Chapter 3 Fuel system and lubrication

For information relating to the RD350 F II and N II models, refer to Chapter 8

Contents

Specifications

Fuel tank capacity	
Total including reserve	20 litres (4.4 Imp gal)
Reserve	2 litres (0.44 Imp gal)
Carburettors	
Make	Mikuni
Type	VM26SS
ID mark	31KO
Main jet	240
Air jet	0.7
Jet needle	5K1
Needle clip position	4th groove from top
Throttle valve cutaway	2.0
Pilot jet	22.5
Air screw (turns out)	1 1/4
Starter jet	80
Float height	21 ± 0.5 mm (0.83 ± 0.02 in)
Fuel level	26 ± 1.0 mm (1.02 ± 0.04 in)
Engine idle speed	1200 ± 50 rpm
Engine lubrication	
Type	Pump-fed total loss system (Yamaha Autolube)
Oil tank capacity	1.6 litre (2.8 Imp pint)
Oil grade	Air-cooled 2-stroke engine oil
Pump colour code	Yellow
Minimum stroke	0.10 ± 0.15 mm (0.004 ± 0.006 in)
Maximum stroke	2.05 – 2.27 mm (0.08 – 0.09 in)
Output per 200 strokes:	
Min	0.12 – 0.19 cc (0.004 – 0.007 Imp fl oz)
Max	2.58 – 2.85 cc (0.091 – 0.101 Imp fl oz)
Transmission lubrication	
Capacity:	
At oil change	1.5 litres (2.6 Imp pt)
After rebuild	1.7 litres (3.0 Imp pt)
Oil grade	SAE 10W30 type SE motor oil
Reed valve	
Bend limit	0.5 mm (0.02 in)
Valve lift	10.3 ± 0.2 mm (0.41 ± 0.008 in)

Note: *YPVS power valve is covered in Chapters 1 and 7*

1 General description

The fuel system comprises the fuel tank from which petrol is fed by gravity to the float bowls of the twin Mikuni carburettors via a vacuum-operated fuel tap. The tap has three positions; "ON" being the main feed, "RES" the reserve fuel supply and "PRI" being a priming position to allow the float chambers to be filled after running dry.

The carburettors are of conventional concentric design, the float chambers being integral with the lower part of the carburettor bodies. Cold starting is assisted by a separate starting circuit which supplies the correct fuel-rich mixture when the 'choke' control is operated. The cold start mechanism is fitted to the left-hand carburettor only.

Air entering the carburettors passes through a moulded plastic air cleaner casing, which contains an oil-impregnated foam air filter. This effectively removes any airborne dust, which would otherwise enter the engine and cause premature wear. The air cleaner also helps silence induction noise, a common problem inherent with two-stroke engines.

Engine lubrication is catered for by the Yamaha Autolube system. Oil from a separate tank is fed by an oil pump to small injection nozzles in the inlet tract. The pump is linked to the throttle twistgrip, and this controls the volume of oil fed to the engine.

The exhaust system is a two piece affair, each cylinder having its own expansion chamber with integral exhaust pipe. The system is finished in a heat-resistant matt black coating.

2 Fuel tank: removal and refitting

1 It is unlikely that the petrol tank will need to be removed except on very infrequent occasions, because it does not restrict access to the engine unless a top overhaul is to be carried out whilst the engine is in the frame.

2 The petrol tank is secured at the rear by a single bolt, washer and rubber buffer that threads into a strut welded across the two top frame tubes. It is necessary first to remove the dual seat before access is available.

3 When the bolt and washer are withdrawn, the petrol tank can be lifted from the frame. The nose of the tank is a push fit over two small rubber buffers, attached to a peg that projects from each side of the frame, immediately to the rear of the steering head. A small rubber 'mat' cushions the rear of the tank and prevents contact with the two top frame tubes.

4 The petrol tank has a locking filler cap to prevent pilferage of the tank contents when the machine is left unattended.

3 Fuel tap: removal, dismantling and reassembly

1 The fuel tap is retained by two cross-head screws to the underside of the fuel tank. In the event of a leak or other problem, try to work out the most likely area of the fault before removing the tap; fuel seepage should be obvious during inspection. Before the tap is removed it will be necessary to drain the fuel into a clean metal container for temporary storage. Remove the two retaining screws and lift the tap away, taking care not to damage the filter which projects into the tank.

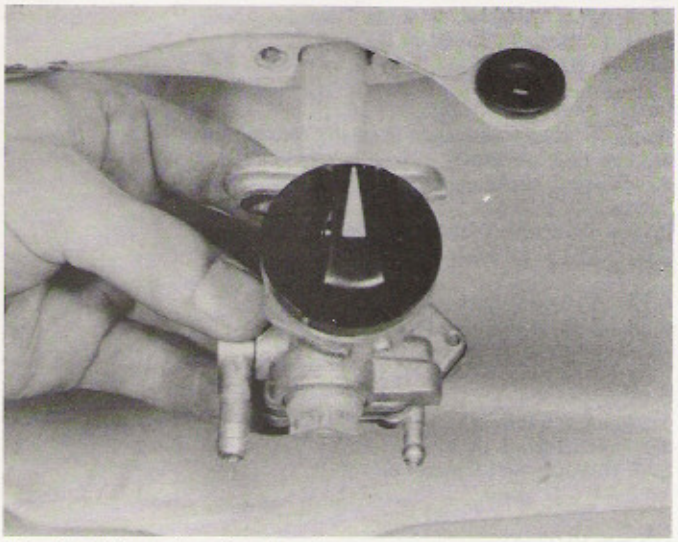
2 Release the single screw which retains the tap control knob and pull it off the tap spindle. Release the two screws which hold the tap position indicator disc and remove it. The tap rotor assembly is retained by a steel plate, this being held in place by two screws. Remove the screws and withdraw the spindle assembly and its wave washer. If the tap has been leaking, the most likely cause is a worn or damaged O-ring between the tap rotor and the body. This can be purchased separately from the tap assembly, as can the oval O-ring between the tap body and the fuel tank, but no other replacement parts are available.

3 On the opposite side of the tap body is the diaphragm valve assembly. This responds to engine vacuum, turning the fuel supply on only when the engine is running. If the vacuum pipe or the diaphragm become holed, the tap will not operate in any position other than the priming ("PRI") setting. If the fault is not attributable to the vacuum pipe it is normal to renew the tap complete. Note that none of the diaphragm valve parts can be purchased separately. The accompanying photographs show the valve arrangement for information purposes only.

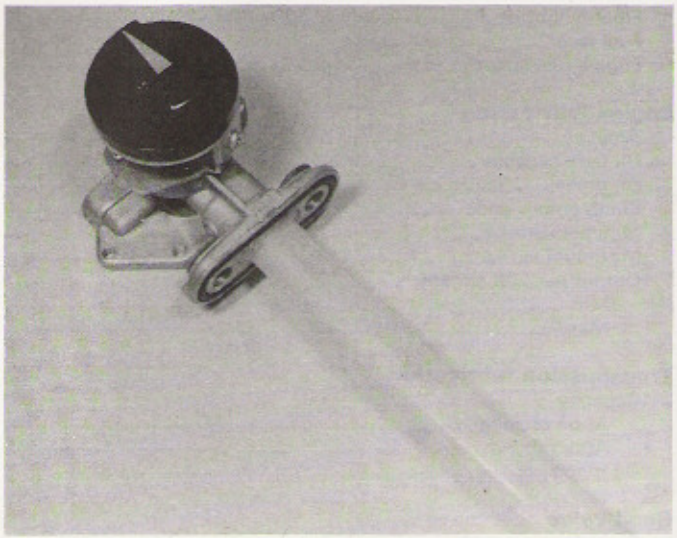
4 The tap is provided with a sediment bowl, in which any fine debris from the tank which has managed to get through the filter gauze, will be trapped, along with any water. The bowl should be periodically removed for cleaning. When refitting the sediment bowl, ensure that the O-ring is in good condition.

5 Before reassembling the petrol tap, check that all the parts are clean, especially the tube which forms the filter and main and reserve intakes.

