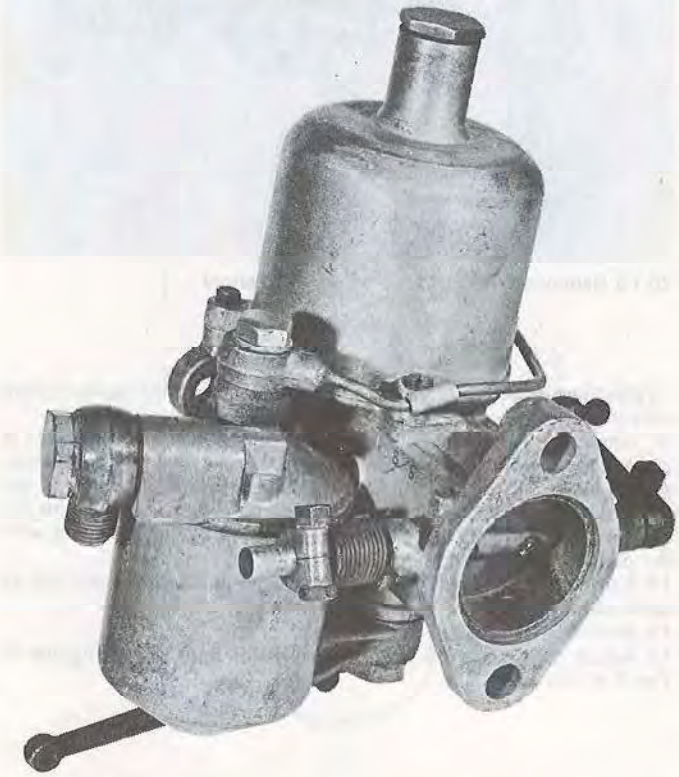


PART 2
Chapter 5 Type H

Contents

1 Introduction

The Type H (Horizontal) carburettor is the earliest of the four types described in this Manual. For the purpose of instruction it may be considered as the basic form of SU instrument, since all later types are largely refined versions and all use the same basic elements.

It was most popular in the early 1950s, and was fitted as standard to many production saloon and sports cars, and as a 'performance modification' to others. It is often to be found fitted with a thermostatic carburettor on larger cars with a multiple installation.

2 Construction

The unit consists of a die-cast aluminium body in which is formed the choke bore, a suction chamber and piston assembly mounted vertically above it, a jet assembly mounted co-axially with the suction chamber below it, and a float chamber assembly attached by an arm to the body.

The body has a flange at each end, drilled for bolts to mount the unit to the engine and for the attachment of an air cleaner or intake system. A circular, machined platform on the upper side mounts the

