SECTION ‘Q’

BRAKE GEAR

‘Q’ 1

The brake gear incorporates a full air system operating brake assemblies of ‘Girling’ manufacture.

The system comprises an engine driven compressor, unloader or governor valve and a dual air reservoir which supplies air to the four brake operating chambers via the foot operated dual brake valve.

The handbrake/parking brake operation is also through the rear spring brake actuator but the air supply for this application is from a separate reservoir.

The front brake air chambers which have 12 sq. in. effective diaphragm area are flange mounted to the tubular mounting plate secured to the brake back plate. They operate the chamber push rods through direct air pressure coupled through flexible hoses.

Diaphragms may be readily exchanged by disconnecting the air pipe unions, and in the case of the rear spring actuator by also winding off the manual release bolt, and then by releasing the clamp rings to remove the diaphragms.

It is recommended that the diaphragms should be inspected at three monthly intervals, which can be varied in the light of operational experience.

A dual air system is provided, air being independently supplied at the front and rear brakes. The brake assemblies are of ‘Girling’ manufacture type 2LS/1AW (front) and 2LS/SW (rear) respectively.

These brakes consist of a torque plate on to which is mounted a cast iron expander unit and an adjuster assembly. Being a full two leading shoe brake, each twin webbed shoe is provided with a solid steel ‘pencil’ strut and one pair of bell cranks, the latter being pivoted on bell crank pins which are located at each end of the shoes. One arm of the bell cranks at the expander unit end of the shoes abuts against the expander tappets, while the bell cranks at the opposite end of the shoes abuts against the adjuster links.

Between the inner arm of the bell cranks is located the steel strut through which is transferred the effort applied. On one arm of the bell crank on each shoe is an adjustable setscrew which abuts against the head of the adjuster link or expander tapper.

The return springs are hooked around the bell crank pins on the outside of the shoe web. Some special installations (for front brakes only) utilize a spring stirrup with one shoe return spring at the adjuster end and one at the expander end.

In some instances these brakes have only one strut and therefore are called 2 LS/1. Where this applies the second shoe only is provided with a strut and bell cranks.

Note:- The above applies to the front brake assemblies of the ‘LI’ Vehicle.

In the 2LS, AW or 2LS/1AW the expander unit includes changes in detail which contribute to the performance of the brake, whilst the adjuster is of conventional design but has a cast iron housing and strengthened tappet heads to ensure long and reliable performance.

The expander is of new design with an oblong wedge operating the rollers and tappets. Circlips have been fitted to the tappets which just touch the expander body when the brake is off. This indicates when the expander is assembled correctly and ensures that the tappets are in the correct position.

Fitting New Shoes

Prise the lowermost shoe, using a ‘Girling’ commercial shoe horn (Pt. No. 6497016), from the expander abutment and collapse the shoe in a ‘pincer’ type movement over the top of the expander. Lift both shoes and springs from the back plate. Where there are four shoe return springs it will be necessary to prise the lowermost shoe from the expander abutment and the adjustment abutment before the shoes and spring can be removed.

Transfer the bell cranks and push rods (as applicable) to the new shoes.

Attach the springs to the shoes and fit the assembly to the back plate in the reverse order to dismantling, fitting the outer springs afterwards.

To prevent the solid push rod from falling out of position when fitting the shoes proceed as follows:-

Fit split pins into the bell crank drilling and before fitting the shoes attach a light spring to the split pins. The push rod will thus be retained in position and the spring can easily be removed when the shoes are in position. Alternatively, the push rod can be retained by fitting ‘Girling’ retaining springs. These springs are left in position and can be transferred to replacement shoes and thereby provide a permanent solution.

Q1.3
Springs for shoes up to 5 in. wide are GB. 46254.
Springs for shoes over 6 in. wide and for cast malleable iron shoes are GB. 46253.
The Bristol LH chassis is fitted with the Girling retaining springs as detailed above.

Setting the Bell Cranks and Push Rod.

Make sure that the tappet airclips are touching the housing before setting the bell cranks.
Screw the adjuster screw in a clockwise direction until the shoe can be seen to lift off the tappet abutment. It should now be possible to rock the shoe on the abutments with the push rod solid. Whilst rocking the shoe and trying to turn the push rod with the fingers, turn the adjuster screw slowly in an anti-clockwise direction until the shoe rock ceases and at the same time, the push rod can just be rotated.
Now turn the adjuster screw 1/4 of a turn in a clockwise direction to pre-load the push rod. Tighten the locknut ensuring that the setting is not disturbed. Repeat with the other shoe (as applicable).

Shoe Adjustment

Turn the adjuster pinion stem clockwise until the brake shoes are hard against the drum, then slacken back until the wheel just revolves freely.

Note:- To ensure the correct functioning of the expander unit throughout the life of the brake shoes it is essential that the shoe to brake drum adjustment is maintained to the just free to revolve position, in order to prevent the shearing of the limiting rivets allowing possible overstrokage of the expander unit.
This setting is normally four clicks back from the full position.

Adjuster and Expander Units.

When renewing or servicing the adjuster or expander it is necessary to remove the brake shoes. Unless the brake has twin web shoes the Girling shoe expanding tool is used.

Adjuster Unit

When servicing the adjuster unit it is not normally necessary to remove the unit from the backplate or (Torque-Plate).
Prise the dust cap from the housing, remove the retaining circlip from the adjuster stem. Screw the adjuster stem right through the unit and shake out the pins. Discard the dust cap.
Clean, examine and renew the parts as necessary. Lubricate the moving parts with Girling Brake Grease and refit in the reverse order to removing. Fit an elastic band around the unit to retain the shaft heads in position.
Position a new dust cap on the adjuster housing and tap the edge into the groove (in six places) round the circumference to retain it.
Refit the dust cover and replace the retaining airclip.

