CHAPTER 8

PARKING BRAKES

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CHAPTER 8

PARKING BRAKES

8.1 SCOPE. This Chapter applies to the operation and inspection of parking brake systems.

8.2 INTRODUCTION. This Chapter describes the function and operation of parking brake systems and provides a suggested procedure for inspection of parking brake systems. It is not intended to serve as a technical manual for the repair and servicing of parking brakes.

8.3 GENERAL.

8.3.1 Operational Requirements. The parking brake shall be adequate to hold the vehicle or combination of vehicles stationary on any grade on which it is operated under all conditions of loading on a surface free from snow, ice, or loose material. In any event, the parking brake shall be capable of locking the braked wheels to the limit of traction (Section 26451(a) VC).

8.3.2 Design Requirements. The parking brake shall be applied either by the driver's muscular efforts, by spring action, or by other energy which is isolated and used exclusively for the operation of the parking brake or the combination parking brake and emergency stopping system, and shall be held in the applied position by mechanical means, spring devices, or captive air pressure in self-contained cells (Section 26451(b), (c) VC).

8.3.3 Supplemental Parking Brake Systems. Some parking brake systems fail to meet the requirements for parking brakes specified in the Vehicle Code due to design characteristics. Such systems may be used to supplement parking brakes but may not be used in lieu of parking brakes. The system types are described in the paragraphs following.

a. Hydraulically Applied and Held Systems. Devices such as "brake locks" or "lever locks" which retain the hydraulic fluid in the service brake system may be installed on vehicles. The devices alone do not meet the requirements for a parking brake as specified in the Vehicle Code because leakage of the fluid from the system will release the.brakes.

b. Air Applied and Held Systems. Devices which when applied retain air in the service brake system do not meet the requirements for a parking brake as specified in the Vehicle Code because leakage of the air from the system will

release the brakes. The use of a hand control valve to apply trailer or front axle brakes and use of the "emergency" position on a tractor protection control valve to apply trailer brakes are two examples of brake applications that do not meet parking brake requirements.

c. "Park" Position - Automatic Transmissions.

The "park" position in an automatic transmission is not a legal parking brake and does not meet all requirements of Section 26451 VC.

8.3.4 Removal of One Parking Brake. When the vehicle is equipped with two parking brake systems (spring brakes and a drive shaft brake for example), both systems must be properly maintained. If one of the systems is removed from the vehicle, the device is no longer a brake and need not be maintained when the following parts are removed.

a. All controls in the driver's compartment.

b. Control cables and rods.

c. Brakeshoes and bands, when they are not part of or used for the service brakes or other parking brake system.

8.4 SYSTEM DESCRIPTION AND OPERATION.

8.4.1 Types of Parking Brakes. The parking. brake, is a hand or foot operated mechanical brake for holding the vehicle stationary while parked. The four basic types are:

a. Integral type

b. Drive shaft type

c. Spring applied

d. Air applied mechanically locked.

8.4.2 Integral Type. The integral type parking brake as shown in Figure 8-1 is the most common parking brake in use today.

a. The integral type parking brake consists of the following major components:

(1) The parking brake operating lever in the driver's compartment.

(2) Cable and conduit system which connects from the parking brake operating lever in the driver 2s compartment to the parking brake levers in the rear wheels.

(3) Cable slack equalizing device.

(4) Adjusting mechanism.

(5) Levers and cams in the. rear wheel brake assembly.

b. When the brake control lever is applied, the cables apply a balanced and equalized pull on both wheel parking brake levers. The levers then move linkage to force the brakeshoes against the brake drums which prevent wheel rotation.