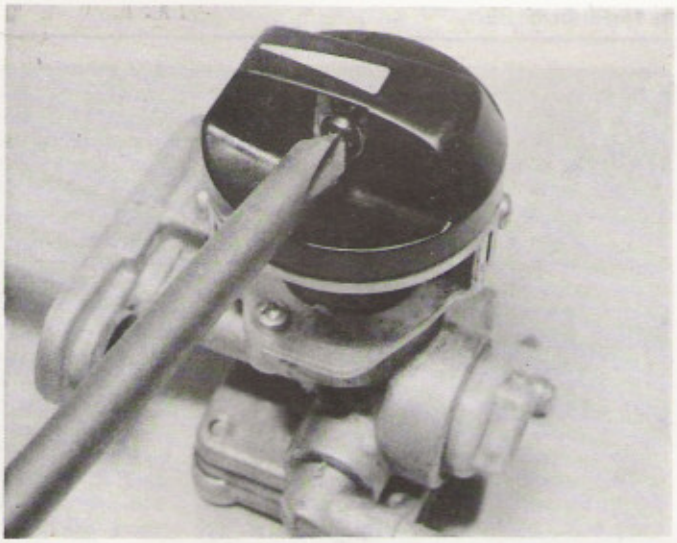
6 Do not overtighten any of the petrol tap components during reassembly. The castings are in a zinc-based alloy, which will fracture easily if over-stressed. Most leakages occur as the result of defective seals.



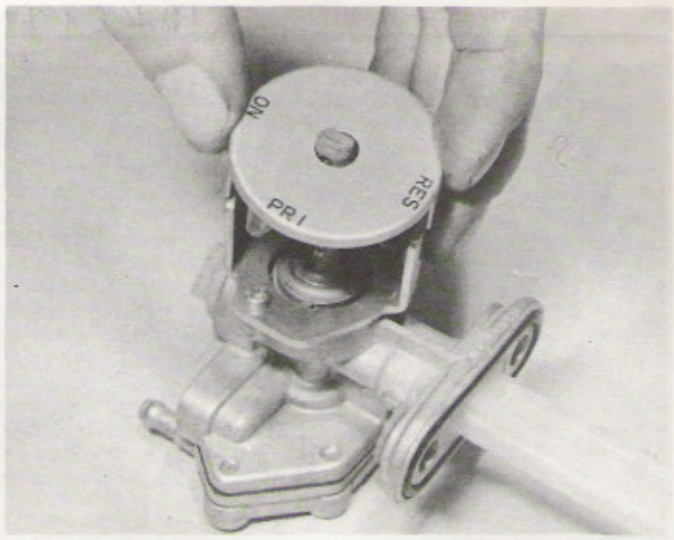
3.1a The fuel tap is retained to the underside of the tank by two bolts



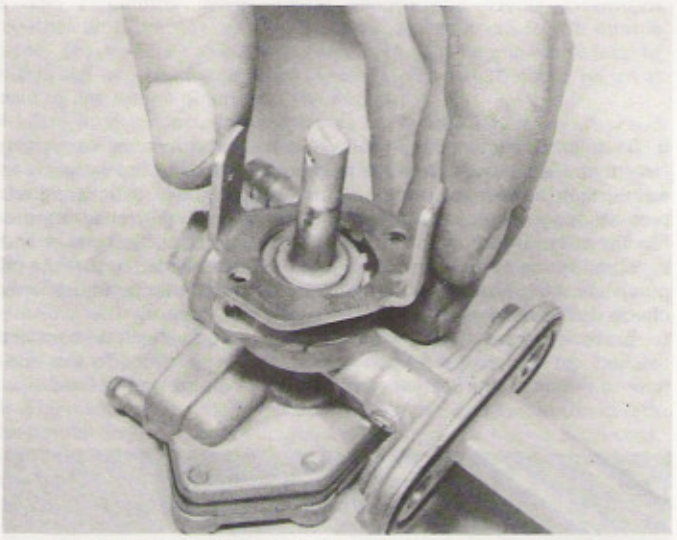
3.1b Note the fuel strainer which projects into the tank from the tap flange



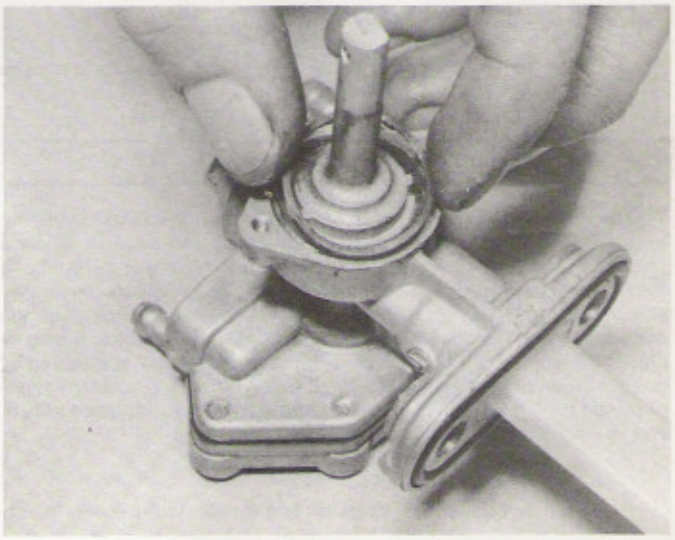
3.2a The tap control knob is secured by a single screw



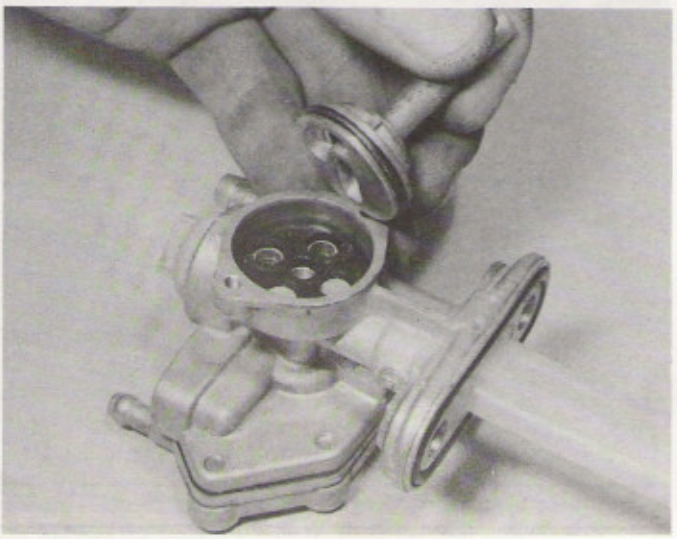
3.2b Remove the two screws and lift away the tap position disc. Note that the 'RES' position is nearest the fuel strainer



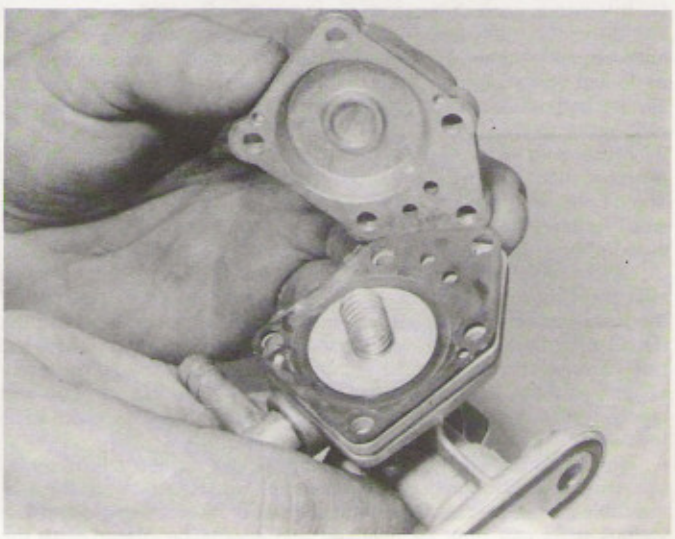
3.2c Tap rotor assembly is retained by two screws



