

APPENDIX "L"

HEYWOOD  
COMPRESSOR TYPE

SH6/2A

AS FITTED TO THE

Cirrus "Minor" Series II

Aero Engine

*Manufactured by*

THE HYMATIC ENGINEERING CO., LTD.,

REDDITCH, England

## KEY TO HEYWOOD COMPRESSOR TYPE SH6/2A

1. Cylinder head cover.  
Fixing screws.  
Intake elbow.  
Flexible hose.
2. Cylinder head and inlet valve assembly.
3. Transfer valve assembly, comprising :  
Transfer valve.  
Transfer valve seat.  
Transfer valve spring.  
Transfer valve guide.  
Transfer valve gasket.  
Transfer valve seating washer.
4. Piston and connecting rod assembly, including transfer valve assembly.
5. Cylinder assembly, including delivery valve assembly and clamping ring.
6. Crankcase assembly, including fixing screws and locking plate.
7. Oil inlet filter assembly, including :  
Oil filter screw assembly.  
Joint (body and banjo).  
Joint (filter screw and banjo).  
Banjo (supplied separately).
8. Crankshaft assembly, including ball bearing.
9. Delivery valve assembly, including :  
Delivery valve.  
Delivery valve spring.  
Delivery valve guide.  
Delivery valve union.  
Delivery valve gasket.
10. Air intake filter assembly, including :  
Filter body.  
Filter body pad.  
Filter body cover.  
Filter body circlip.