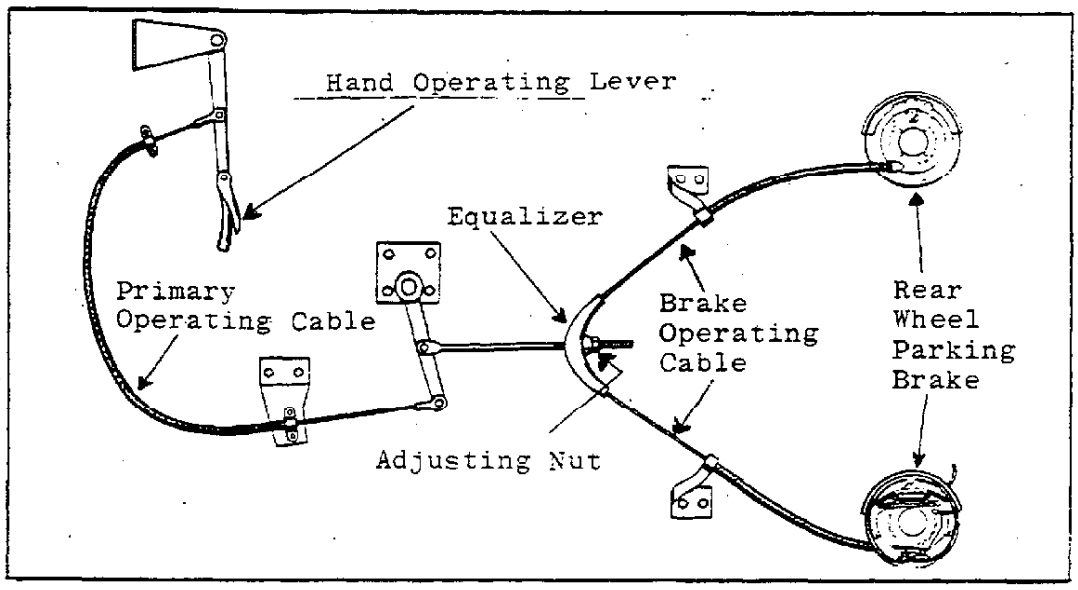

Fig. 8-1. Integral Type Rear Wheel Parking Brake

8.4.3 Drive Shaft Type. The drive shaft type parking brake as shown in Figure 8-2 is the least common type of parking brake now in use.

a. The transmission or drive shaft type parking brake consists of-the following major components:

(1) The parking brake' lever mechanism in the driver's compartment.

(2) A cable or rod control system which connects to the lever mechanism of the brake and brake drum.

(3) Brake drum and brakeshoes or brake disc and calipers attached to the drive shaft near the transmission. This type of parking brake may be the external band (contracting) type or the internal shoe (expanding) type.

b. When the parking break is applied, force is transmitted through the cable or rod control to either contract the external band or expand the internal shoes against the drum. This system prevents wheel rotation by locking the drive shaft.

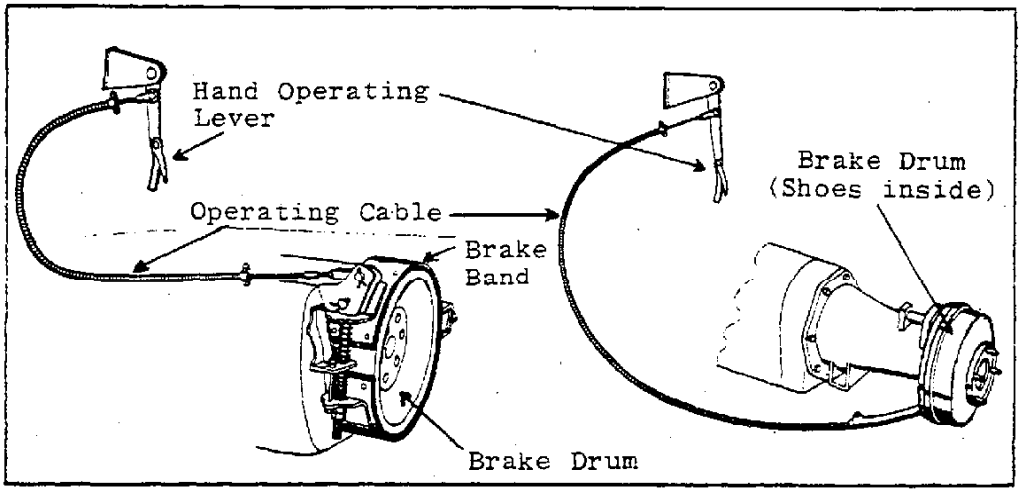

Fig. 8-2. Drive Shaft Parking Brake

8.4.4 Spring Type Brake. The spring type parking brake as shown in Figure 8-3 is used on vehicles with air brake systems

a. The spring type parking brake system consists of the following major components.

(1) Cab mounted operating controls.

(2) Spring chamber. (Two types: Piggyback mounted on service brake chamber. Remotely mounted on truck frame or other suitable location.)

(3) Piping, fittings, and valves necessary for operation of the system.

(4) Mechanical devices necessary to convert spring force into brakeshoe application force.

b In the released position, air pressure in the brake chamber compresses the spring holding the brake in the unapplied position. The brake is applied by operating the cab controls to release air from the brake chamber. Release of air permits the spring to expand. The spring operates the slack adjuster either through a cable connection or through the brake chamber push rod which applies the brake.

