TM 9-1827B

WAR DEPARTMENT TECHNICAL MANUAL

ORDNANCE MAINTENANCE

VACUUM BRAKE SYSTEMS

(BENDIX B-K)

WAR DEPARTMENT *1 MAY 1944*

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TM 9-1827B, Ordnance Maintenance, Vacuum Brake Systems (Bendix B-K), is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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(For explanation of symbols, see FM 21-6)

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CHAPTER 1

INTRODUCTION

1. SCOPE.

a. The instructions contained in this manual are for the information and guidance of personnel charged with the maintenance and repair of units composing the B-K vacuum power brake system. It deals directly with the bench overhaul of units after they have been removed from the vehicle. This manual does not contain information which is intended primarily for the using arms, since such information is available to ordnance maintenance personnel in 100-series TMs and in FMs.

b. This manual contains description and procedure for disassembly, inspection, repair, rebuilding, test and adjustment of each individual unit.

2. ARRANGEMENT.

a. Chapters 1 and 2 contain introductory material, including explanation of the power brake principle. Chapters 3 through 20 contain maintenance procedures for specific units. Each unit or assembly is covered by a separate chapter.

CHAPTER 2

PRINCIPLE OF VACUUM POWER BRAKES

3. PURPOSE.

a. Vacuum brakes are actuating devices designed to create a force to apply the brakes of a vehicle in excess of that practical through physical effort.

4. OPERATING PRINCIPLE.

a. Vacuum Suspended System. The principles of vacuum brakes are the pressure differentials of atmosphere or air. Any object at sea level is normally subject to an outside air pressure of almost 15 pounds per square inch of its surface; inside and outside; top, bottom, and sides. This pressure is termed "atmospheric pressure" and

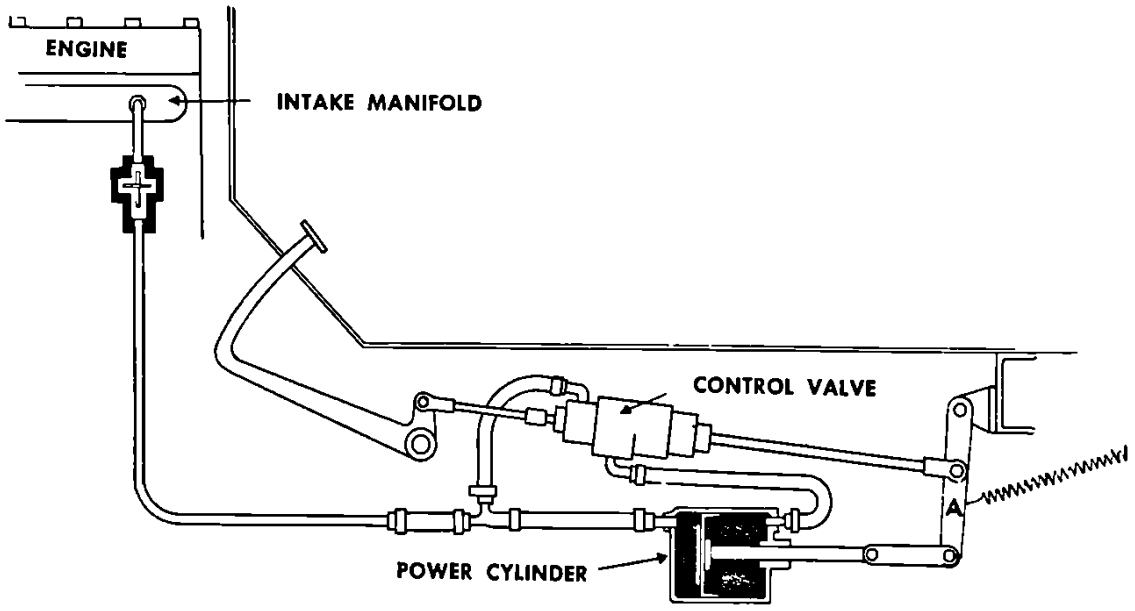

Figure 1—Power Brake System—Schematic Diagram

is sometimes known as the weight of air. To clarify the principle, analyze the action of vacuum and atmospheric pressure on a piston in a cylinder (fig. 2). If both ends of the cylinder are connected to the intake manifold of a gasoline engine, approximately two-thirds of the air or atmosphere will be drawn into the intake manifold, creating a vacuum of 20 inches on both sides of piston. Piston is now balanced between opposite and equal pressures. By disconnecting the vacuum line at one end of cylinder (fig. 3), and maintaining the vacuum on the opposite end, atmosphere will enter the opened end of cylinder, depleting the vacuum, therein causing an unbalancing of opposite forces. The full weight of air (14.7 pounds per square inch) will then be opposed by only 4.7 pounds per square inch, and piston will move toward the lower pressure side. The differential be-

tween 14.7 pounds and 4.7 pounds is 10 pounds; thus 10 pounds of effort is available for each square inch area of piston. The piston when connected to mechanical levers or hydraulic piston will transmit its power to the brake system. The admittance of air to deplete the vacuum on one side of the piston is metered by a control valve