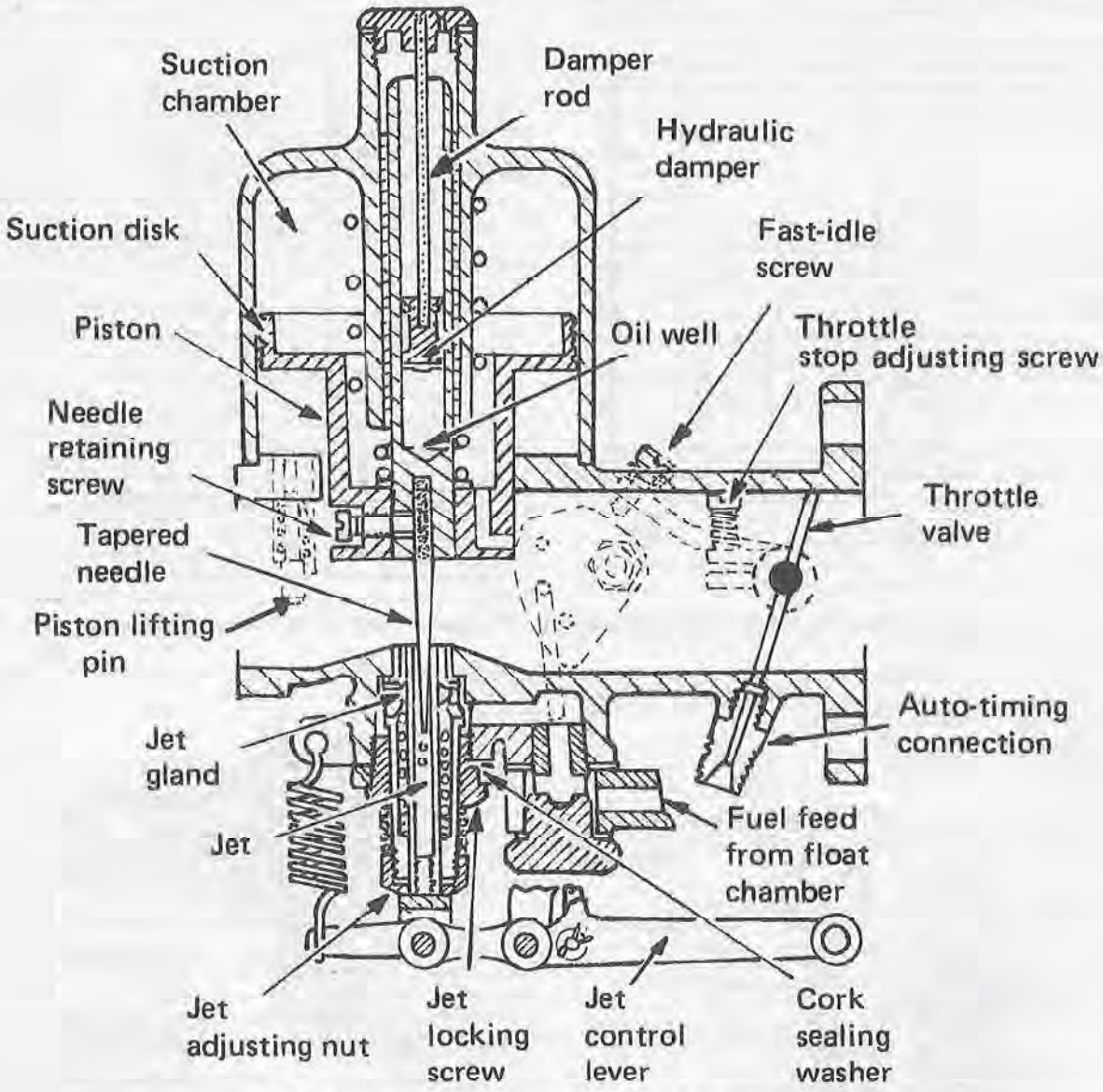


Fig. 5.1 Cross-section through the type H carburettor (Sec 2)

suction chamber, with a large bore intercepting the choke bore at right angles in which the piston moves.

The underside of the body has an internally threaded boss for attachment of the jet assembly, and a similar boss for attachment of the float chamber arm. They are linked to each other by a drilling through the cast web between them.

Other cast features on the body include bosses bored to form throttle spindle bearings, a lug with a hole to accept the tail of a jet return (tension) spring, a housing for a piston lifting pin, tapped holes for vacuum connections, and bosses for throttle/choke interconnecting linkage bearings.

The suction chamber is a die-cast aluminium cylinder with a central guide tube fitted with a hardened steel sleeve bearing. The guide tube is extended at the top of the chamber and internally threaded for attachment of a hydraulic damper. Lugs are provided at the chamber base for attachment to the unit body with screws.

A piston slides in the bearing in the suction chamber, the smaller, lower diameter protruding into the bore of the carburettor body. The piston consists of two parts; the piston rod and the piston disc with integral suction disc. The piston rod is hollow, to act as an oil well for the hydraulic damper (which is secured to the suction chamber). The piston has two ports drilled from the top and emerging on the downstream (throttle plate or engine) side of the piston. A tapered needle is fitted to the base of the piston assembly and secured by a locking screw.

3 Jet assembly

Refer to Fig. 5.3. The jet assembly consists of the jet (1) which slides in upper bearings (13) and lower bearing (7). Jet glands (12), conical washers and washers (11) are fitted to the bearing and loaded to their respective ends by compression spring (10). The assembly is fitted to the unit body with nut (4) sealed with washer (5) and cork washer (6). The bearing is a loose fit in the nut, thus permitting slight radial movement of the jet assembly to centre it, relative to the needle.

The assembly is held to the body by the clamping action of the nut against the flange at the top of the lower bearing. The soft (copper) washer (5) forms a seal between the lower jet bearing (7) and the body.

The maximum height of the jet is determined by the position of the jet adjusting nut (2), the jet being held in contact with it by the spring loading on the external jet control lever linkage.

The jet size is identified by a code number stamped on one face of the steel fork.

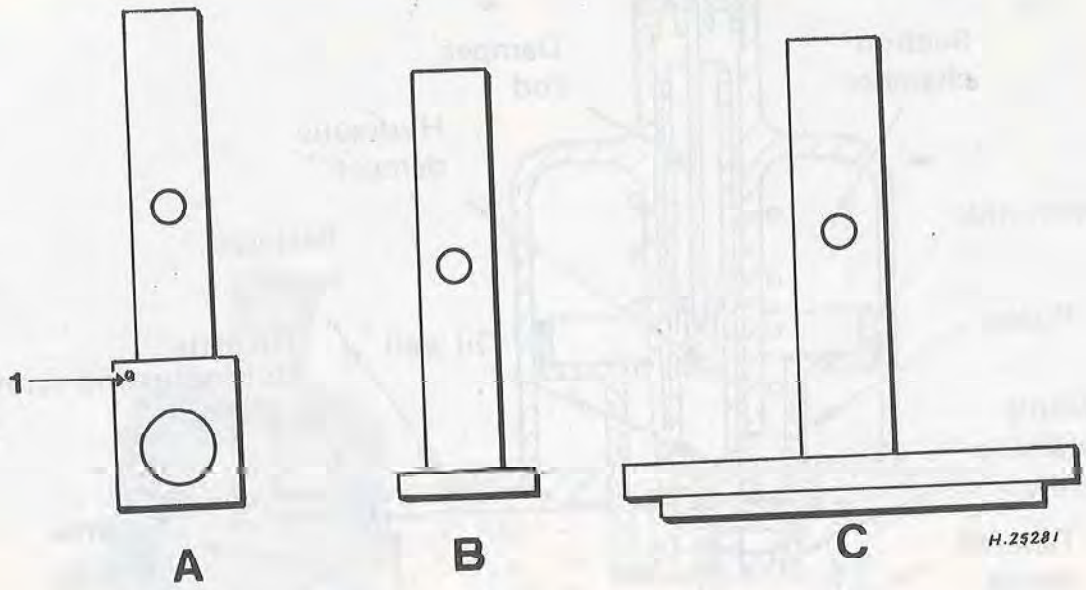


Fig. 5.2 The three types of jet – Standard (A), Thermostatic (B), and Invicta (C) (Sec 3)