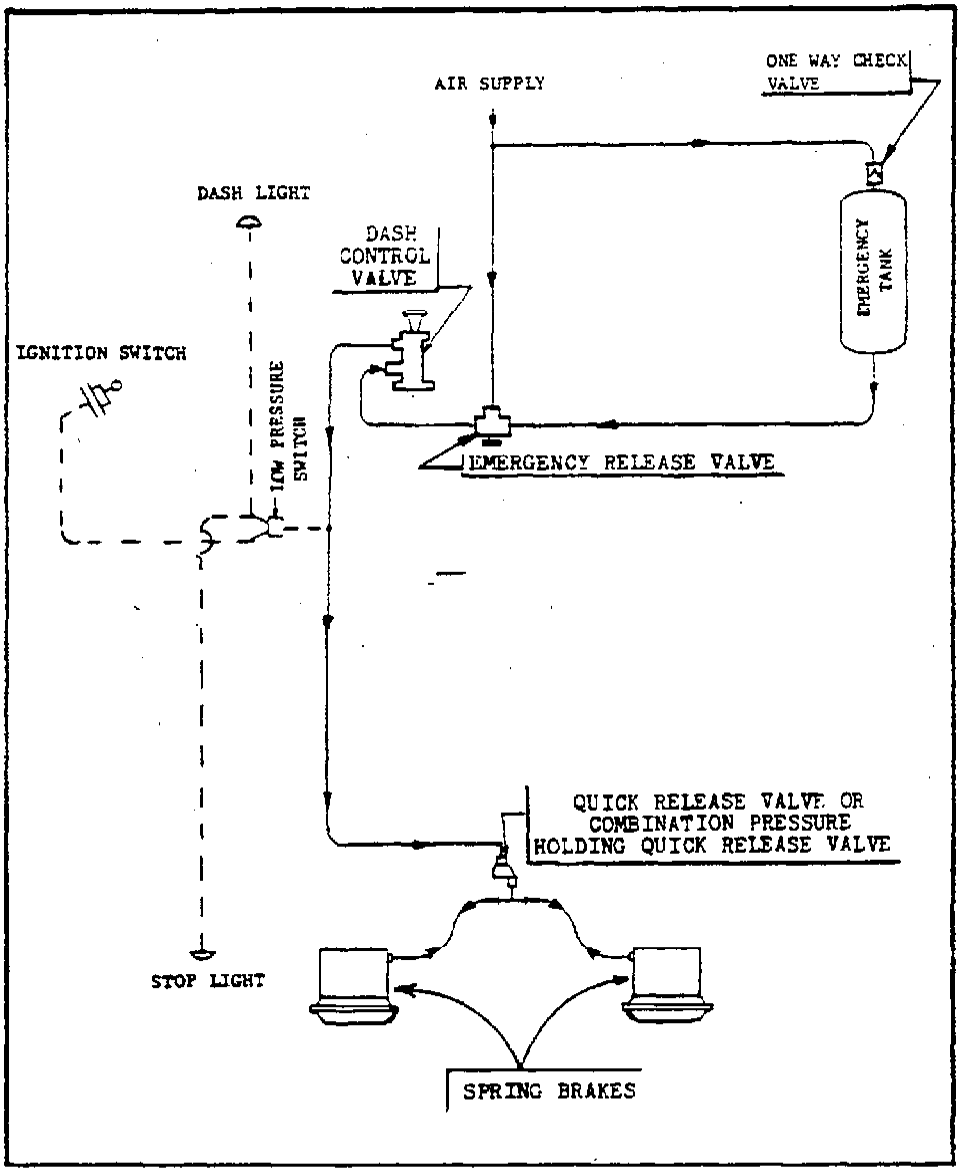

Fig. 8-3. Spring Type Parking Brake System

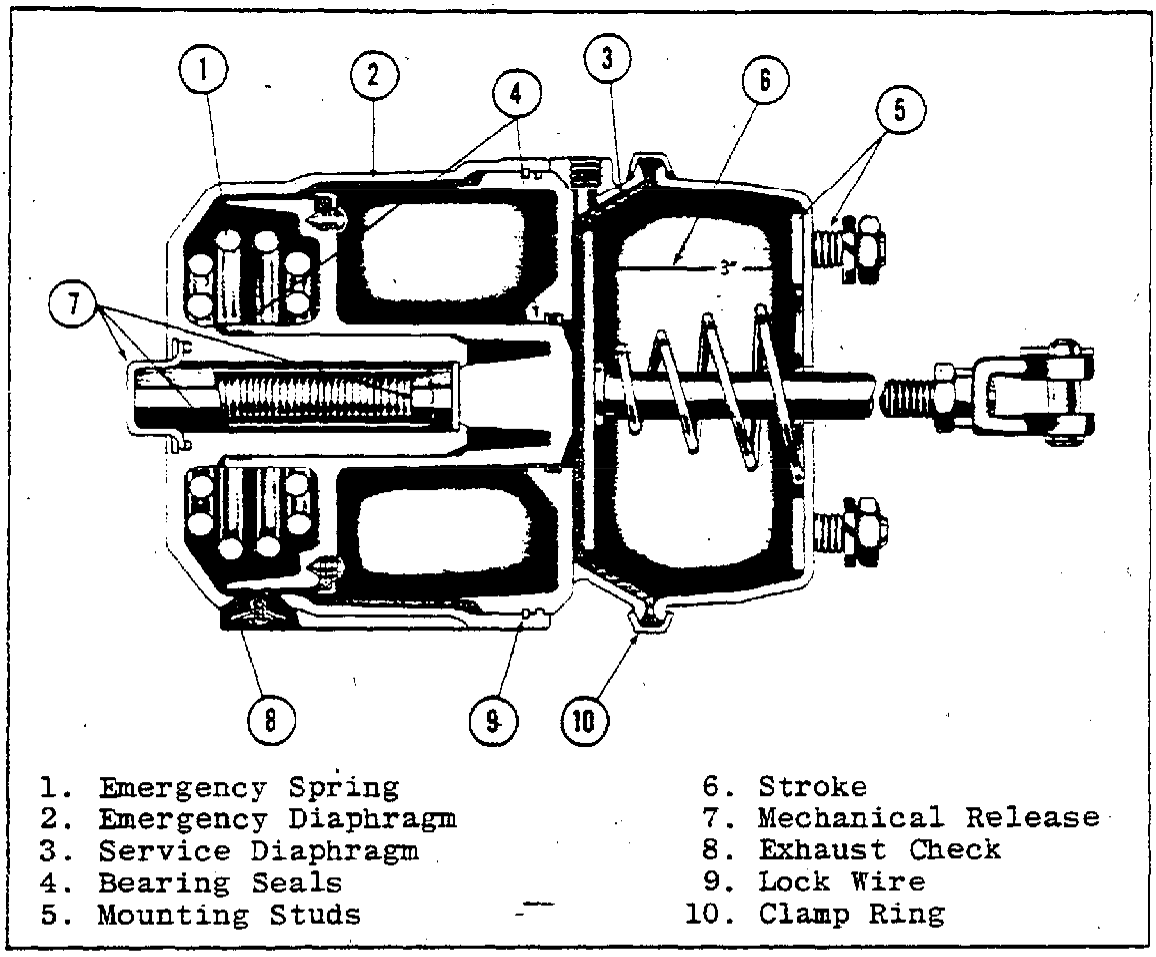

Fig. 8-4. Spring and Service Brake Actuator

8.4.5 Air Applied Mechanically Locked Parking Brake. The air applied mechanically locked parking brake system as shown in Figure 8-5 is used on vehicles equipped with air brake systems.

a. The system is composed of the following major components.

(1) Cab mounted operating controls.

(2) Double diaphragm brake chamber. (One diaphragm for service brake; one diaphragm to apply parking brake.)

(3) Mechanical locking device on the brake chamber push rod.

(4) Piping, fittings, and valves necessary for operation of the system.

(5) Mechanical devices and linkage necessary to convert the applied force to brakeshoe application force.

b. In this system, operation of the cab controls applies air pressure to the parking brake diaphragm which applies the brake. The chamber is designed with a mechanical lock on the brake chamber push rod. The mechanical lock is held in the released position by compressed air. When the air is released, the lock tightens around the push rod holding it in the applied position. The brake is released by applying a full application of service air to the service system and operating the cab control to release the lock mechanism.

