate and adjust according to OEM or maintenance specifications.

d) Inspect exterior pull mechanism. Verify mechanism operates properly. If test requires breaking or removal of seals, these must be renewed after test.

6.3 Tools

The following tools normally required for performing powered door system periodic inspection and maintenance shall be made available:

a) Stopwatch

b) Vacuum cleaner

c) Source of compressed air (compressed air is to only be used in compliance with 29 CFR part 1910.242 sections A&B).

d) Control System Portable Test Unit (PTU) if the control system provides for the use of such a unit.*

e) Volt-ohm-millimeter*

f) Hand tools normally carried by maintenance personnel

***** Tools that shall be calibrated in accordance with railroad instructions or its manufacturer's recommendations.

6.4 Training requirements

Railroads and their contractors shall develop and execute training programs that equip employees with the knowledge and skills necessary to safely and effectively perform the tasks outlined in this standard.

Annex A

(informative)

Bibliography

[B1] 49 CFR, Part 231, Railroad Safety Appliance Standards.

[B2] 49 CFR, Part 229, Railroad Locomotive Safety Standards

[B3] 49 CFR, Part 238, Passenger Equipment Safety Standards

Annex B

Figures

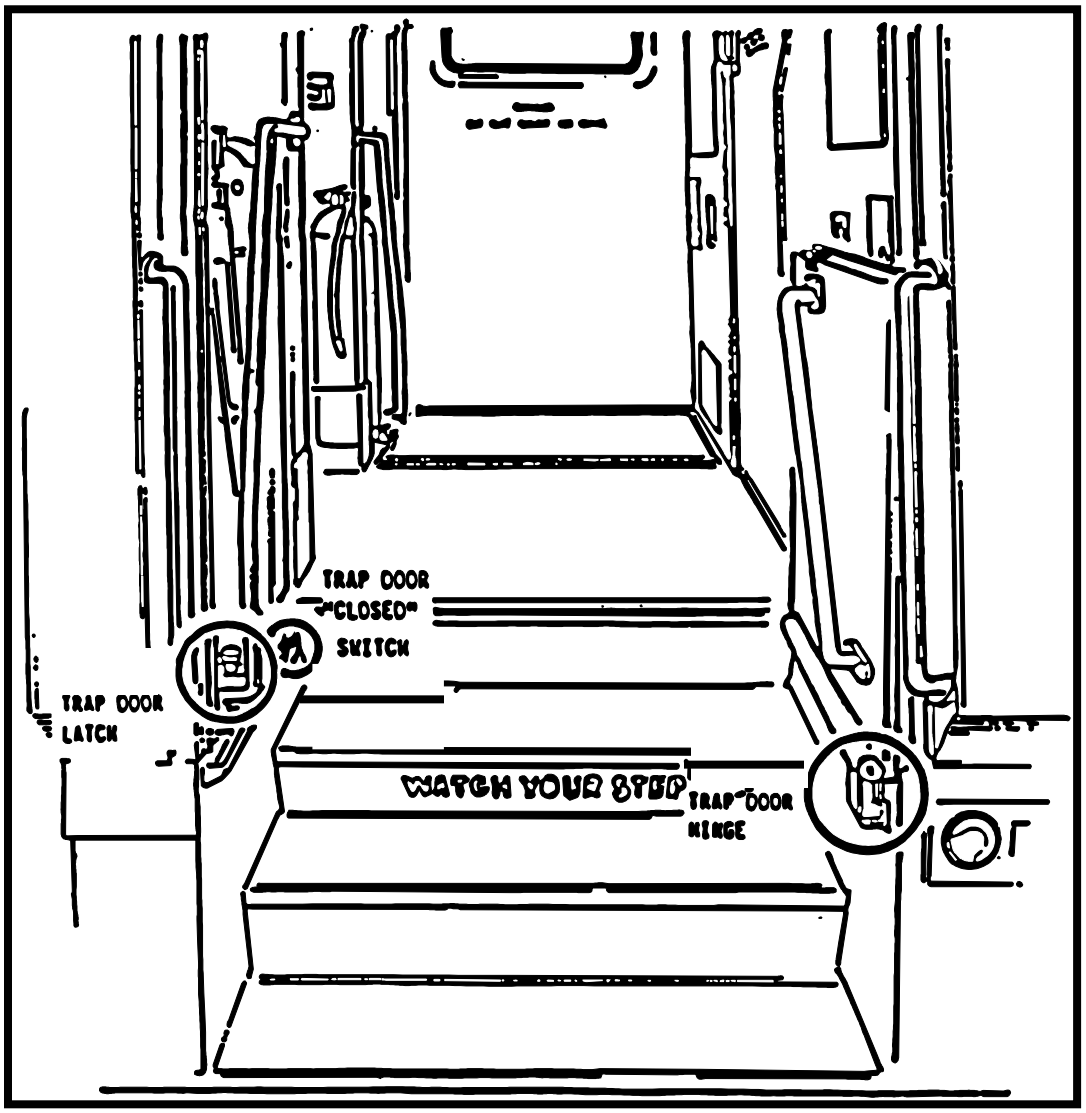

Figure B.1 - Trap door and stepwell

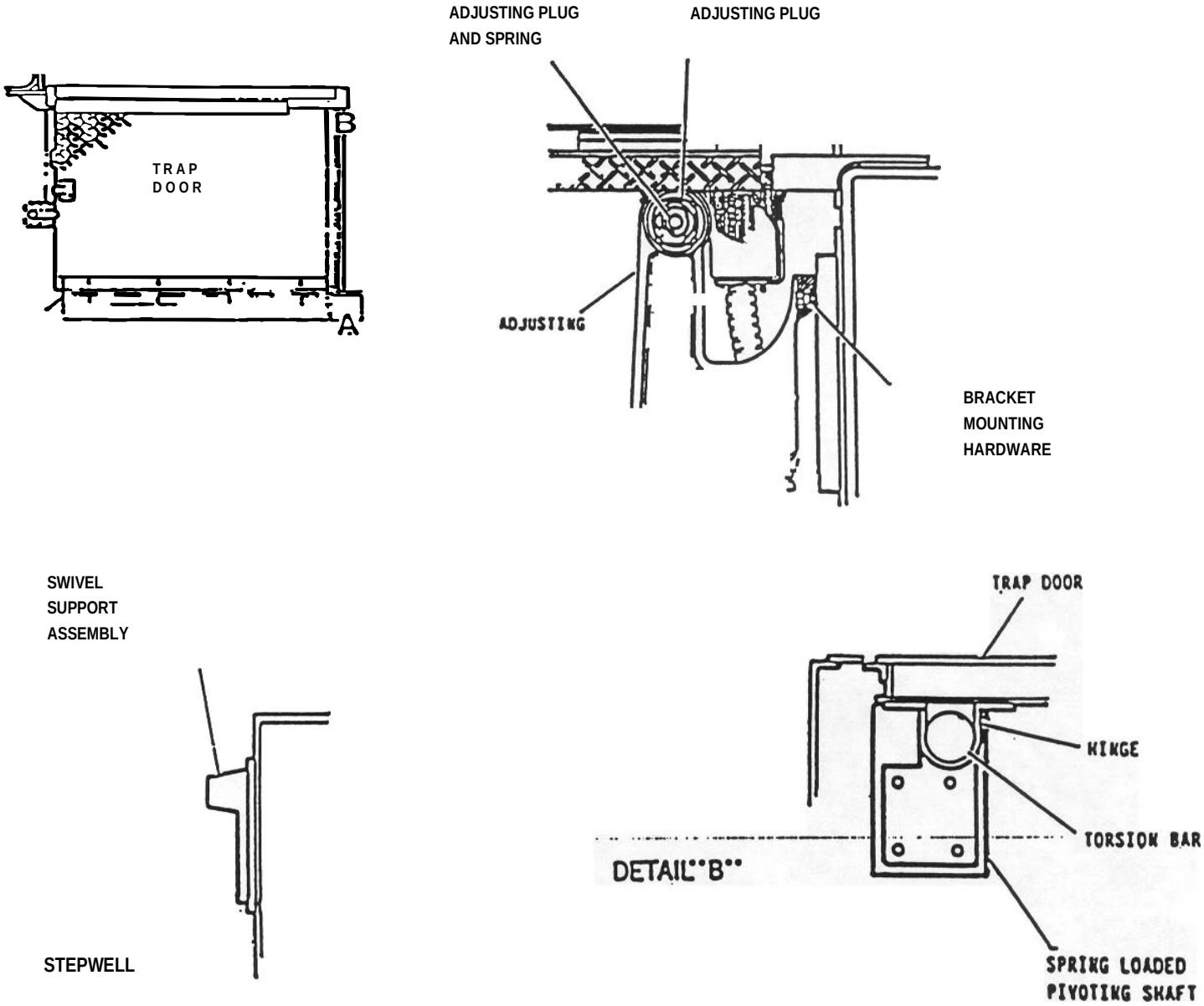

Figure B.2 - Trap door and hinge arrangement

Figure B.3 - Hinged door arrangement

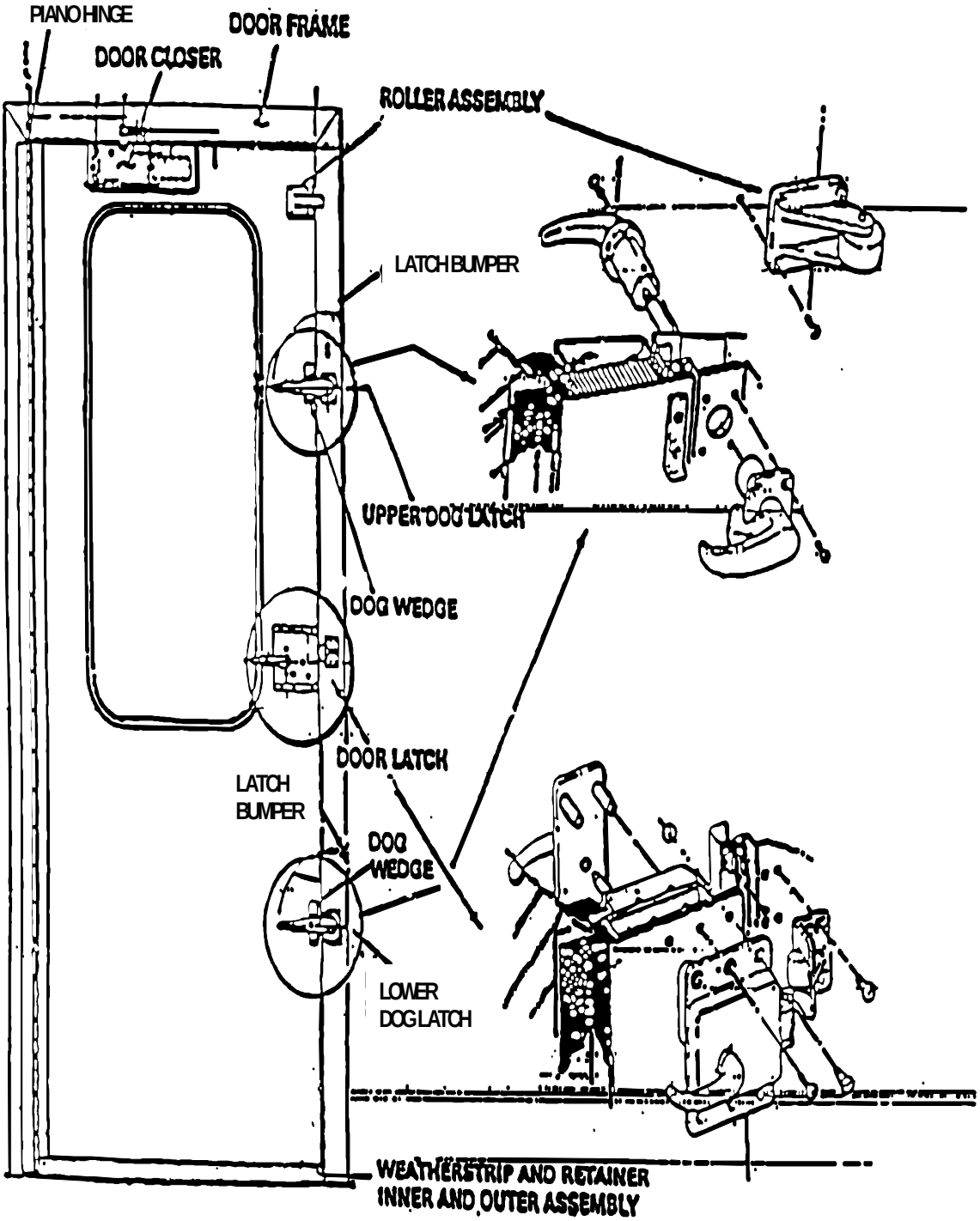

Diagram of weatherstrip and retainer inner and outer assembly