If the adjuster unit has been removed from the backplate (or torque plate) refit but do not finally tighten the retaining bolts until the adjuster has been centralised. (refer to the expander).

Expander Unit

Application of this unit at the rear axle is provided through a ‘Westinghouse’ spring brake actuator, the brake being applied through a push rod action, the front axle brakes are applied through push rods operated by orthodox air brake chambers.
Remove the spring actuator unit or brake chamber from their respective mounting flange plate.
Unlock the tab washers remove the set bolts and release the mounting flange plates, and dirt excluder.
Release the expander housing lockplate, securing bolts and remove the expander assembly from the backplate.
Extract the rivets, the tappets, plunger and rollers can now be withdrawn.
Clean examine and renew the parts as necessary. Lubricate the moving parts with Girling brake grease and refit in the reverse order to removal. Do not finally tighten the retaining bolts.
Clean down the backplate and refit the shoes as previously described. Refit the brake drum and lock up the shoes in the drum by turning the adjuster stem clockwise. Tap round the drum with a soft hammer to centralise the expander and adjuster assemblies. Attempt to turn the adjuster still further and repeat, when no more movement can be obtained, tighten the expander and adjuster retaining bolts, and bend over the locking tab washer. Slacken back the adjuster until the wheel just revolves freely. Jack down and road test.

When fitting a new air cylinder the shoes must be first locked in the drum by turning the brake adjuster clockwise and afterwards clicked back to the correct working clearance.

Q1.4
Spring Brake actuator

Spring brake actuators produce the brake force to operate the foundation brakes of the vehicle and are fitted to the rear axle of the L11 Vehicle.

The diaphragm portion is used for the service brake, and the spring portion normally for both the secondary and parking functions.

The front portion is similar to a conventional brake chamber with a reinforced front plate. The rear portion is a cast aluminium case containing a piston operated by a powerful coil spring.

Operation

Normal Driving

Air pressure above the low pressure signal is applied to the spring piston which compresses the spring and holds off the brakes. The system ensures that the vehicle cannot move until the air pressure is available.

Service Brake

The service brake portion operates in the same manner as a standard brake chamber. It is supplied with varying air pressure through the service brake control - normally the foot valve. The spring is held in compression by maintaining a steady pressure in the spring chamber.

Secondary and Parking.

Releasing air from the spring chamber by graduable hand control valve allows the spring to extend and provide progressive secondary braking. When the air is completely exhausted the vehicle is parked with the brakes held on by mechanical action. In the unlikely event of a leak that cannot be made good by the compressor, a gradual automatic brake application will result, the rate of deceleration depending on the rate of leak.


The readily accessible release bolt permits the safe and speedy servicing of the actuator or the foundation brakes. It also allows the vehicle to be moved in the absence of air pressure and is a necessary condition prior to towing.

Maintenance.

Note:- Important - Before attempting to remove the circlip retaining the rear end cover, exhaust all air, fully unscrew the release bolt, remove the unit from the chassis, and clamp the whole unit securely in a suitable press.

Always fully unscrew the release bolt before removing clamp ring to extract the diaphragm.

The only regular maintenance required is periodic visual inspection and checks for air leaks.

The unit should be overhauled every 50,000 miles or annually, whichever is the first occurrence.

Dismantle remembering the above warning, wash seals and diaphragm in soap and water, and the metal parts in a suitable solvent.

Inspect all parts and replace any that are worn and defective. Smear components with a suitable grease, Osmolin Artic Grade or its equivalent, and re-assemble. Apply air to parts and test for leaks, and re-install in the vehicle.

Inspection Procedure for Checking Air System

The following procedure is recommended for checking the air system.

This is to be carried out with the air system empty and the brakes adjusted.

(1) Operate the main electric starter switch; the brake and gearbox warning lights should illuminate and the low warning buzzer should sound.

There are separate warning lights for the brakes and when a semi-automatic gearbox is fitted.

(2) Start up the engine and charge up the complete air system and observe that:-

(a) The warning buzzer should cease sounding at 60/50 p.s.i.

(b) The brake warning light should go out at this pressure.

(c) When the brake air pressure gauge reads 80/85 p.s.i. there should be a pause in the rise. This is due to the regulating valve in the Handbrake/Gearbox system opening when the footbrake system has attained 80 p.s.i. During this pause the gearbox light should go out.

Note:- This applies to the ‘L11’ vehicle fitted with semi-automatic gearbox.

(d) When the pressure gauge reaches 120 p.s.i. an audible cut-off of the unloader valve should be heard.

(3) Build up to 120 p.s.i. and stop the engine.
(4) Apply the footbrake and check connections for leaks.
(5) Release the footbrake and start engine, operate brake pedal repeatedly to simulate brake application and check unloader valve cutting in at 95 p.s.i. and rising to 120 p.s.i. before cutting out.
(6) Stop engine and disconnect delivery pipe between unloader valve and split brake reservoir and check for air leaks from the brake reservoir check valves.
(7) Disconnect delivery pipe to Handbrake/Gearbox reservoir between take-off main feed pipe and pressure regulating valve and check for leaks from regulating valve.
(8) Operate handbrake control and check for rear spring brake operation.
(9) With the engine stopped continue to operate brake pedal until the brake warning light comes on and the warning buzzer sounds. Gauge pressure should read 59 & 71 p.s.i. Continue brake application to empty the system and the gauge to read zero.
(10) Restart engine and charge system and check connections broken during inspection.
(11) Stop engine and leave vehicle for 15 minutes during which period the pressure drop must not exceed 5 p.s.i.