1 Jet size stamped on jet
Jet sizes: 9 = 0.09 in, 1 = 0.1 in. 125 = 0.125 in

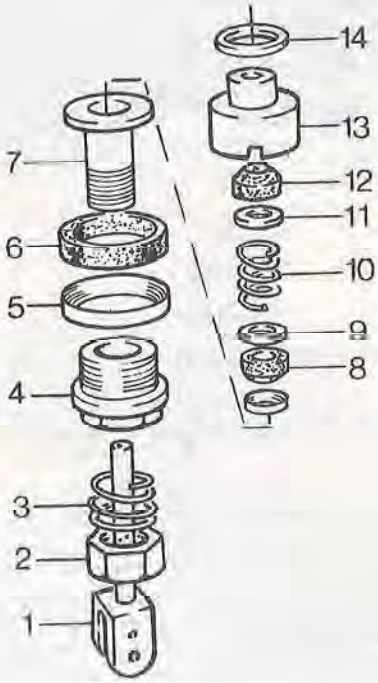


Fig. 5.3 Exploded view of the Standard jet components (Sec 3)

1 Jet
2 Jet adjusting nut
3 Spring
4 Fitting nut
5 Copper washer
6 Cork washer
7 Lower jet bearing
8 Jet gland
9 Washer
10 Spring
11 Washer
12 Jet gland
13 Upper bearing
14 Washer

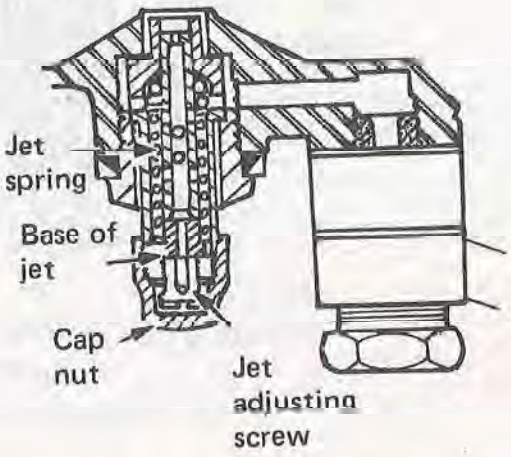


Fig. 5.4 Cross-section of the thermostatic carburettor jet (Sec 3)

When a thermostatic carburettor is used in conjunction with Type H unit/s, the jet is not required to be manually operated and is therefore fixed in a simpler, leak-proof manner. The assembly is referred to as a *sealed jet base*. Access to the jet, for adjustment, is gained after removal of the cap nut.

The damper consists of a cylindrical, non-return valve assembly retained on the end of a rod by a circlip. The rod is serrated at the top and pressed into a screwed brass cap, by which it is secured to the suction chamber. The valve is immersed in the oil in the hollow piston rod, and is so arranged that oil can pass freely through it in a downwards direction (piston falling), but presents a high resistance to upwards flow (piston rising).

4 Float chamber and its operation

The float chamber assembly consists of the chamber, a detachable lid incorporating the inlet valve, and a float.

The chamber is a die-cast aluminium cylinder fitted with a central float guide rod. An extension arm at the bottom of the chamber is enlarged at its outer end, and drilled for a banjo bolt which secures it to the carburettor body. Fuel is supplied to the carburettor through a drilling in the arm.

The detachable lid incorporates lugs which carry the float lever hinge pin. The inlet valve consists of a brass seating screwed into the lid, in which slides a steel needle. The position of the needle is controlled by the float lever movement. Fuel inlet to the valve is from an external banjo union, secured with a banjo bolt to a tapped hole in the lid. A thimble-shaped filter is retained in the inlet by the banjo bolt, the open inlet end being loaded towards it (to seal the periphery) by a conical spring surrounding the filter. The inlet assembly is sealed with soft fibre washers.

The top, threaded portion of the float guide rod projects through a central hole in the lid and retains it with a cap nut. A cover cap is fitted under the cap nut to protect the annular vent from the ingress of dirt. The lid is located in the chamber by a machined spigot at the rim.

The float consists of two brass spinnings soldered together, with a brass tube running through the centre. The float slides vertically on the guide rod fixed to the float chamber base and operates the inlet valve via the hinged lever.

Fuel, supplied by an external mechanical or electric pump, enters the float chamber inlet and passes through the fine mesh filter. As the fuel level in the chamber rises, the float rises and operates the inlet valve, reducing the flow and stopping it when a previously determined level is attained. Petrol flows from the base of the chamber through the drilling in the arm to the jet assembly, and rises to the same level (just below the top of the jet when in its fully raised position).

5 Operation

Cold starting

To start the engine from cold, the external, facia-mounted mixture control (choke) is pulled out, which lowers the jet assembly in its bearings and glands. With the piston seated on the bridge of the carburettor, this lowering of the jet increases the annular area between the needle and the orifice at the top of the jet. The throttle plate is partly opened by the mechanical interconnection between the mixture control linkage and the throttle lever.

See Chapter 2 for explanation of the constant-depression concept.

With the engine turning over by hand cranking or by the starter motor, the depression generated in the inlet manifold is sensed in the suction chamber via the passages in the base of the piston. The resultant upward load on the piston assembly, due to the differential pressures sensed above and below the suction disc, lifts the piston against the spring load.

The depression created by the flow of air between the underside of the piston and bridge lifts fuel from the jet. The fuel is atomised in the mixing chamber (that part of the choke bore between the piston and the throttle plate) and passes to the engine, when it should start and run.

Normal running, cruising and full throttle

With a cold engine, the mixture must be enriched to compensate for the effects of fuel condensation on the cold surfaces of the induction system, which has the effect of weakening the effective mixture delivered to the engine combustion chambers. This is achieved by lowering the jet assembly, thus increasing the annular area around the needle at any position of the needle, and permitting more fuel to flow.

As the engine warms through, the mixture strength is weakened by progressively raising the jet assembly until, when normal working temperature is attained, the jet is at its highest position, dictated by the position of the jet adjusting nut which will have been preset (see Section 9).