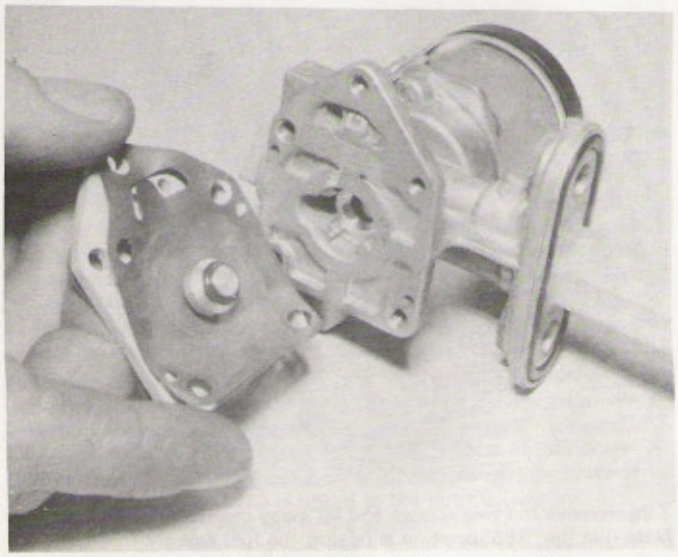
3.2d Lift away the wave washer, followed by the tap rotor



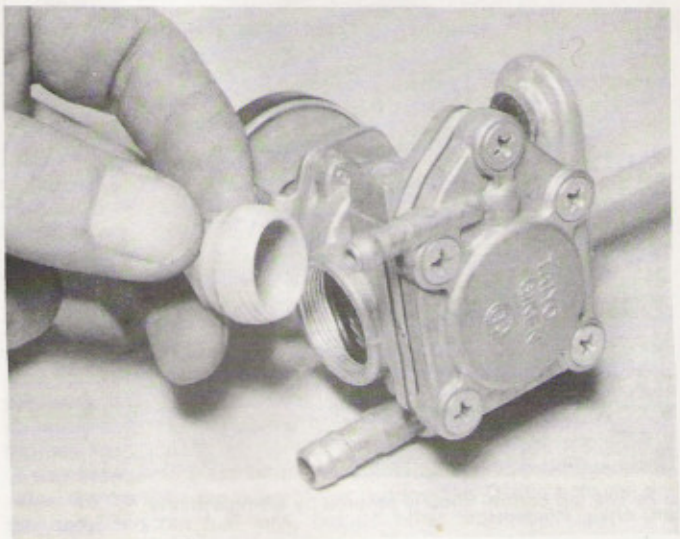
3.2e Renew the O-ring if there have been signs of leakage



3.3a Cover conceals the diaphragm assembly and spring



3.3b Fuel valve is on inner face of the diaphragm assembly



3.4 Sediment bowl is located on the underside of the tap body

4 Fuel and vacuum pipes: examination

1 The fuel and vacuum pipes are made of thin-walled synthetic rubber and are retained at each end by small wire clips. It is good practice to check that the pipes are sound on a regular basis. If split or if they have become hardened due to the effects of engine heat, they should be renewed. Most motorcycle dealers stock tubing of the correct size and material. On no account use natural rubber tubing or plastic tubing in place of the original type; natural rubber is attacked by petrol and will disintegrate, blocking the carburettor jets. Many types of plastic tubing will rapidly become brittle under the influence of fuel, and will soon split or leak.

5 Carburettors: removal and refitting

1 As a general rule, the carburettors should be left alone unless they are in obvious need of overhaul. Before a decision is made to remove and dismantle them, ensure that all other possible sources of trouble have been eliminated. This includes the more obvious candidates such as fouled spark plugs, a dirty air filter element or choked exhaust system baffles. If a fault has been traced back to the carburettors, proceed as follows.

2 Make sure that the fuel tap is turned to the "ON" or "RES" position, then prise off the petrol feed pipes at the carburettor stubs. The oil delivery pipes are removed in a similar manner, noting that the small tubular clips should be displaced first. The pipes can then be eased away from their stubs with the aid of an electrical screwdriver.

3 Slacken the screws of the clips which secure each carburettor to its inlet and airbox adaptors. Each carburettor can now be twisted free of the rubber adaptors and partially removed. This affords access to the threaded carburettor tops, which should be unscrewed to allow the throttle valve assemblies to be withdrawn. It is not normally necessary to remove these from the cables, and they can be left attached and taped clear of the engine. If removal is necessary, however, proceed as follows.

4 Holding the carburettor top, compress the throttle return spring against it and hold it in position against the cap. Once out of the way the cable can be pushed down and slid out of its locating groove. The various parts can now be removed and should be placed with the instrument to which they belong. Do not allow the parts to be interchanged between the two instruments.

5 The carburettors are refitted by reversing the removal sequence. Note that it is important that the instruments are mounted vertically to ensure that the fuel level in the float bowls is correct. A locating tab provides a good guide to alignment but it is worthwhile checking this for accuracy. Once refitted, check the carburettor adjustments and synchronisation as described later in this Chapter. Note too that the oil pump delivery pipes should be bled and the pump adjustments checked after overhaul.

6 **Note:** if the carburettors are to be set up from scratch it is important to check jet and float level settings prior to installation. To this end, refer to the next two Sections before the carburettors are refitted.

5.4 Compress the return spring, then disengage the inner cable

6 Carburettors: dismantling and reassembly

1 Invert each carburettor and remove the float chamber by withdrawing the four retaining screws. The float chamber bowls will lift away.

exposing the float assembly, hinge and float needle. There is a gasket between the float chamber bowl and the carburettor body which need not be disturbed unless it is leaking.

2 With a pair of thin nose pliers, withdraw the pin that acts as the hinge for the twin floats. This will free the floats and the float needle. Check that none of the floats have punctured and that the float needle and seating are both clean and in good condition. If the needle has a ridge, it should be renewed in conjunction with its seating.

3 The two floats are made of plastic, connected by a brass bridge and pivot piece. If either float is leaking, it will produce the wrong petrol level in the float chamber, leading to flooding and an over-rich mixture. The floats cannot be repaired successfully, and renewal will be required.

4 The main jet is located in the centre of the circular mixing chamber housing. It is threaded into the base of the needle jet and can be unscrewed from the bottom of the carburettor. The needle jet lifts out from the top of the carburettor, after the main jet has been unscrewed. The pilot jet is located in a smaller projection, next to the main jet.

5 The float needle seating is also found in the underside of the carburettor, towards the bell mouth intake. It is secured by a small retainer plate and is sealed by an O-ring. If the float needle and the seating are worn, they should be replaced as a set, never separately. Wear usually takes the form of a ridge or groove, which may cause the needle to seat imperfectly.

6 The carburettor valves, return springs and needle assemblies together with the mixing chamber tops, are attached to the throttle cable. The throttle cable divides into two at a junction box located within the two top frame tubes. There is also a third cable, which is used to link the oil pump with the throttle.

7 After an extended period of service the throttle valves will wear and may produce a clicking sound within each carburettor body. Wear will be evident from inspection, usually at the base of the slide and in the locating groove. Worn slides should be replaced as soon as possible because they will give rise to air leaks which will upset the carburation.

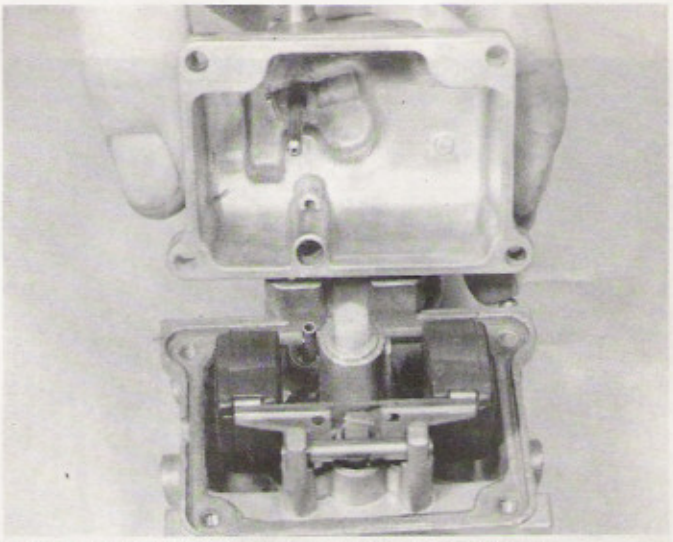
8 The needles are suspended from the valves, where they are retained by a circlip. The needle is normally suspended from the groove specified at the front of this Chapter, but other grooves are provided as a means of adjustment so that the mixture strength can be either increased or decreased by raising or lowering the needle. Care is necessary when replacing the carburettor tops because the needles are easily bent if they do not locate with needle jets.