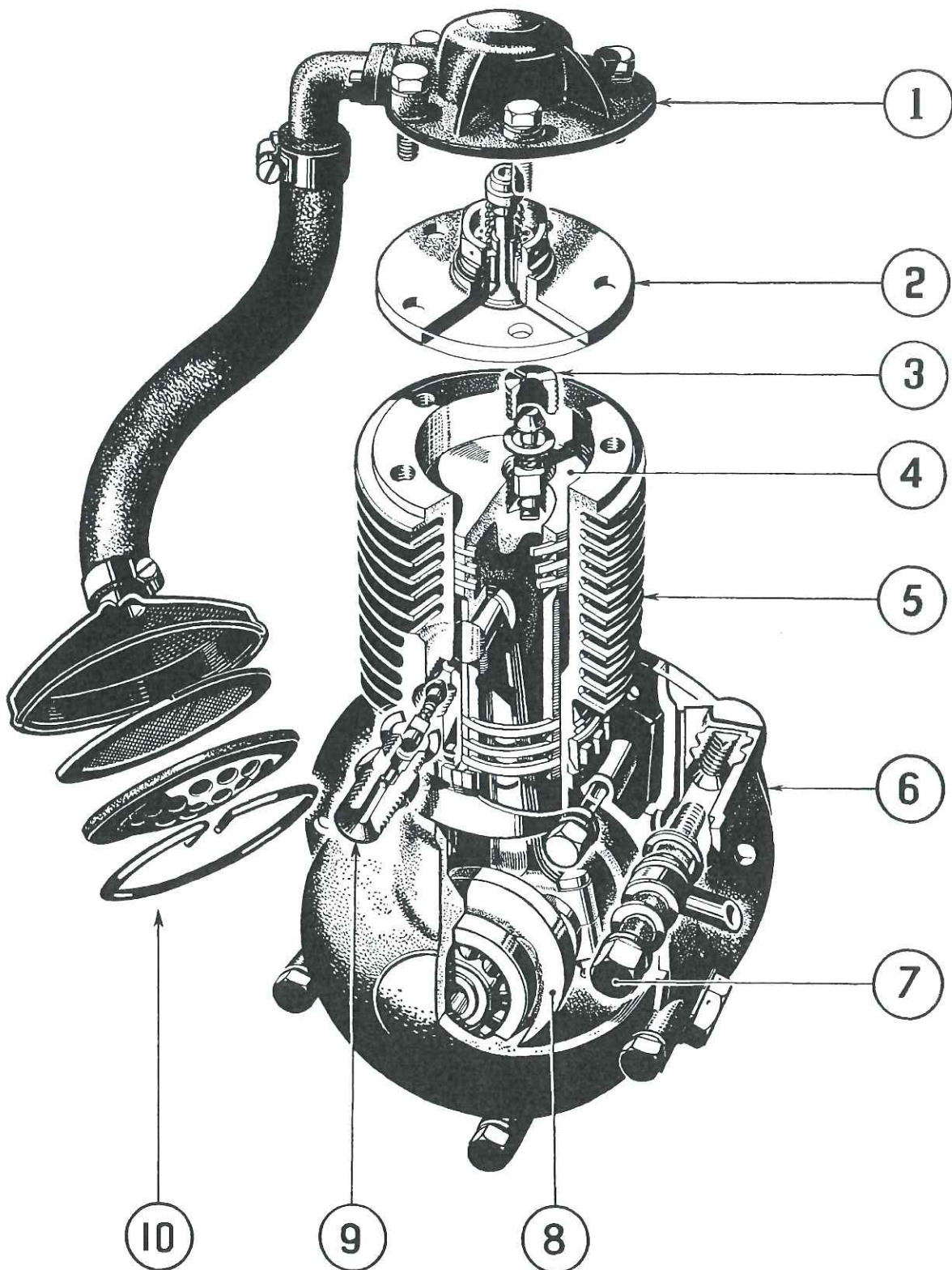


Figure 1.—General Arrangement. Heywood Compressor Type SH6/2A.

## HEYWOOD

### COMPRESSOR TYPES SH6/2A, SH6/7B, SH6/5B and SH6/9

**1. PURPOSE.**

Type SH6/2A or SH6/5B supplies compressed air to the pneumatic system at a pressure up to 450 lb./sq. in., and type SH6/7B or SH6/9 at pressures up to 600 lb./sq. in.

**2. LEADING PARTICULARS.**

Hymatic type No. :—SH6/2A, SH6/7B, SH6/5B and SH6/9.

Air-cooled, single cylinder, two-stage, stepped-piston.

Cylinder capacity 45 c.c.

Flange mounting for quill shaft drive from engine.

Weight 5 lb.

**Speed of Rotation.**

Half engine speed, normal 1,200-1,600 r.p.m. Maximum 10 minute period, 2,100 r.p.m.

**Performance.**

<i>Type</i>	<i>r.p.m.</i>	<i>Pressure lb./sq. in.</i>	<i>F.A.D. cu. ft./min.</i>
SH6/2A . . .	1,200	450	1.25
SH6/5B . . .	1,200	450	1.25
SH6/7B . . .	1,200	600	1.2
SH6/9 . . .	1,200	600	1.2

**Lubrication.**

Engine pressure 30-75 lb./sq. in.

Oil : D.E.D.2472B, Aero Shell 80 (Winter), Aero Shell 100 (Summer).

External feed through banjo and filter screw on crankcase, evacuation through space around crankshaft at rear of crankcase.

**Temperature.**

To be kept below 110° C. (corrected for tropical conditions).

**AIR FILTRATION.**

TYPES SH6/2A AND SH6/7B. Filter type S.F.1, supplied as an additional item. Fitted over the existing cylinder head, the felt element seats on a rubber joint ring around the inlet valve cap and is held in place by a clip and spring band.

TYPES SH6/5B AND SH6/9. Hymatic filter type S.F.2A connected to

cylinder head intake elbow by short length of hose. Detachable filter pad held in position by circlip.

### 3. DESCRIPTION.

A two diameter stepped piston reciprocates in a finned steel cylinder also with two bore diameters. Three piston rings on each diameter maintain compression. On types SH6/2A and SH6/7B the poppet type inlet valve assembly is screwed into a finned light alloy cylinder head, whilst on types SH6/5B and SH6/9 the same type of valve is completely enclosed by a cover with an elbow inlet port. The cylinder head, and in the case of the SH6/5B and SH6/9 the cover also, is attached to the top of the cylinder by five O.B.A. screws, a seal being made by a compressed lead wire joint.