Under cruise conditions, the throttle plate will be partly open with the engine running fast. The obstruction presented by the throttle reduces the depression in the mixing chamber, and thence in the suction chamber, and the piston falls until the forces acting above and below the suction disc are in balance. The depression at the jet will be the same as before, but as the jet has been raised the mixture will be weaker.

The high manifold depression will be sensed just downstream of the throttle plate at the auto-timing connection (on units so fitted) and transmitted to the distributor to advance the ignition timing, with beneficial effects on fuel economy.

At full throttle, the throttle plate presents only a slight obstruction; manifold depression is sensed in the suction chamber and the piston lifts to its maximum limit. The depression at the jet is as before, but more fuel is drawn out due to the withdrawal of the tapered needle, which creates a greater annular area. The mixture strength remains constant.

Acceleration

A richer mixture is required for smooth acceleration. This is achieved by increasing the depression at the jet for any given piston position by retarding the rate at which the piston lifts, thus temporarily increasing the air velocity. The hydraulic damper, in conjunction with the oil-filled piston rod, controls the rate at which the piston rises.

Note that the damper does not limit or reduce the height to which the piston rises, it merely controls the speed at which it rises, causing an immediately richer mixture to be delivered when the throttle is snapped open, which gradually weakens as the piston lifts to its correct position.

As the damper is only effective for upward movement of the piston, the piston falls immediately the throttle is closed, preventing an over-weak mixture being produced.

6 Special overhaul procedures

1 Refer to Chapter 4.

2 The SU part numbers for gasket and overhaul packs are as follows:

Carburettor model	Throttle diameter	Gasket pack	Overhaul pack
H1	*1 1/8"*	*AUE 800S*	*AUE 850*
H2	*1 1/4"*	*AUE 800S*	*AUE 850*
H4	*1 1/2"*	*AUE 801S*	*AUE 850*
H6	*1 3/4"*	*AUE 801S*	*AUE 850*

Note: *Overhaul packs may be difficult to obtain. The 'S' suffix on the gasket pack part numbers indicates that throttle plate screws are included*

Disassembly

1 Clean the outside of the carburettor thoroughly. Remove the banjo bolt, banjo union and fibre washers. Extract the filter and spring assembly from inside the float chamber lid (photo).

2 Mark the relative position of the suction chamber to the body.

3 Remove the damper and its washer. Unscrew the chamber retaining screws. Lift the chamber straight off (photos).

4 Remove the piston spring and washer (if fitted), lift out the piston assembly carefully and empty out the damper oil from the piston rod.

5 Undo the needle locking screw and remove the needle. If the needle sticks in place, first tap it inwards and then pull it out; do not bend it (photo).

6 Unhook the lever return spring. Remove the split pins and clevis pins (photos). Remove the fast idle cam pivot bolt. Note the positions of the aluminium spacing washer and the spring washer. If a thermostatic starting carburettor is fitted, refer to Chapter 9.

7 Undo the linkage assembly. Press in the piston lifting pin, extract the circlip from its groove and withdraw the pin and its spring downwards.

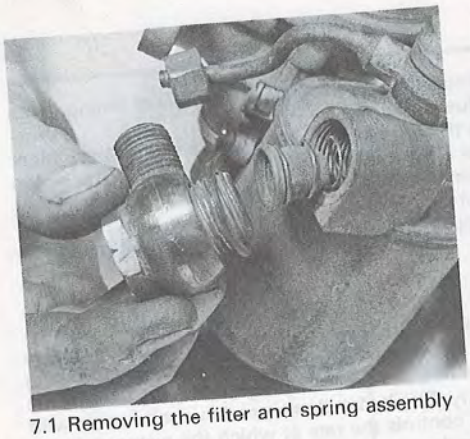
8 Withdraw the jet and take off the jet adjusting nut and spring.

9 Unscrew the jet locking nut and carefully withdraw the assembly. Lift off the upper jet bearing and copper washer. Extract the gland and brass gland washer (photos).

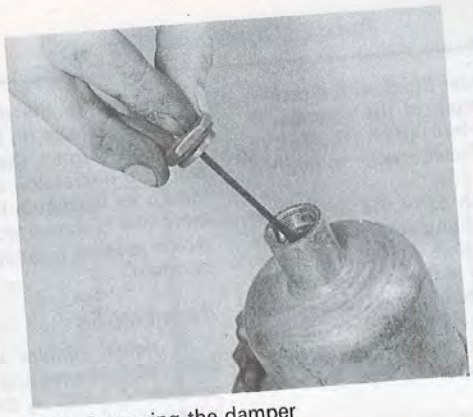
10 Remove the gland spring and extract the lower jet bearing from the jet locking nut. Extract the gland and brass gland washer from the bearing. Do not touch the jet locking nut cork washer.

11 Mark the position of the lid to float chamber. Unscrew the central nut and remove the overflow pipe and washers; the stay, washer and cover cap, or the cover cap alone. Record the positions of the washers and other components. Lift off the lid, note the gasket. Remove the float (photos).