9 The manually operated choke is unlikely to require attention during the normal service life of the machine. When the plunger is depressed, fuel is drawn throught a special starter jet in the left-hand carburettor by a partial vacuum that is created in the crankcase. Air from the float chamber passes through holes in the starter emulsion tube to aerate the fuel. The fuel then mixes with air drawn in via the starter air inlet to the plunger chamber. The resultant mixture, richened for a cold start, is drawn into the engine through the starter outlet, behind the throttle valve.

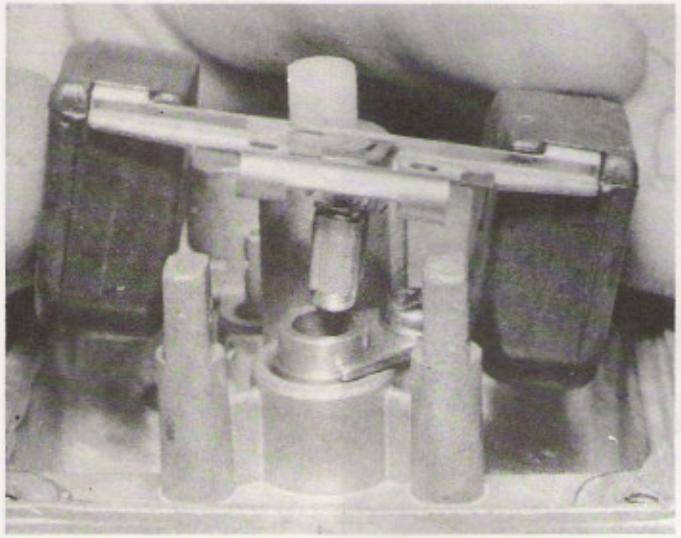
10 Before the carburettors are reassembled, using the reversed dismantling procedure, each should be cleaned out thoroughly, preferably by the use of compressed air. Avoid using a rag because there is always risk of fine particles of lint obstructing the internal air passages or the jet orifices.

11 Never use a piece of wire or sharp metal object to clear a blocked jet. It is only too easy to enlarge the jet under these circumstances and increase the rate of petrol consumption. Always use compressed air to clear a blockage; a tyre pump makes an admirable substitute when a compressed air line is not available.

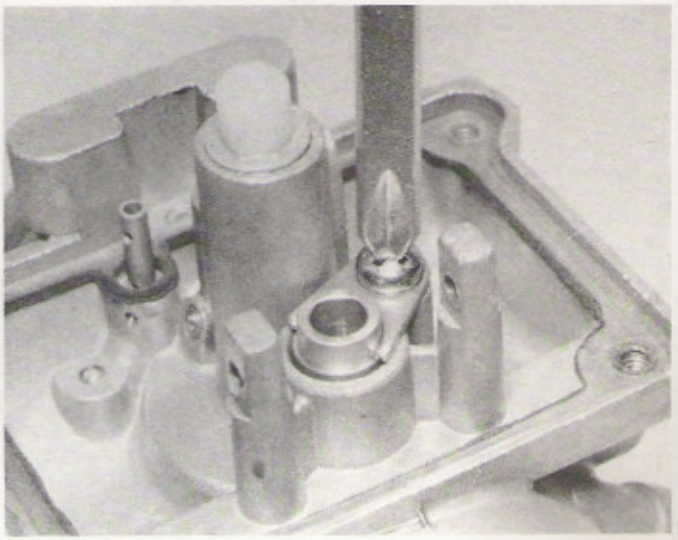
12 Do not use excessive force when reassembling the carburettors because it is quite easy to shear the small jets or some of the smaller screws. Before attaching the air cleaner hoses, check that both throttle slides rise when the throttle is opened.



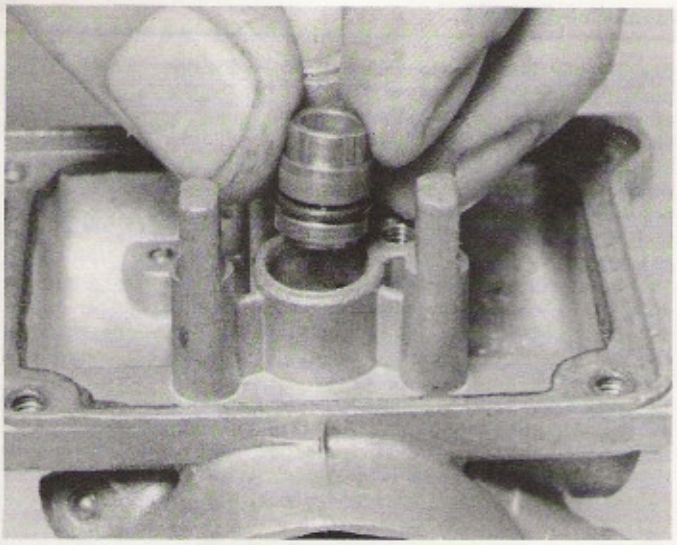
6.1 Remove the four screws and lift away the float bowl



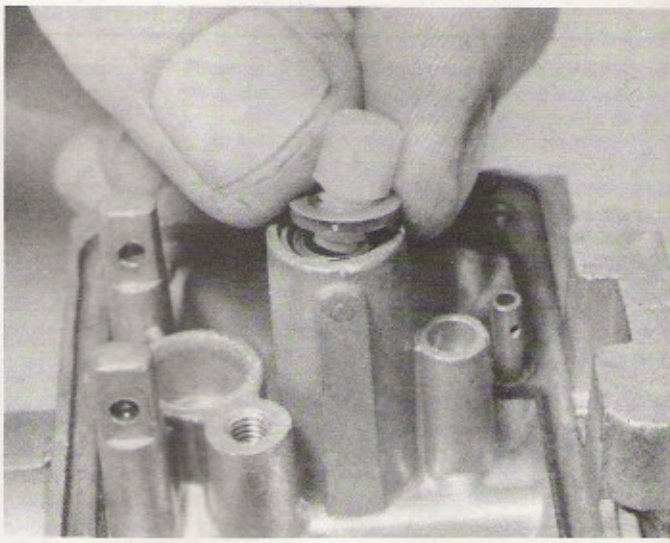
6.2a Remove the pivot pin, then lift away the float assembly



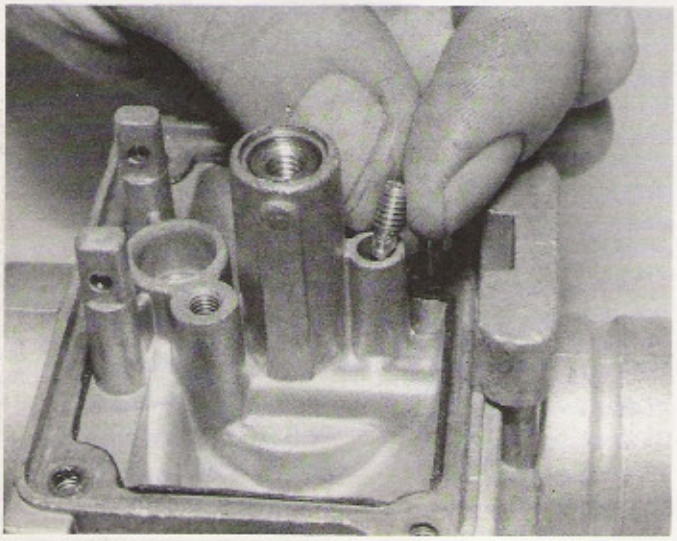
6.2b Release the single screw and retainer ...