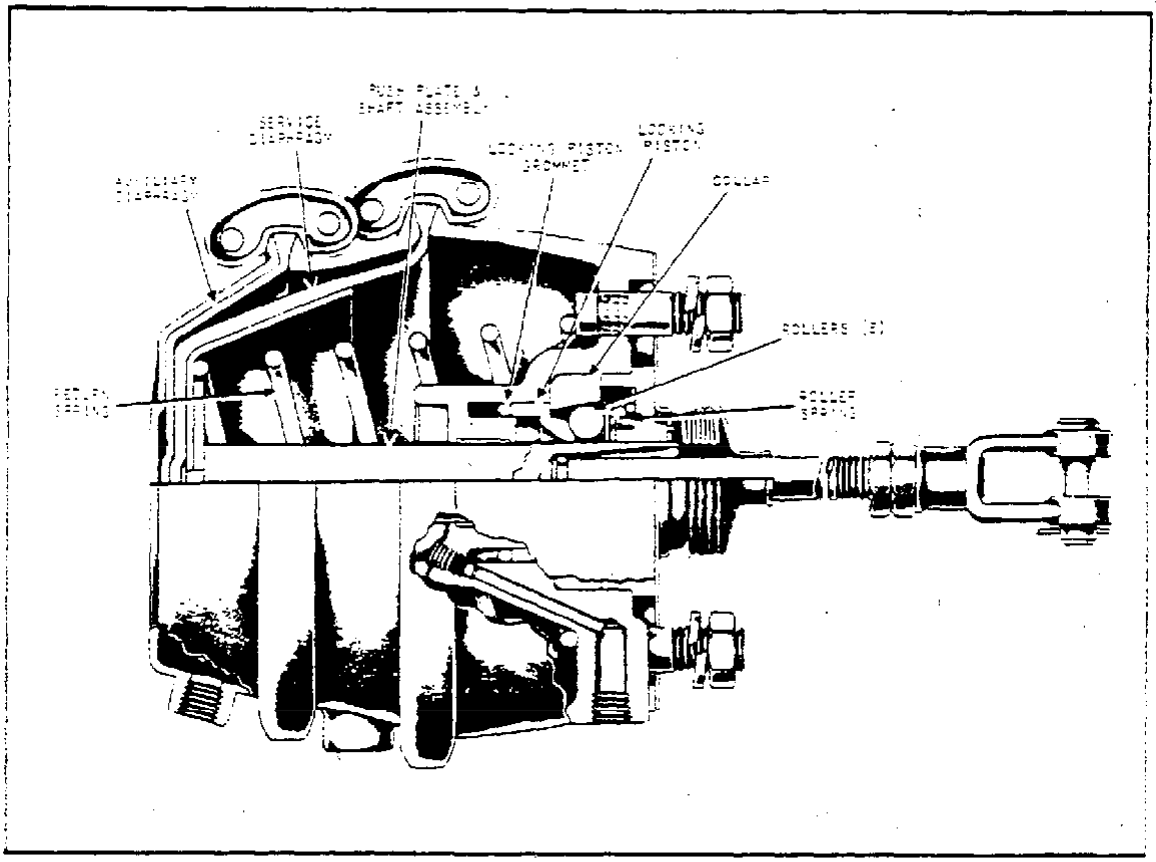

Fig. 8-5. DD3 Brake Actuator
(Air Applied-Mechanically Held)

8.5 INSPECTION AND TEST PROCEDURES.

8.5.1 Inspection Location. Sites selected for parking brake testing should meet the following requirements

a. The site must be free of loose material.

b. The site must be on an incline which is adequate to determine the holding capability of the parking brake,, or ramps must be provided to be used as an inclined surface for testing the holding capacity of the parking brake,

c. Tests should be conducted only at locations which do not interfere with traffic or cause a traffic hazard.

8.5.2 Safety Precautions. The following safety precautions must be taken prior, to inspecting a parking brake system.

a. Ascertain that the service brakes are operative.

b. The wheels must be blocked, the engine must be stopped, and the transmission engaged while conducting a visual inspection;

c. In view of the possibility of structural or mechanical failure of the spring unit on spring brake assemblies, any position near a spring brake assembly during its operation must be considered dangerous; therefore, inspection personnel will not place themselves in a position where it is possible to be struck by parts of the spring brake assembly.

8.5.3 Visual Inspection. Determine the type system installed on the vehicle. Inspect the component parts as follows:

a. Apply cab mounted operating levers or controls and determine that-the parking brake has applied, remains applied, and that operating controls' operate freely.

b. Inspect integral and drive shaft brakes for worn clevis pins, loose parts, broken or missing springs, broken or missing brake linings, worn rods, yokes, or couplings, worn anchor pins, and worn or slack pull cables. Determine that brake shoes. contact brake drums,

c. Inspect each air applied or spring applied brake chamber for lack of brake application, missing mounting bolts, missing parts, loose pipe fittings, air leaks, and cracked or broken pipes. Check push rod travel for proper brake adjustment.

8.5.4 Operational Test. An operational test for parking brakes should be conducted on an incline equivalent to a grade of not less than 6%. This is a 6 foot rise in 100 feet, or .6 feet (74 inches) in 10 feet.

a. The test should be conducted as follows:

(1) Determine that service brakes operate.

(2) Have the driver apply the parking brake.

(3) Remove chock blocks.

(4) Have the driver release the service brakes.

b. Failure of the parking brake to hold the vehicle on any incline on which it is being tested is a violation of Section 26451(a) VC.

c. The holding capability of the parking brake should not be determined by pushing the vehicle or by an engine stall test.