12 Pull out the hinge pin for the hinged lever and detach the lever (photo).

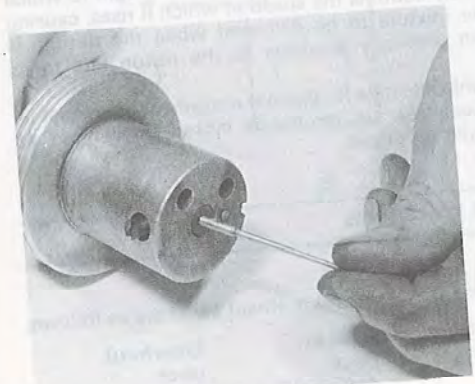


7.1 Removing the filter and spring assembly



7.3A Removing the damper

7.3B Lifting the suction chamber away from the base



7.5 Removing the needle from the piston

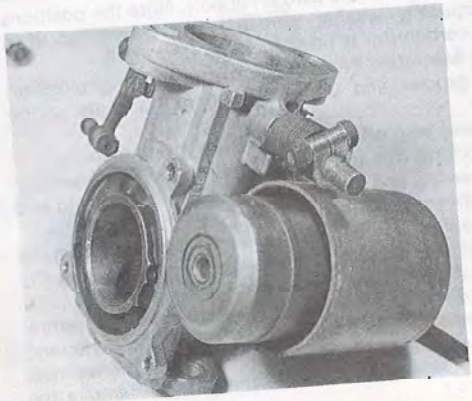
7.6A Jet control lever and return spring

7.6B Removing the lever clevis pin

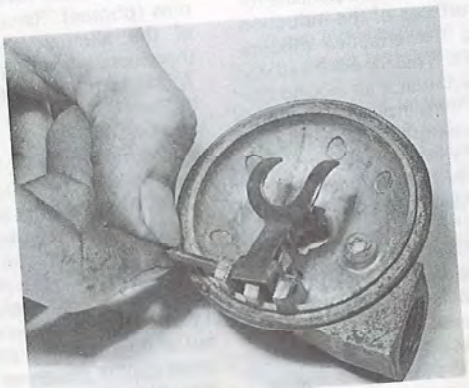
7.9A Removing the jet locking nut ...

7.9B ... and upper jet bearing

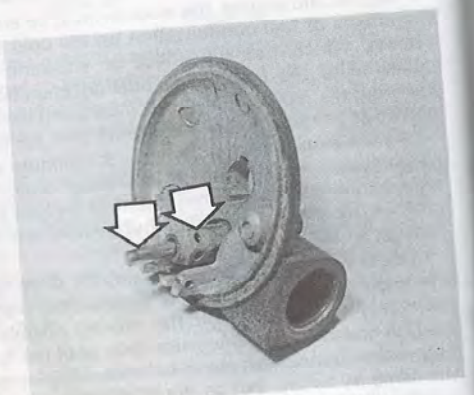
7.11A Removing the float chamber lid ...



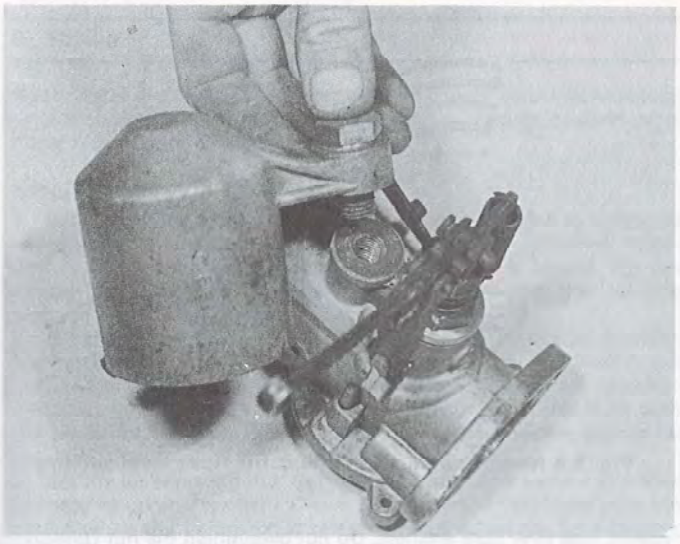
7.11B ... and float



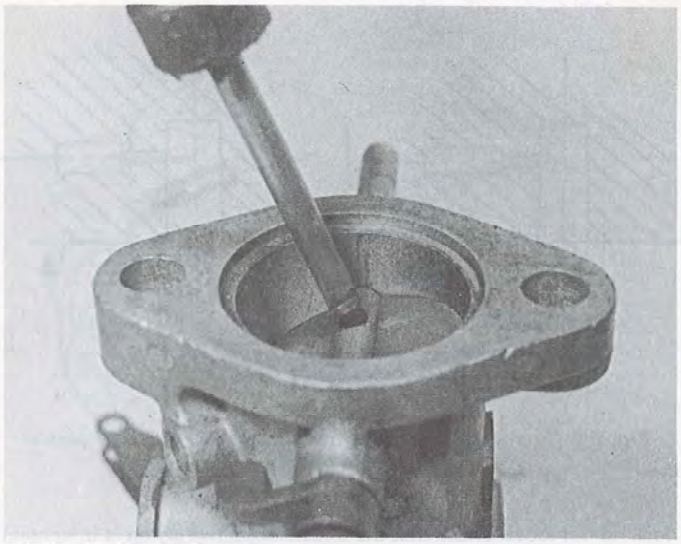
7.12 Removing the needle valve hinge pin and lever



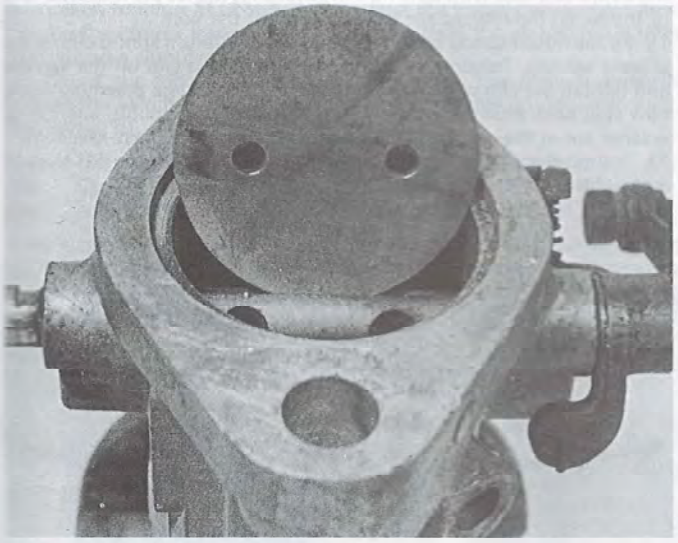
7.13 Needle and needle valve seating (arrowed)