The cylinder is provided with an annular spigot which fits into a groove in the top of a split light alloy crankcase, and is locked in position by a screwed clamping ring which seats on the conical top face of the crankcase halves. A one-piece steel crankshaft journalled in a large diameter phosphor-bronze bush in the drive end of the crankcase, and in a ball race shrunk into the crankcase front cover, has the white-metalled big end of a steel connecting rod bolted to the crankpin. The small end of the connecting rod connects with a steel gudgeon pin which is an air-tight seal in the piston. Five O.B.A. screws hold the halves of the crankcase together, and also retain a locking plate which engages in one of the slots cut in the clamping ring. Three oil outlet bosses closed by plugs are provided in the crankcase to allow external oil drainage from the lowest point when the compressor is mounted vertically, or at 60 deg. either side of this position. A mounting flange is provided to fit the standard accessory drive face on engine or gear box.

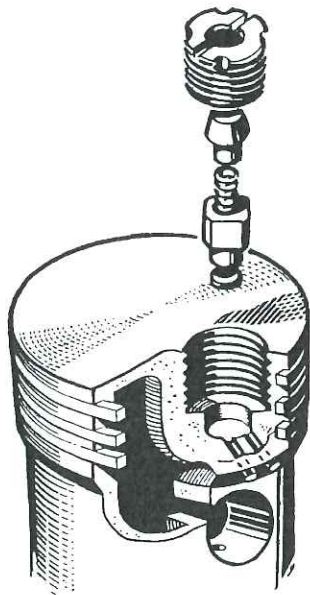


Figure 2.—

Transfer Valve. Scrap view of piston showing ports and valve parts exploded. Reading from top to bottom the parts are:—Transfer valve seat, joint, valve, spring, guide and seating washer.

Lubrication is by force feed from the engine supply, fed either through a port in the flange or by external pipe to a banjo connection on the oil inlet filter which is screwed into the crankcase. Suitable passages in crankcase and crankshaft allow a metered supply of oil to reach the main bearing, big end and small end.

Evacuation is either externally by pipe fitted to the lowest of the oil outlet bosses on the crankcase, or internally through the openings in the rear of the compressor crankcase.

Drive is by quill shaft fitting into the splines provided in the rear of the crankshaft. Inlet air is cleaned by being drawn through a felt pad in a filter clipped over the cylinder head (types SH6/2A and SH6/7B) or by a felt pad in a separate filter connected to the elbow on the cylinder head cover by a short length of flexible hose (types SH6/5B and SH6/9).

Three valves are provided in the compressor.

**INLET VALVE**, consisting of an externally threaded P.B. seat screwed into the cylinder head, acts also as a guide for the steel poppet valve. The valve is held in the closed position by a spring retained by a collar screwed on to the valve stem, which is peened over to lock.

**TRANSFER VALVE.** A mushroom valve seating in a steel body screwed into the piston crown is retained against its seat by a spring inside a valve guide. A screwdriver slot is provided to tighten the valve body down on to a gasket in the piston. The assembled valve is slightly below the piston crown and is locked by peening over the light alloy into four slots on the body of the valve.

**DELIVERY VALVE.** This steel mushroom valve seats in the cylinder at a port drilled in the step between the two-bore diameters. A spring inside a guide holds the valve to its seat, and the complete assembly is retained by the delivery valve union which is screwed into the cylinder wall, leakage being prevented by a gasket between union and the boss on the cylinder.

#### 4. OPERATION.

On the downward stroke of the piston, air is drawn into the cylinder through the suction valve in the cylinder head. The suction valve closes as the piston reaches the limit of the downward stroke.