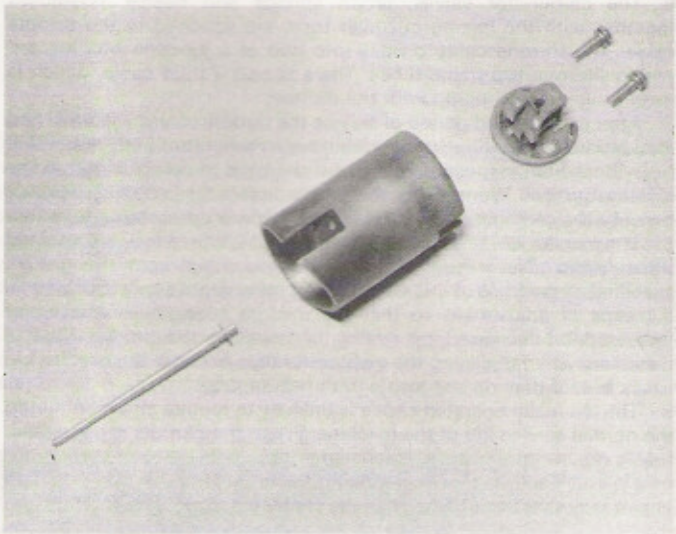
6.2c ... to free the float valve seat. Renew O-ring if worn



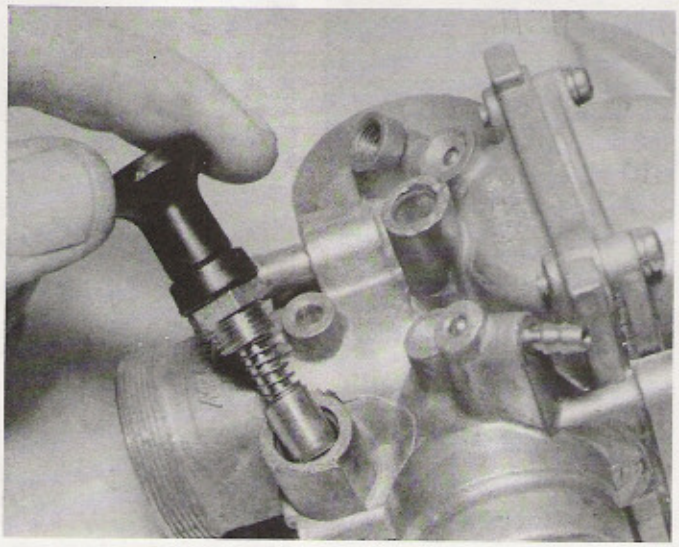
6.4a Main jet screws into base of carburettor. Note plain washer



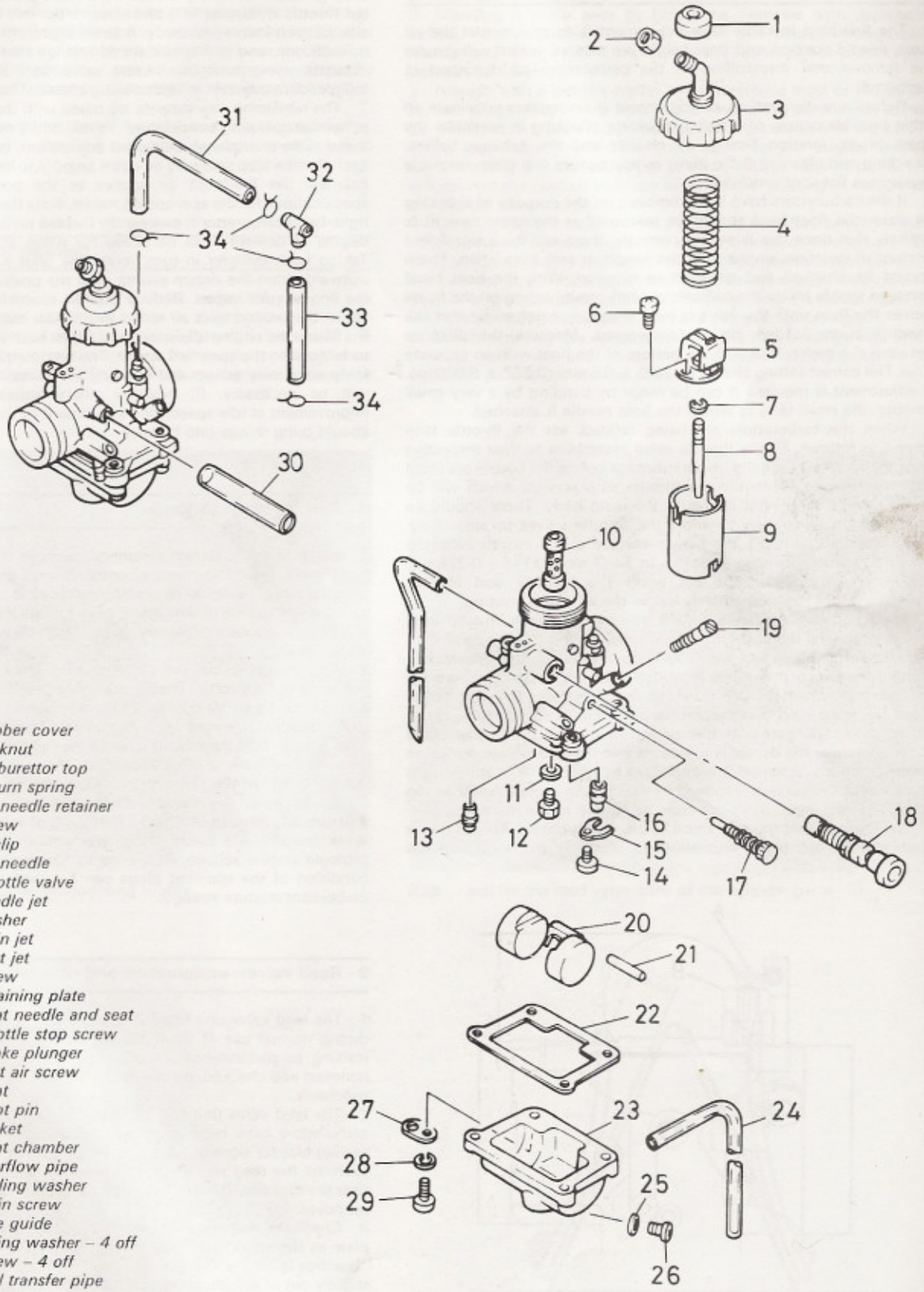
6.4b Pilot jet is fitted into adjacent bore



6.8 Remove retainer from inside the throttle valve to free the needle



6.9 Choke assembly screws into the carburettor as shown



1 Rubber cover
2 Locknut
3 Carburettor top
4 Return spring
5 Jet needle retainer
6 Screw
7 Circlip
8 Jet needle
9 Throttle valve
10 Needle jet
11 Washer
12 Main jet
13 Pilot jet
14 Screw
15 Retaining plate
16 Float needle and seat
17 Throttle stop screw
18 Choke plunger
19 Pilot air screw
20 Float
21 Pivot pin
22 Gasket
23 Float chamber
24 Overflow pipe
25 Sealing washer
26 Drain screw
27 Pipe guide
28 Spring washer – 4 off
29 Screw – 4 off
30 Fuel transfer pipe
31 Fuel pipe
32 Union
33 Fuel pipe
34 Pipe clip

Fig. 3.1 Carburettors

7 Carburettors: adjustment

1 The first step in carburettor adjustment is to ensure that the jet sizes, needle position and float height are correct, which will require the removal and dismantling of the carburettors as described in Section 6.

2 Before any dismantling or adjustment is undertaken eliminate all other possible causes of running problems, checking in particular the spark plugs, ignition timing, air cleaner and the exhaust baffles. Checking and cleaning these items as appropriate will often resolve a mysterious flat spot or misfire.

3 If the carburettors have been removed for the purpose of checking jet sizes, the float level should be measured at the same time. It is unlikely that once this is set up correctly, there will be a significant amount of variation, unless the float needle or seat have worn. These should be checked and renewed as required. With the float bowl removed slowly rotate the carburettor until gravity acting on the floats moves the float until the valve is **just** closed, but not so far that the needle's spring-loaded pin is compressed. Measure the distance between the gasket face and the bottom of the float with an accurate ruler. The correct setting should be 21.0 ± 0.5 mm (0.827 ± 0.020 in). If adjustment is required it can be made by bending by a very small amount, the small tang to which the float needle is attached.

4 When the carburettors are being refitted, set the throttle stop screws as follows. Fit the throttle valve assemblies to their respective instruments and secure the carburettor tops before the bodies are fitted into their adaptors. Identify the throttle stop screws, which will be found projecting at right angles to the main body. These should be slackened off completely to allow the throttle valves to close fully. Check the throttle cable free play, measured at the throttle twistgrip flange and where necessary set this to 3 – 7 mm (0.118 – 0.276 in); cable free play should be set using the adjuster and locknut arrangement located immediately below the twistgrip housing.

