Chapter 12

BOGIE DAMPER

Type No. ◀ 2.00189.012 ▶

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LIST OF ILLUSTRATIONS

Introduction

1. This unit is an oleo-pneumatic damping device that controls the rate of bogie oscillation. It consists of a piston tube that contains a floating piston and slides within a cylinder. The floating piston separates the oil and nitrogen charges.

Description *(fig. 1)*

2. The cylinder is closed at one end by a bushed eye-end fitting which is screwed on, sealed by a single rubber ring and locked by a circlip. A port, for oil filling, is located in the end fitting and is closed by a plug and bonded seal. A gland nut that houses a compound seal is screwed on to the other end of the cylinder and is locked by a circlip. The nut secures a flanged bush for the piston tube against the end of the cylinder.

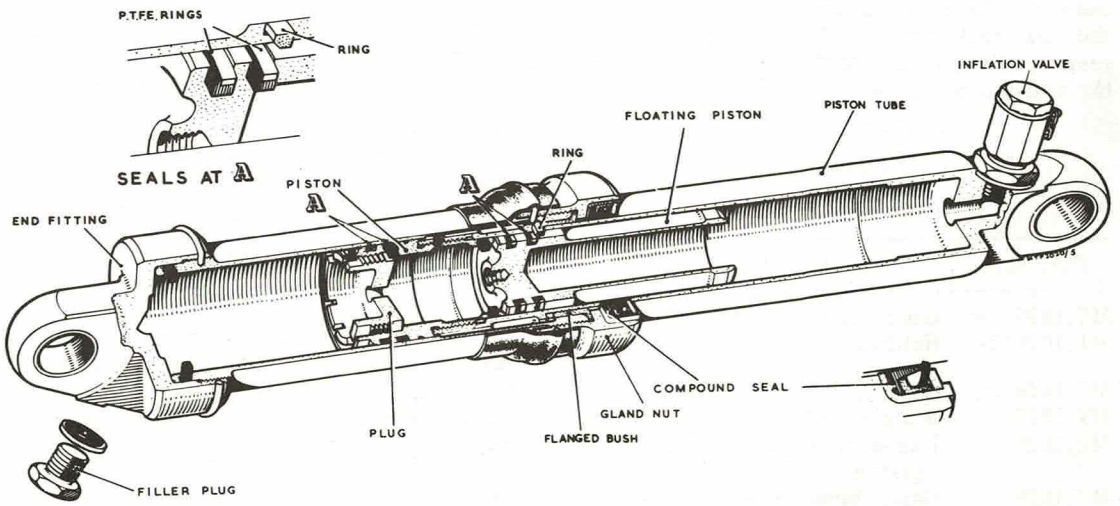

Fig. 1. Bogie damper

3. At its outer end the piston tube is integral with a bushed eye-end into which an inflation valve is screwed and sealed by a bonded seal. Adjacent to the inner end of the tube, a flange provides an abutment for a stop-ring that limits the outward stroke of the tube. The tube contains a floating skirted piston which is sealed by two double seals.

4. A hollow piston is screwed into the inner end of the piston tube and locked by a grub screw. The piston is sealed in the tube by a single rubber ring and in the cylinder by two double seals. A calibrated orifice plug is screwed into the piston bore and is locked by a split pin.

Principle of operation

5. The cylinder is charged with oil and the piston tube with nitrogen under pressure, and the unit is alternately compressed and extended by the oscillations of the bogie. The rate of movement is governed by the initial pressure in the piston tube and the rate of fluid transfer through the orifice.

6. When the unit is closed by an external force, the oil passes through the orifice and acts upon the floating piston to further compress the nitrogen, thus damping the inward stroke of the piston tube. Upon the outward stroke, the floating piston forces the oil back through the orifice which restricts the passage of the oil and damps the outward movement.

SERVICING

TABLE 1

Special tools

Part No.	*Description*
MT.1025	Bench clamp for MT.1026
MT.1026/2	Holding blocks for piston tube
MT.1026/23	Holding blocks for cylinder
MT.1027	Spanner for orifice plug
MT.1028	Extractor bolt for floating piston
MT.1029	Hand clamp for piston
MT.1043	Tommy bar for end fitting

