Chapter 2

ACCUMULATORS (FLUID), TYPE A.2/1A AND A.2/2A

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Introduction

1. The accumulator Type A.2, a sectioned view of which is shown in fig. 1, is fitted to the Goblin Mk. 1, 2 and 3 aero-engines. The function of the unit is to provide an additional boost of fuel to the burners during the initial motoring period when the speed of the engine is insufficient to provide a readily ignitable fuel spray of sufficient duration to start the engine.

DESCRIPTION

2. For the convenience of description, the unit may be conveniently divided into two main assemblies i.e., the main body casting and the piston assembly with spring.

Main body casting

3. The main body consists of two cylindrical light-alloy castings, the cylinder and end cap. A flange cast integral with each section forms the joint for the two sections, which are retained together by six special cheese-headed bolts and nuts, these bolts being used to secure the unit to the engine. The bore of the cylinder is machined to accommodate the piston, whilst the upper end of the cylinder has a cast boss to house the main union, which serves as an inlet when the accumulator is being charged and as an outlet when discharging. The end cap has a slightly smaller bore than the cylinder, thus forming a stop for the piston when the accumulator is fully charged. A banjo union is fitted to the bottom of the end cap for fuel drainage.

Piston assembly and spring

4. The piston is an aluminium-bronze casting, the upper face being stepped to provide a seating for the "U" shaped synthetic rubber seal. The seal is retained in position by a steel

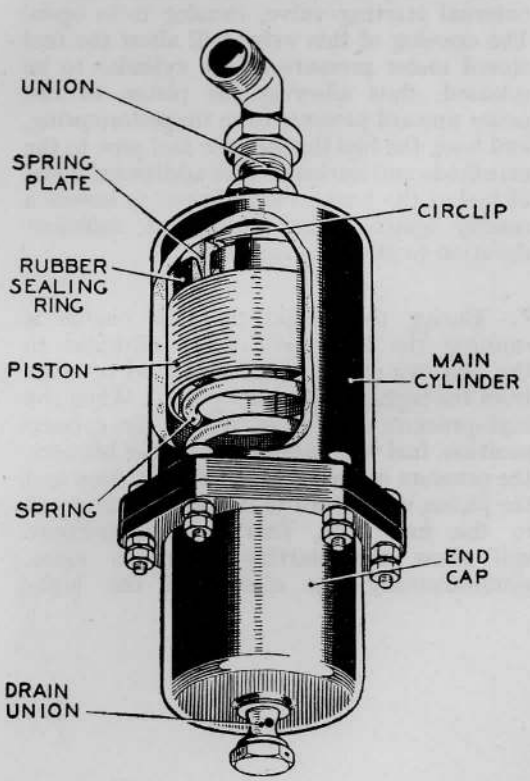

Fig. 1. Cut-away view of unit

spring plate and circlip, the circlip being located in a groove in the piston. The piston is loaded by a helical spring located at its upper end on the underside of the piston crown, the lower end being located at the bottom of the end cap.

PRINCIPLE OF OPERATION

5. The accumulator operates in conjunction with a high-pressure cock in the fuel control box and an external starting valve in the fuel system between the accumulator and the burner manifold. Whilst the engine is running, the accumulator is fully charged and the piston is adjacent to the fuel inlet. When the starter motor rotates the engine, fuel from the high-pressure fuel pump enters the accumulator through the main union. As the fuel pressure increases, it will gradually overcome the piston spring-loading and thus push the piston towards the end cap; when in this position the cylinder will be fully charged with fuel.

6. As the fuel pressure will continue to rise after the cylinder is full, the additional predetermined pressure will be exerted on the external starting valve, causing it to open. The opening of this valve will allow the fuel stored under pressure in the cylinder to be released, thus allowing the piston to rise under upward pressure from the piston spring, and force the fuel through the fuel pipe to the manifolds and burners. This additional boost of fuel at the burners is sufficient to ensure a readily ignitable fuel spray of sufficient duration to start the engine.

7. During the period that the engine is running, the piston will remain adjacent to the end cap owing to the sustained pressure from the high-pressure fuel pump. When the high-pressure cock is moved to the CLOSED position, fuel will be cut off from the burners, the pressure in the accumulator will drop and the piston will return to its position adjacent to the fuel inlet. This drop in pressure will allow the starting valve to close; simultaneously, the closing of the high-pressure cock opens a cam-operated dump valve which permits surplus fuel from the manifold and burners to drain to atmosphere.

8. Any fuel which may pass the synthetic rubber seal will drain to atmosphere through the drain union in the end cap.

Installation

9. The installation of this unit is covered in Volume 1 of the relevant engine Air Publication.

Inhibiting and packing

10. Inhibiting and packing are to be carried out as described in Volume 2, Part 3, Section 5, Chapter 2, of this Air Publication.

SERVICING

11. It is important that the unit be kept clean and free from foreign matter. Examination of the main feed pipe and connection must be made in accordance with the servicing schedule and any leakage immediately rectified.

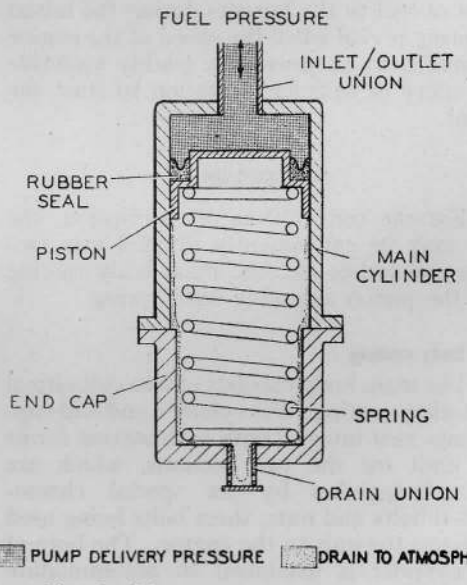

Fig. 2. Diagrammatic view of unit