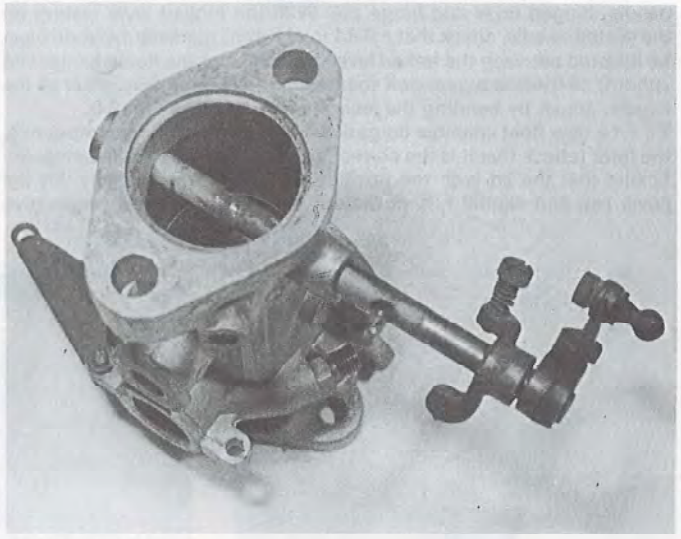
7.14 Removing the float chamber



7.15A Remove the screws ...



7.15B ... and withdraw the throttle disc ...



7.15C ... and spindle

13 Lift out the needle from its seating (photo) and unscrew the seating from the lid using a spanner 0.338 in (8.58 mm) across flats. Do not distort the seating.
14 Remove the screw retaining the stay to the carburettor body (if fitted). Remove the fixing retaining the float chamber to the body (photo). Record the positions of the fibre washers and the brass washer.
15 Remove the two disc retaining screws and mark the disc for location. Twist the throttle and ease out the disc from its slot in the spindle. Pull out the spindle from the body (photos).
16 Loosen the return spring clip bolt and remove the clip, spring, and return spring plate (if fitted). If a clamped operating lever is fitted, loosen the clamping bolt and remove the lever.
17 For instructions on cleaning, inspection and repair, refer to Chapter 4.

8 Assembly

Note: *Ensure that all parts are clean and dry before assembly.*
1 Fit the spindle to the body, ensuring that the fixed lever is in the correct position. Slide the throttle disc into the slot in the spindle and fit two new retaining screws. Do not tighten at this stage. Close the throttle, when the disc will centre itself in the bore. Check visually that contact is made between the disc and the bore throughout its circumference. Tighten the screws and spread the split ends sufficiently to prevent the screws unscrewing.
2 Fit the jet assembly in the reverse order to disassembly, using new gland packings. Ensure that the washer is under the shoulder of the lower jet bearing, that the coned faces of the gland washers face toward the gland packings, and that the copper washer is fitted with the sharp edge towards the upper jet bearing. Fit the assembly to the body, but do not tighten the jet locking nut at this stage (photos).
3 Fit the needle to the piston. The relative position of the two parts is critical, and may be either of two arrangements according to the contour of the needle at junction of the taper and the shank (ie square or radiused shoulder). Fit and tighten a new locking screw.
4 Fit the piston assembly to the body, taking care not to damage the needle. Fit the washer (if provided) and piston spring to the piston rod. Lightly oil the outside of the piston rod and fit the suction chamber. Fit and tighten the securing screws.
5 Remove the jet, jet locking nut, and spring. Refit the adjusting nut and screw it up as far as it will go. Refit the jet and ensure that it is in the correct relative position (check position of fork). With the jet

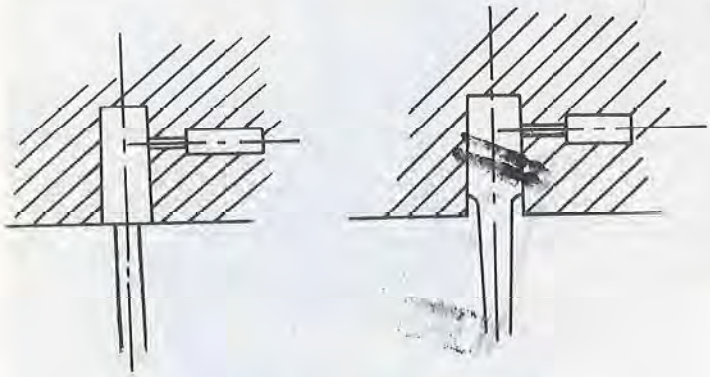


Fig. 5.5 Correct fitted position of the two types of piston needle (Sec 8)

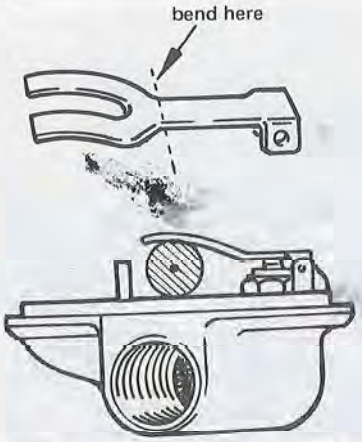


Fig. 5.6 Needle valve adjustment for float level setting (Sec 8)

locking nut loose, check that the underside of the piston is in contact with the top of the jet, which will protrude into the bore. The jet is now accurately centred. Tighten the jet locking nut, remove the jet and adjusting nut, fit the spring and refit the adjusting nut and jet.