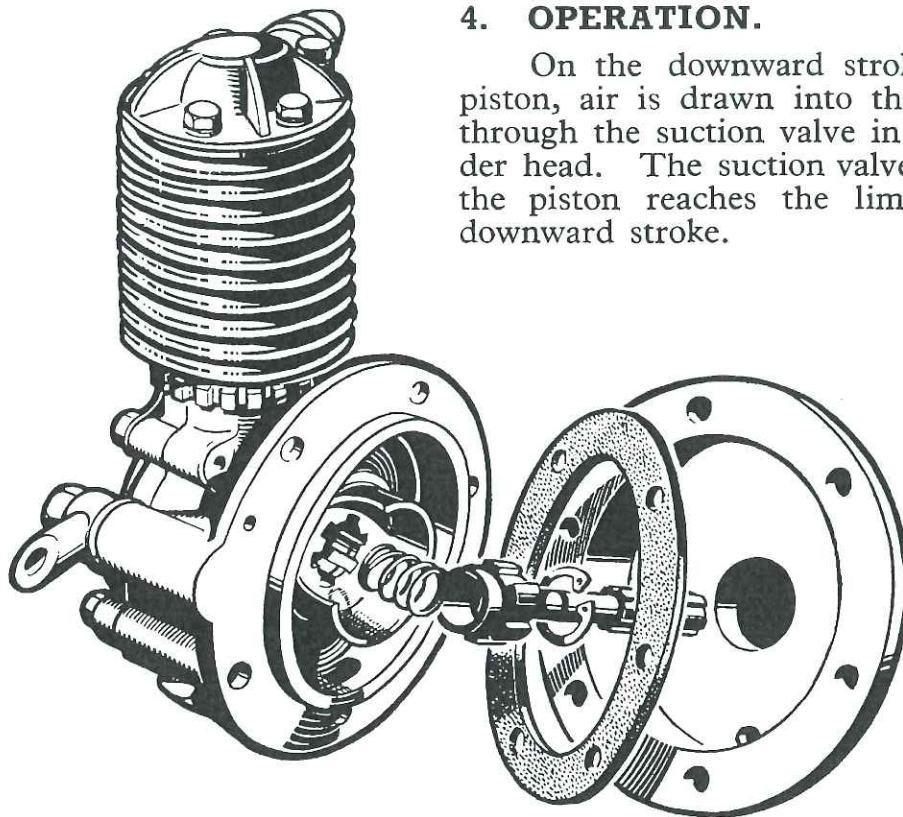


Figure 3.—Installation. Drift shaft is spring loaded and held in position by a circlip. Gasket between compressor flange and drive flange.

On the upward stroke of the piston the air in the first stage volume, above the piston, is compressed and causes the transfer valve in the piston to open. The air is thereby transferred into the second stage volume, formed by the annular space between the large cylinder diameter and the small piston diameter below the top land. On the following downward stroke the air in the second stage is further compressed and is discharged through the delivery valve on the side of the cylinder. At the same time, the first stage volume is refilled, through the suction valve, and the cycle is complete.

#### 5. INSTALLATION.

**MOUNTING.** Flange mounting on standard accessories drive face. Six

holes provided for attachment studs or screws. Gasket between compressor and drive flange to prevent oil leakage. Compressor can be mounted vertically or 60 deg. each side of this position.

Direct drive by quill shaft from engine or accessories gearbox. Large end of quill shaft is inserted in the compressor crankshaft, spring loaded to prevent float and held in position by a circlip. The smaller splined end fits into the engine drive.

**LUBRICATION.** External pipe and banjo connection to the oil inlet filter screw on the compressor crankcase, or internally through a port in the flange. The oil filter screw can be removed for cleaning. Oil drainage either internally through the rear of the crankcase, leaving the three oil outlet plugs in position, or externally, using a union screwed into the lowest of the drain bosses and straight drain pipe.

**COOLING.** Cooling is effected by air stream through a duct and shroud surrounding the cylinder.

**AIR INTAKE.** Types SH6/2A and SH6/7B. Felt filter pad clip over the cylinder head.

SH6/5B and SH6/9. Air intake filter mounted alongside the compressor and connected to the cylinder head by flexible hose.

## 6. PERIODIC INSPECTION.

40 hours—Check and clean filter type S.F.1 (SH6/2A and SH6/7B).

Check and clean filter type S.F.2A (SH6/5B and SH6/9).

120 hours—Check and clean oil inlet filter.

320 hours—Check inlet valve for wear.

Check cylinder locking rings for tightness.

Check crankcase fixing screws for tightness.

Check delivery valve union for tightness.

480 hours—General overhaul.

### Note.

The above inspection schedule laid down by the manufacturers may be altered to suit the Maintenance Schedule of the engine.

## 7. DISMANTLING.

(Note.—The reference numbers in brackets refer to sub-assemblies on Fig. 1.)

### ITEMS FOR PERIODIC INSPECTIONS

#### Filter type S.F.1 (for compressor type SH6/2A and SH6/7B).

Lift off spring band holding filter frame over cylinder head. Remove frame and filter element, taking care not to lose the rubber joint ring on which the element seats around the inlet valve cap.