5 The throttle stop screws should be screwed slowly inward until they **just** contact the underside of the valves. If this is done carefully it should be possible to feel and see the point at which this occurs. It is worth spending a little time to ensure that the two screws are set accurately. An alternative method is to use a metal rod, the plain end of a drill bit being ideal. Set the throttle stop screws so that the rod is a light sliding fit beneath each throttle valve cut away. With either of the above methods, the object is to ensure that the two screws are set in similar positions. Once set it is important to ensure that in subsequent adjustments each screw is moved by exactly the same amount as the other. The two instruments can now be refitted to the machine.

6 Next, check that the two throttles are synchronised. Unless this is established it will prove impossible to persuade the engine to run evenly, and poor synchronisation will make mixture and throttle stop settings futile. Standing on the right-hand side of the machine open the throttle twist-grip fully and observe the two small windows in the side of each instrument body. A small alignment pip should be visible in each one, and it is important to arrange these so thay they are in accurate synchronisation. Each valve can be adjusted via the independent adjuster in each mixing chamber top.

7 The remaining adjustments are made with the engine running and at normal operating temperature. To this end it may prove necessary to make some provisional idle speed adjustment, remembering to adjust each throttle stop screw by an equal amount to keep the carburettors in balance. Set the pilot air screws to the position shown in the specifications for the appropriate model. Note the pilot air screw on the right-hand carburettor is awkwardly located on its inner face and some degree of dexterity will be called for when adjustment is required. Taking each cylinder in turn, rotate the pilot air screw inwards and outwards from the datum setting until the position is found at which the engine runs fastest. Reduce the idle speed if necessary, and then adjust the second pilot air screw in a similar manner.

8 Check the engine idle speed and adjust both throttle screws equally to bring it to the specified speed. The carburettors should by now be fairly accurately set up and in many instances no further adjustment will be necessary. If, however, there appears to be room for improvement at idle speed, fine adjustment of the throttle stop screws should bring things into balance.

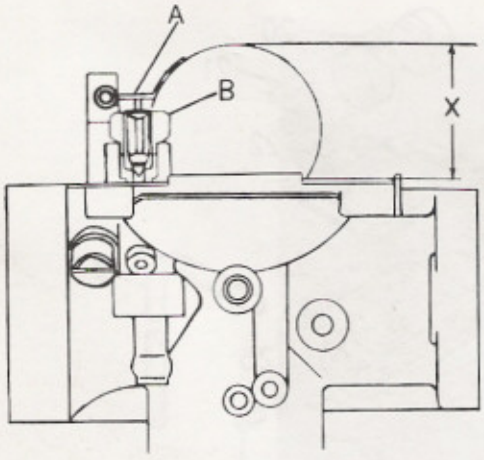


Fig. 3.2 Float height measurement

A Tang
B Float needle housing
X Float height

8 Carburettors: settings

1 Some of the carburettor settings, such as the sizes of the needle jets, main jets and needle position are predetermined by the manufacturer. Under normal circumstances it is unlikely that these settings will require modification, even though there is provision made. If a change appears necessary, it can often be traced to a developing engine fault.

2 As a rough guide, the slow running screw controls the engine speed up to 1/8 throttle. The throttle valve cutaway controls the engine speed from 1/8 to 1/4 throttle and the position of the needle from 1/4 to 3/4 throttle. The main jet is responsible for the engine speed at the final 3/4 to full throttle. It should be added that none of these demarkation lines is clearly defined; there is a certain amount of overlap between the carburettor components involved.

3 Always err on the side of a rich mixture because a weak mixture has a particularly adverse effect on the running of any two-stroke engine. A weak mixture will cause rapid overheating which may eventually promote engine seizure. Reference to Chapter 3 will show how the condition of the sparking plugs can be used as a reliable guide to carburettor mixture strength.

9 Reed valves: examination and renovation

1 The reed valve unit fitted in each inlet port requires little attention during normal use. If there are indications of a fault, such as poor starting or performance, or uneven running, the valves should be removed and checked, otherwise do not disturb them between engine overhauls.

2 The reed valve unit can be unbolted from the inlet port after the carburettors have been removed (see Section 5). Check the rubber sealing face for signs of tears or splits; renew the valve unit if damaged. Examine the reed petals for indications of fatigue, such as cracking near the root end. It is not advisable to remove the petals for inspection purposes.

3 Check the clearance between the reed valve petals and the stopper plate as shown in the accompanying line drawing. The recommended clearance is 10.3 ± 0.2 mm (0.41 ± 0.008 in). If the clearance is only slightly out of specification, carefully bend the stopper plate to correct it. If the error exceeds 0.3 mm (0.012 in) renew the stopper plate.

4 Note the clearance between the reed valve petal and the case. The petal bend limit is 0.5 mm (0.02 in) maximum. In practice the valves should be closed, or almost closed. Valve petals and stopper plates are available as replacement parts from Yamaha dealers. If either is to be renewed, remove the two screws holding the assembly to the case and

lift the stopper and petal away. Always deal with one valve at a time to avoid interchanging parts.

5 Before fitting the new parts, clean and degrease the valve case, reed and stopper plate. Assemble the valve components, noting that the cutaway on the lower corner of both reed and stopper should align. Apply Loctite to the securing screws, tightening them evenly to prevent warpage. If possible, tighten the screws to 0.1 kgf m (0.7 lbf ft).

6 When refitting the assembly to the inlet port, use a new gasket. Tighten the retaining bolts in a diagonal sequence to 1.5 kgf m (11 lbf ft).

10 Exhaust system: cleaning

1 The exhaust system is often the most neglected part of any two-stroke despite the fact that it has a pronounced effect on performance. It is essential that the exhaust system is inspected and cleaned out at regular intervals because the exhaust gases from a two-stroke engine have a particularly oily nature which will encourage the build-up of sludge. This will cause back pressures and restrict the engine's ability to 'breathe'.

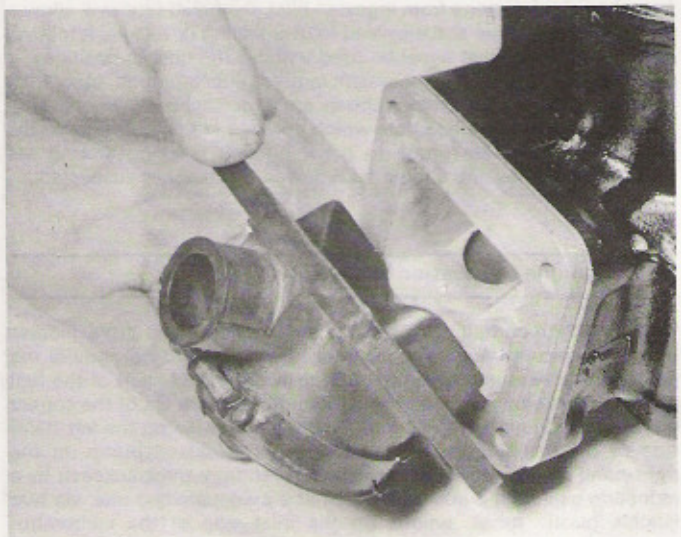
2 Cleaning is made easy by fitting the silencers with detachable baffles, held in position by a set screw that passes through each silencer end. If the screw is withdrawn, the baffles can be drawn out of position for cleaning.

3 A wash with a petrol/paraffin mix will remove most of the oil and carbon deposits, but it the build-up is severe it is permissible to heat the baffles with a blow lamp and burn off the carbon and old oil.

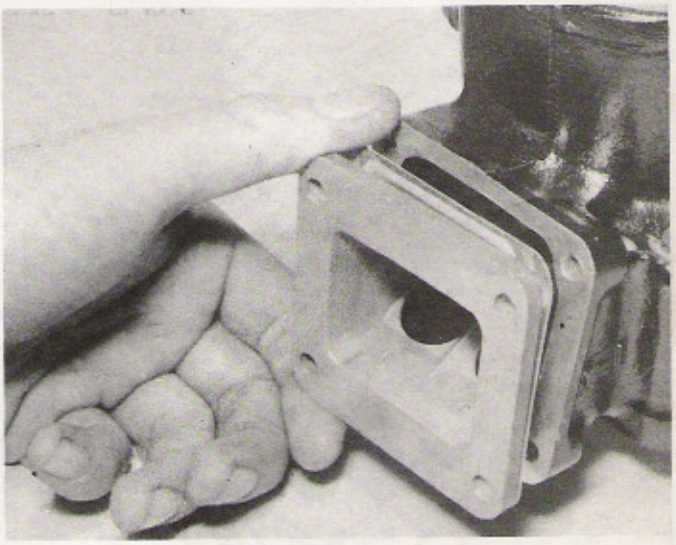
4 At less frequent intervals, such as when the engine requires decarbonising, it is advisable also to clean out the exhaust pipes. This will prevent the gradual build-up of an internal coating of carbon and oil, over an extended period.