6 Fit the float chamber valve seating to the float chamber lid. Fit the needle, hinged lever and hinge pin. With the hinged lever resting on the seated needle, check that a 0.44 in (11 mm) diameter twist drill can be inserted between the forked lever and the lip of the float chamber lid (photo). If there is a gap, or if the bar lifts the forked lever clear of the needle, adjust by bending the lever where shown in Fig. 5.6.

7 Fit a new float chamber lid gasket (do not use jointing compound), the float (check that it is the correct way up) and the float chamber lid. Ensure that the lid is in the position marked on disassembly. Fit the cover cap and central nut, or drainpipe, washers and nut (alternative detail). Use new fibre washers. Do not overtighten the nut (photo).

8 Fit the float chamber assembly to the carburettor body using new fibre washers or rubber grommets (alternative detail).

9 Insert the fuel inlet filter assembly (spring end innermost) and fit the banjo and bolt with new fibre washers. Note that the recessed face of the banjo fits toward the hexagon end of the bolt.

10 Fit the return spring plate, return spring and return spring clip to the throttle spindle. Tension the spring by turning the clip on the spindle and tighten the clip pinch-bolt (photo). Fit the linkage assembly using new split pins. Ensure that the distance washer and double-coil spring washer are in their correct positions in relation to the fast-idle cam.

11 Top up the piston rod with oil as described in Section 11, then fit and tighten the damper rod.

8.2A Jet assembly

8.2B Refitting the jet assembly

8.6 Checking the float level setting with a 0.44 in (11.0 mm) diameter twist drill

8.7 Refitting the float chamber lid

8.10 Throttle return spring (arrowed)

9 Tuning

Note: *Refer to Chapter 3 for notes on tuning, with particular reference to preliminary procedures. If a thermostatic starting carburettor is fitted, refer also to Chapter 9.*

Single carburettor installations

1 Set the throttle adjusting screw. Warm up the engine to operating temperature, then switch off. Unscrew the throttle adjusting screw until it is just touching its stop, and the throttle is closed. Set the throttle adjusting screw 1 1/2 turns open. Ensure that the fast idle screw is clear of the fast idle cam.

2 Set the jet height. Mark the components for correct reassembly, and remove the piston and suction chamber unit. Disconnect the mixture control wire (if fitted), or remove the jet cap nut (thermo-type). Screw the jet adjusting nut/screw until the jet is just flush with the bridge of the carburettor, or fully up if this position cannot be obtained.

3 Set the jet adjusting nut. Replace the piston and suction chamber unit into its original position. Check that the piston falls freely onto the bridge when the lifting pin is released. Turn down the jet adjusting nut/screw two complete turns.

4 Set the idle speed. Start the engine and adjust the throttle adjusting screw to give the desired idle speed. Turn the jet adjusting nut/screw up to weaken, or down to richen, until the fastest idle speed, consistent with even running, is obtained. Re-adjust the throttle adjusting screw to give the correct idle speed, if necessary. Refit the jet cap nut on the thermo-type carburettor.

5 Check the mixture strength (CO content). The mixture strength affects the colour of the exhaust gases, and the idle quality – see Figs. 5.9 and 5.10, and the following tables.

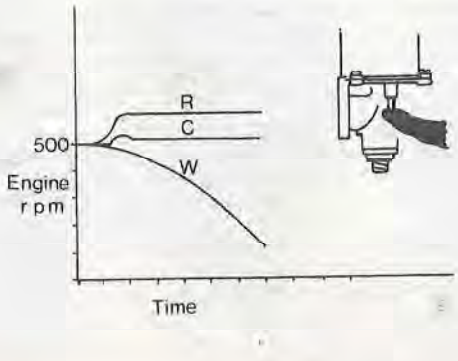
(w)	*Too weak*	*Colourless, irregular note, splashy misfire*
(c)	*Correct*	*Regular and even note*
(r)	*Too rich*	*Blackish, regular or rhythmical misfire*

Check for correct mixture by slowly pushing the lifting pin up about 0.031 in (0.8 mm) after free movement has been taken up. The graph illustrates the effect on engine rpm as the lifting pin raises the piston, indicating the mixture strength.

(r)	*Rich mixture*	*rpm increases considerably*
(c)	*Correct mixture*	*rpm increases very slightly*
(w)	*Weak mixture*	*rpm immediately decreases*

6 Connect and set the mixture control wire (except on thermo-type carburettor). Connect the mixture control wire and adjust with about 0.0625 in (1.6 mm) free movement before it starts to pull on the jet lever. Pull the choke knob at the facia until the linkage is about to move the carburettor jet, and adjust the fast idle screw to give an engine speed of about 1000 rpm when the engine is hot.

7 Fill the damper. Finally top up the piston damper with engine oil, until the level is 0.5 in (13 mm) above the top of the hollow piston rod. On dust-proofed carburettors (identified by no vent hole in the damper cap, and a transverse hole drilled in the neck of the suction chamber), the oil level should be 0.5 in (13 mm) below the top of the hollow piston rod.