#### Filter type S.F.2A (for compressor type SH6/5B and SH6/9).

Press the two ends of the wire circlip (10) together and remove. Take out element (10).

**Oil Inlet Filter.**

With 0 B.A. spanner (or tommy bar, according to type of filter screw fitted) remove oil inlet filter screw (7) taking care not to lose the joint washers on either side of the banjo connection.

**Inlet Valve.**

The examination of this valve is greatly facilitated if the compressor is removed from the engine.

Slacken the five cylinder head bolts (1) with 0 B.A. spanner (or socket headkey) and remove.

Lift off cylinder head cover (1) and cylinder head (2) (types SH6/5B and SH6/9), or cylinder head (11) (types SH6/2A and SH6/7B). Discard the lead wire joint. The valve stem is peened over to lock the collar, so that the valve cannot be dismantled.

**Cylinder Clamping Ring (5).**

To tighten clamping ring without removing compressor from engine :

Remove crankcase fixing screws (6) holding locking plate (6). With a hammer shaft held against delivery valve union, to prevent cylinder from turning, tighten clamping ring (5) with "C" spanner.

**Crankcase Fixing Screws.**

0 B.A. spanner (or socket head key) for tightening or removing crankcase fixing screws.

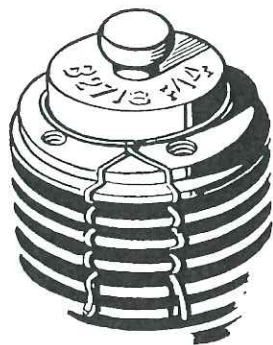


Figure 4.

Fitting Cylinder Head Assembly. Wrap a length of 25 S.W.G. lead wire around the guide, crossing over and twisting the ends of the wire once only.

**Delivery Valve Union.**

When removing the delivery pipe from the compressor, hold the delivery valve union (9) with spanner, otherwise the union may be unscrewed with the danger that the delivery valve guide, spring and valve will fall out.

**General Overhaul.**

It is advisable to return the compressor to the manufacturers, The Hymatic Engineering Co. Ltd., Redditch, England, for overhaul when this becomes necessary.

**8. RE-ASSEMBLY.****AFTER PERIODIC INSPECTION****Filter type S.F.1 (SH6/2A and SH6/7B).**

Fit on rubber joint washer over inlet valve cap. Place element and frame in position over cylinder head and clip in place with spring band.

**Filter type S.F.2A. (SH6/5B and SH6/9).**

Fit in filter element (10) and cover and fasten in position with circlip.

The filter assembly is connected to the compressor by a short length of hose fastened by Jubilee clips at either end.



### Oil Inlet Filter.

Anneal the copper gaskets to be fitted at either side of the banjo.

Place the small gasket on the filter next to the hexagon head. Pass filter through banjo connection. Place large gasket on banjo. Screw filter bolt into crankcase and tighten carefully to avoid overstraining.

### Inlet Valve.

To re-fit cylinder head and inlet valve assembly after inspection, place guide (B2718/F4) on the top of the cylinder bore.

Wrap a length of 25 S.W.G. lead wire around the guide, crossing over and twisting the ends of the wire once only.

Press ends of wire down the cylinder fins to hold loop in position when the guide is removed.