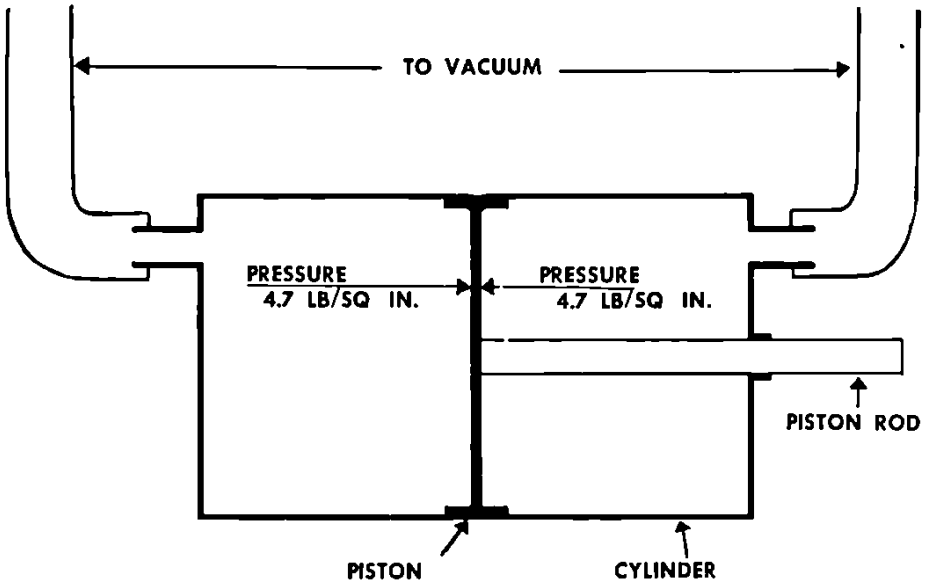

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Figure 2—Piston in Cylinder Balanced in Vacuum

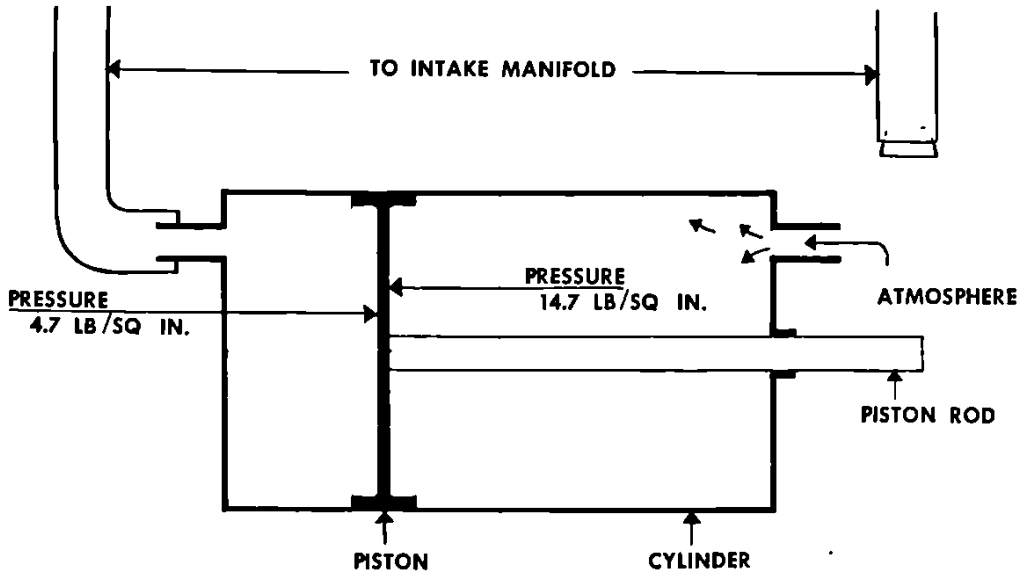

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Figure 3—Piston in Cylinder Actuated by Atmosphere