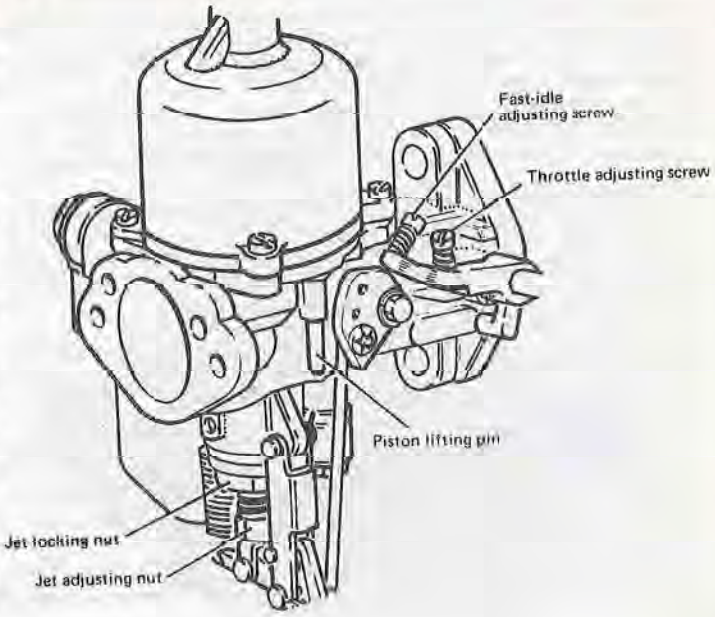


Fig. 5.7 Type H carburettor tuning points (Sec 9)

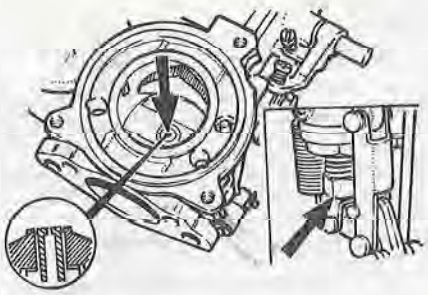


Fig. 5.8 Initial jet height setting (Sec 9)

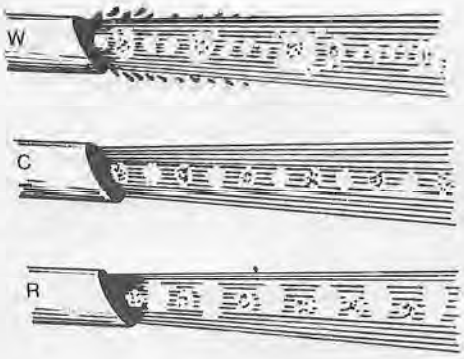


Fig. 5.9 Diagram of effect on exhaust of mixture strengths at idle speed (Sec 9)

Fig. 5.10 Graph showing effect of piston lifting pin on idle speed at different mixture strengths (Sec 9)

Multiple carburettor installations

8 Before the attempted tuning of any carburettor installation, it is essential to make sure the valve clearances, points gap and spark plug gaps are correct. Successful tuning cannot take place if any one of these is 'out'. Multiple carburettor set-ups have their problems compounded if this is not strictly observed.

9 Remove the air cleaner(s) and check for throttle linkage adjustment, smoothness of action and that the dashpots are topped up properly. Run the engine to normal operating temperature, then switch off.

10 Slacken a clamping bolt on one of the throttle spindle interconnection couplings between the carburettors.

11 Unscrew both throttle stop adjusting screws until they are both just touching their stops with the throttle closed. Turn both screws clockwise 1 1/2 turns exactly.

12 Remove the pistons and suction chambers.

13 Disconnect the jet control interconnecting rods and cables on the non-thermo carburettors, or remove the jet cap nuts on thermo-type carburettors. Turn the jet adjusting nuts or screws until each jet is flush with the bridge of its carburettor.

14 Refit the pistons and suction chambers. Top up the piston rods with oil, refit and tighten the damper rods, then check that each piston falls freely by pressing the small lifting pin upwards and letting the pistons fall onto their bridges. A distinct 'click' should be heard. Turn down the jet adjusting nuts or screws 2 turns exactly.

15 Restart the engine, and turn the throttle stop adjusting screws by equal amounts to give the desired idle speed. To make sure that both carburettors are synchronised, use a length of tubing placed between the carburettor intake and the ear, and adjust the throttle screws fractionally until the hiss from both units is the same. Alternatively, use a balancing device (flowmeter) in accordance with its manufacturer's instructions.

16 With the carburettors correctly synchronised, turn the jet adjusting nuts or screws up or down by equal amounts until the fastest idle speed is obtained, consistent with even running. If necessary, re-adjust the throttle stop adjusting screws by equal amounts until the correct idle speed is re-obtained.

17 Now check the mixture strength on each carburettor separately, using the procedure described in paragraph 5. Stop the engine.

18 Refit the jet cap nuts on thermo-type carburettors.

19 With both throttles closed, tighten the clamping bolt on the interconnection coupling with the pin of the link pin lever resting against the edge of the pick-up lever hole. When forked levers are fitted, set the cranked levers so that the pin is 0.006 in (0.15 mm) from the lower edge of the fork. This makes sure that both (all) carburettor throttles operate simultaneously.

20 Where cold start control (choke) cables are fitted, reconnect them, together with the interconnecting rods, and adjust them with reference to paragraph 6, making sure that both operating arms move simultaneously.

21 Refit the air cleaners and re-check for correct mixture strength.

Fig. 5.11 Balancing twin carburettors (Sec 9)

1 Throttle stop adjustment screws

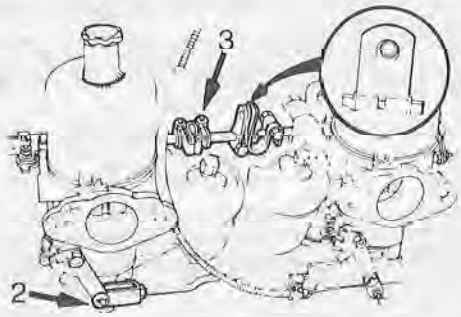


Fig. 5.12 Control couplings on multiple carburettor installations (Sec 9)

2 Throttle spindle coupling *3 Choke control coupling*