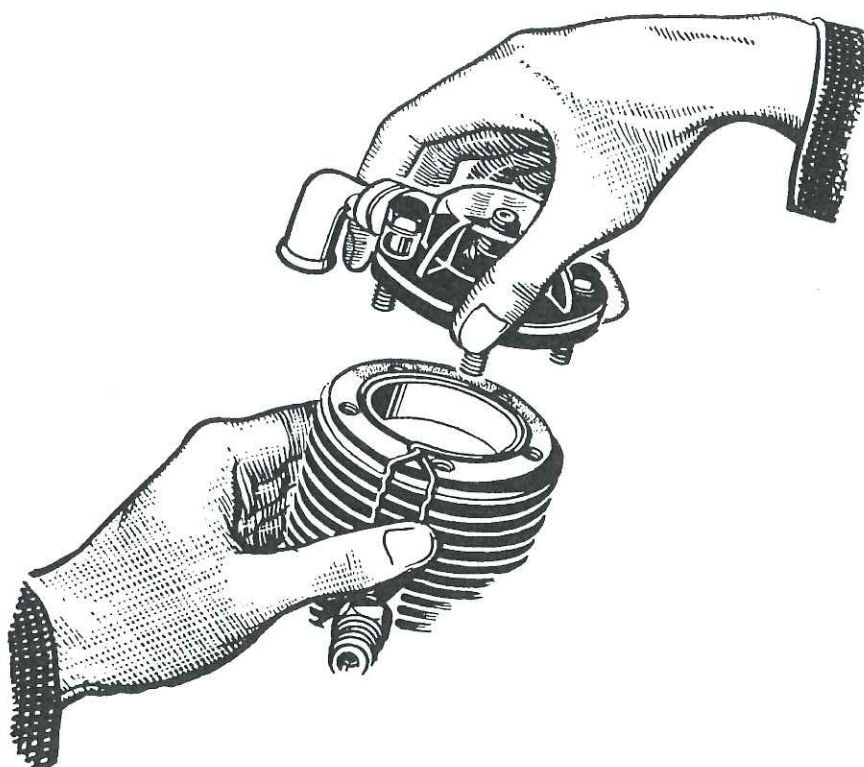


Figure 5.—Fitting Cylinder Head Assembly. Carefully hold cylinder head and cover with fixing bolts in position, over the wire. Gently lower head on to lead wire without disturbing the loop. Tighten alternate screws.

Carefully hold cylinder head and cover (SH6/5B and SH6/9) with fixing bolts in position, over the wire. (With types SH6/2A and SH6/7B there is no cover over the head.)

Gently lower head on to lead wire without disturbing the loop. Tighten down alternate fixing screws evenly.

This will make a joint .004 in. in thickness.

With turning handle (B2718/F13) turn compressor crankshaft to ensure that the lead joint is correctly placed. If this joint overlaps, the top clearance of the piston will not be sufficient and the subsequent fouling against the wire can be felt.

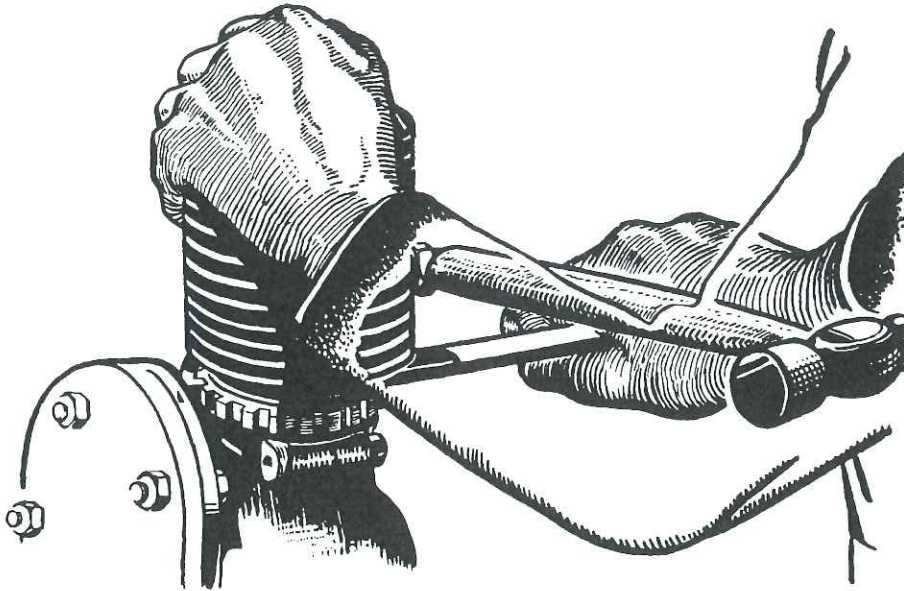


Figure 6.—Tightening Clamping Ring. Hold hammer shaft against delivery valve union to prevent movement of cylinder. With "C" spanner tighten clamping ring.

### **Cylinder Clamping Rings.**

After tightening clamping ring, a new locking plate should be fitted.

Mark out a locking plate and file up the tongue to suit clamping ring.

Fit into position on crankcase and tighten up the two long crankcase fixing screws.