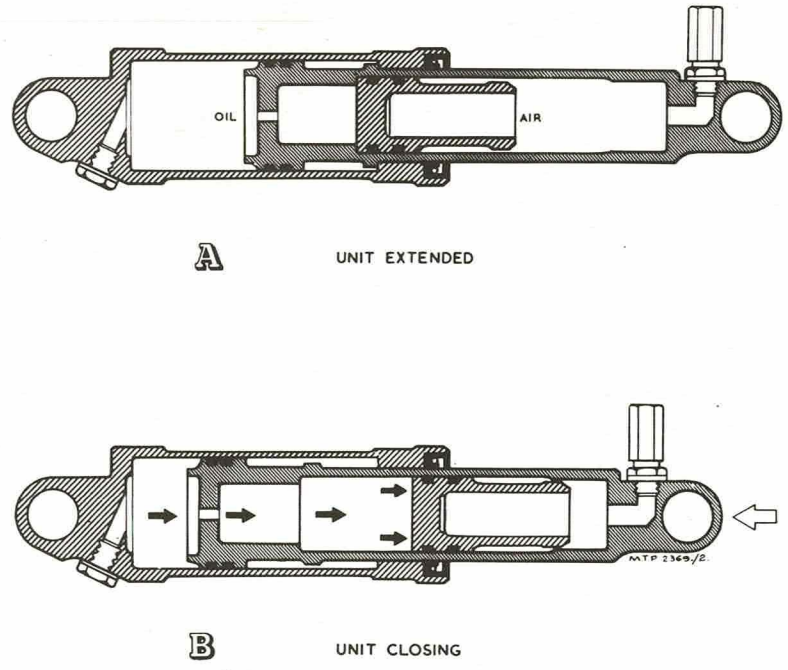

Fig. 2. Functional diagram

Dismantling

WARNING . . .

This unit may contain nitrogen under pressure which must be released via the inflation valve prior to dismantling.

7. (1) Unscrew the inflation valve and the filler plug, remove the bonded seals, then drain all oil from the cylinder.

(2) Remove the circlip from the end fitting, and unscrew the end fitting from the cylinder.

(3) Remove the circlip from the gland nut, and unscrew the nut, then taking care not to damage the lip of the compound seal, withdraw the nut from the piston tube.

Note . . .

The compound seal should not be removed unless it is unserviceable.

(4) Withdraw the piston tube and piston from the cylinder; remove the bush and ring from the piston tube.

(5) Remove the split pin locking the plug to the piston, and unscrew the plug.

(6) Remove the grub screw locking the main piston to the piston tube, and unscrew the piston.

(7) Withdraw the floating piston from the piston tube and remove all the seals.

Note . . .

The bushes in the eye-ends should not be removed unless they are unserviceable.

Assembling

8. Lubricate all parts with clean Oil OM-15 (34B/9100572) with the exception of the sealing rings which should be lubricated with Grease (34B/9100519).

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(1) Fit new sealing rings throughout: care must be taken that the rings are not overstretched, and that the single and double seals are assembled as they are shown (*fig.* 1).

(2) If a new compound seal is to be fitted, ensure that the lip of the seal faces outwards and press the seal into the gland nut.

(3) Insert the floating piston, skirt leading, in the piston tube, then screw the main piston into the tube and tighten.

(4) Fit a new bonded seal to the inflation valve and screw the valve into the piston tube.

(5) Connect a Turner adapter with a suitable gauge to the inflation valve and inflate with nitrogen to a pressure of 300 lb/in^2, then immerse the tube in oil. Leakage is not permissible.

(6) Release the pressure from the piston tube via the inflation valve, then remove the inflation valve.

(7) Lock the main piston to the piston tube by fitting a new grub screw; lock the grub screw by peening metal into the screwdriver slot, using a ball-ended punch.

(8) Screw the plug into the main piston, tighten, and lock in position with a new split pin.

(9) Insert the bush in the recessed end of the cylinder and secure in position with the gland nut. After satisfactory completion of tests, lock the gland nut with a new circlip.

(10) Position a new ring, chamfered diameter leading, on to the piston tube. Insert the tube, eye-end leading, in the open end of the cylinder and into the bush, then taking care not to disarrange the seals, locate the piston in the cylinder.

(11) Screw the end fitting on to the cylinder and tighten. After satisfactory completion of tests, lock the end fitting to the cylinder with a new circlip.

(12) Fit a new bonded seal to the filler plug and screw the plug into the end fitting. After satisfactory completion of tests, wire-lock the plug to the end fitting.

(13) Screw the inflation valve, with its bonded seal, into the piston tube.

Testing

9. All tests are to be carried out with clean oil OM-15 and nitrogen.

(1) Replace the inflation valve with a suitable connector and pressure gauge. With the damper vertical and the piston tube uppermost, pump in oil through the connection to a pressure of 300 lb/in^2. Release the pressure. Carry out this operation three times to ensure the discharge of all nitrogen.

(2) With the damper vertical and the cylinder uppermost, connect a hand pump and pressure gauge to the filling port. Pump in oil, allowing the damper to extend, and raise the pressure to approximately 275 lb/in^2. With the damper ends free, pressure in the oil end must never exceed 300 lb/in^2. Release the pressure and close the damper. Carry out this operation three times to ensure the discharge of all air. Replace the filler plug and bonded seal.

(3) Place the damper in a press and compress the damper until the pressure gauge on the piston tube indicates 4500 lb/in^2. Maintain this pressure for two minutes during which period leakage is not permissible. Release the pressure and remove the damper from the press.

(4) Drain all oil from the piston tube and inflate with nitrogen to 300 lb/in^2. Slacken off the filler plug at the oil end to release any excess fluid and to ensure that the floating piston is bottomed. Re-tighten the filler plug. Place the damper in a press and close it to 14·27 in. between centres and allow it to cool. The nitrogen pressure should then be 750 $\pm$ 100 lb/in^2. Release the nitrogen pressure with the damper in the compressed condition, then remove the damper from the press.

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