5 Do not run the machine with the baffles detached or with a quite different type of silencer fitted. The standard production silencers have been designed to give the best possible performance whilst subduing the exhaust note. Although a modified exhaust system may give the illusion of greater speed as a result of the changed exhaust note, the chances are that performance will have suffered accordingly.

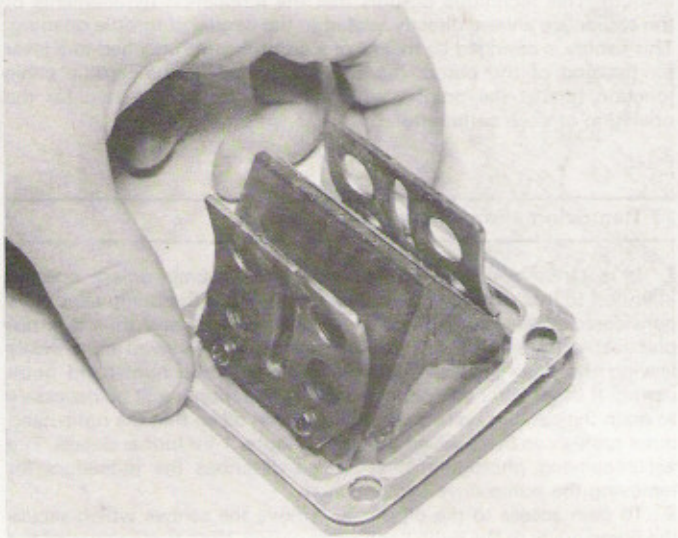
6 When replacing the exhaust system, use new sealing rings at the exhaust port joints and check that the baffle retaining screws are tightened fully in the silencer ends.



9.2a Remove the carburettor mounting rubber ...



9.2b ... and lift the reed valve clear of the cylinder barrel



9.3 Check the reed petal and stopper clearances (see text)

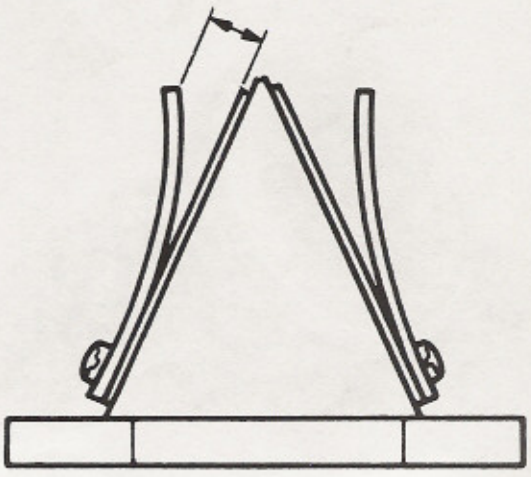
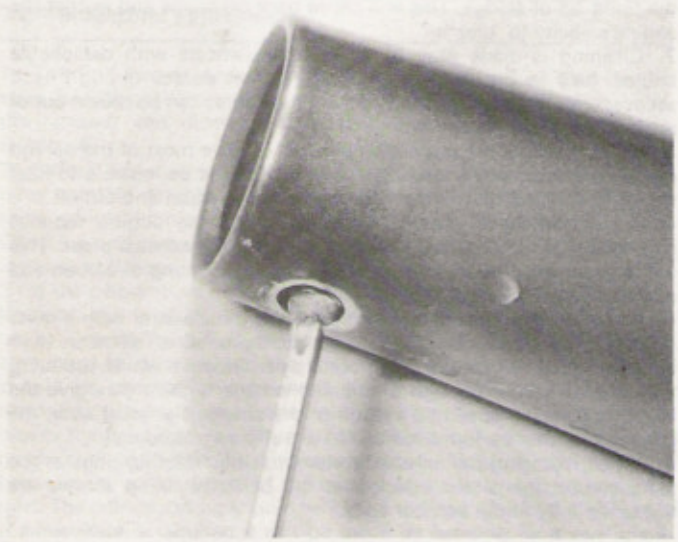
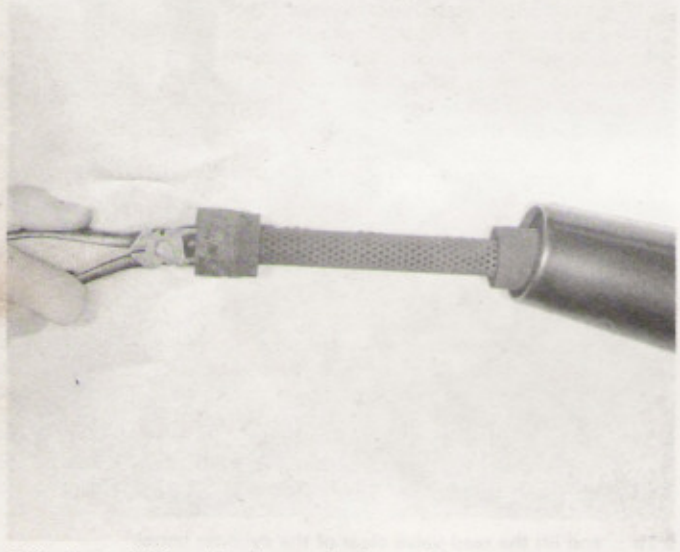


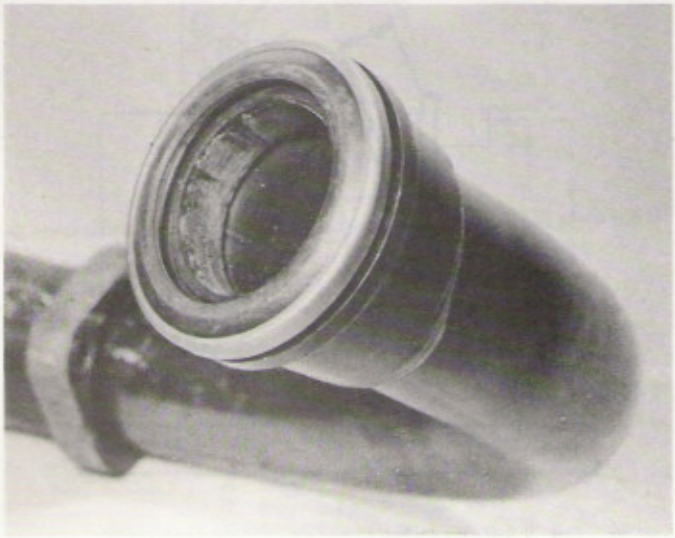
Fig. 3.3 Reed valve stopper plate adjustment



10.2a Exhaust baffles are retained by a screw on underside of silencer



10.2b Grasp baffle with pliers and twist to aid removal



10.6 Use new exhaust port seals to prevent gas leakage

11 Air cleaner: removal and cleaning

1 The air cleaner casing is mounted on the frame beneath the fuel tank. It is connected to a second moulded plastic chamber immediately behind the carburettors. This functions as an intake silencer and conveys the cleaned air to the carburettor intakes via short rubber adaptors.

2 Access to the air cleaner element requires the removal of the fuel tank and seat. The seat can be lifted clear once its retaining latches have been released. Turn the fuel tap to the "ON" or "RES" position and disconnect the fuel feed pipes. Remove the single fixing bolt at the rear of the tank and lift the tank upward and rearwards to free it from its front mounting rubbers.

3 The air cleaner cover is retained by three screws. Remove the screws and lift the cover clear to expose the flat foam element. This can be removed in turn by pulling it out of the casing. Wash the element in clean petrol to remove the old oil and any dust which has been trapped by it. When it is clean, wrap it in some clean rag and gently squeeze out the remaining petrol. The element should now be left for a while to allow any residual petrol to evaporate. Soak the cleaned element in engine oil and then squeeze out any excess to leave the foam damp but not dripping. Refit the element, ensuring that the cover seal has been refitted.

4 Note that a damaged element must be renewed immediately. Apart from the risk of damage from ingested dust, the holed filter will allow a much weaker mixture and may lead to overheating or seizure. It follows that the machine must never be used without the filter in position.

5 The rest of the air cleaner system requires little attention, other than checking that the connecting rubbers are undamaged. When checking these do not omit the adaptors which connect the carburettors to the inlet ports. These are prone to perishing and cracking around the balance pipe stubs and should be renewed if leakage is suspected.

12 The engine lubrication system

1 In line with current two-stroke practice the Yamaha YPVS models utilise a pump-fed engine lubrication system and do not require the mixture of a measured quantity of oil to the petrol content of the fuel tank in order to utilise the so-called 'petroil' method. Oil of the correct viscosity is contained in a separate oil tank mounted on the left-hand side of the machine and is fed to a mechanical oil pump on the right-hand side of the engine which is driven from the crankshaft by a reduction gear. The pump delivers oil at a predetermined rate, via two flexible plastic tubes, unions on the inlet side of the carburettor venturis. In consequence, the oil is carried into the engine by the incoming charge of petrol vapour, when the inlet port opens.

2 The oil pump is also interconnected to the throttle twistgrip so that when the throttle is opened, the oil pump setting is increased a similar amount. This technique ensures that the lubrication requirements of the engine are always directly related to the degree of throttle opening. This facility is arranged by means of a control cable attached to a lever on the end of the pump; the cable is joined to the throttle cable junction box at the point where the cable splits into two for the operation of each carburettor.

13 Removing and refitting the oil pump

1 It is rarely necessary to remove the oil pump unless specific attention to it is required. It should be noted that the pump should be considered a sealed unit – parts are not available and thus it is not practicable to repair it. The pump itself can be removed quite easily leaving the drive shaft and pinion in place in the right-hand outer casing. If these latter components require attention it will be necessary to drain the cooling system and transmission oil so that the right-hand outer casing can be removed. Refer to Chapter 1 for further details. The accompanying photographic sequence describes the procedure for removing the pump drive components.

2 To gain access to the oil pump, remove the screws which secure the pump cover to the right-hand outer casing. With these removed the pump will be clearly visible at the bottom of the pump recess. Do not

disturb the water pump end cover which is immediately above the oil pump.

3 Displace the small spring steel clips which secure oil delivery pipes to the pump outlets, then ease the pipes off the outlet stubs using a small screwdriver. The large feed pipe from the oil tank is removed in a similar fashion, but before removing it have some sort of plug handy to push into the end of the pipe. This will prevent the oil from the tank being lost. Pull on the pump cable inner to rotate the pump pulley. Holding the pulley in its fully open position release the cable and disengage it from the pulley recess.

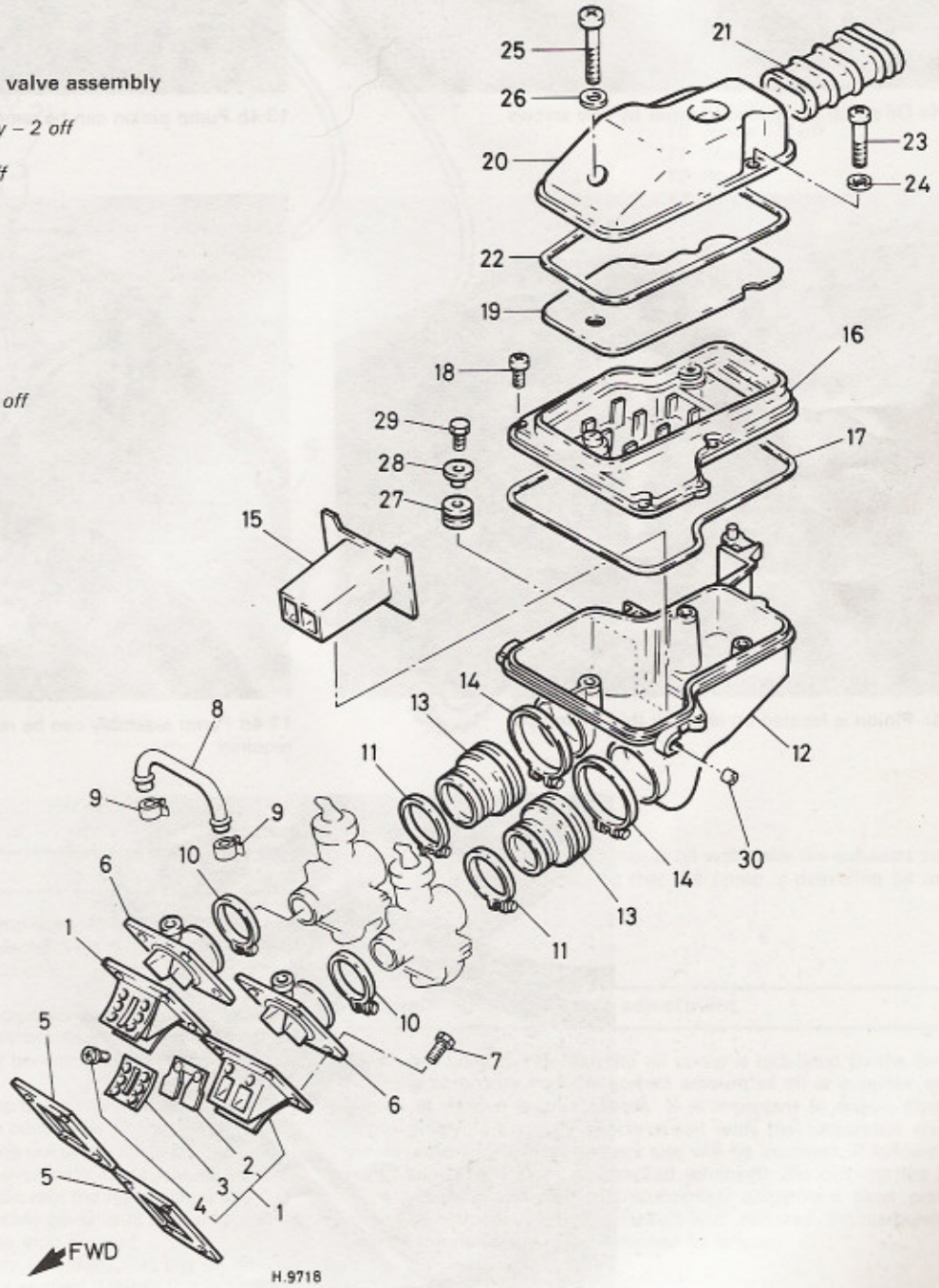
4 The pump is secured to the cover by two screws which pass throught its mounting flange. Once these have been removed the pump can be removed, noting that it may prove necessary to turn the pump slightly to free it from its drive shaft.

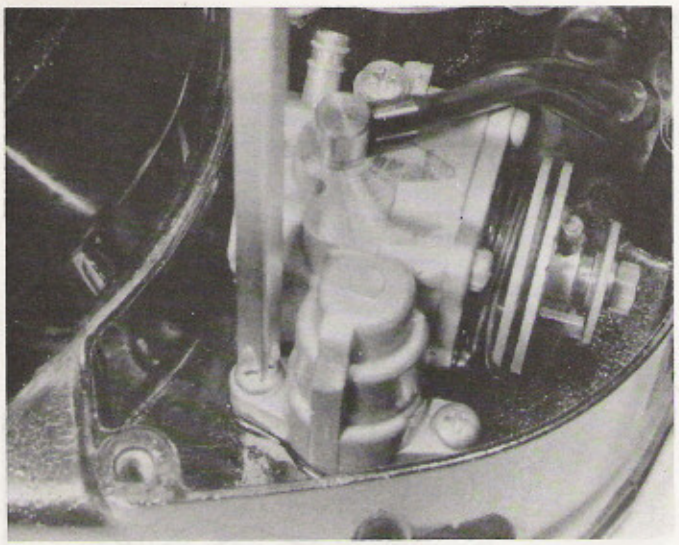
5 Further dismantling is not practicable, and it will be necessary to renew the pump if it is obviously damaged. Maintenance must be confined to keeping the pump clear of air, and correctly adjusted, as described in the following sections.

6 Refit the oil pump to the crankcase cover, using a new gasket at the oil pump/crankcase cover joint. Replace and tighten the two crosshead mounting screws. The remainder of the reassembly is accomplished by reversing the dismantling procedure, but do not replace the pump cover because the oil pump must be bled to ensure the oil lines are completely free from air bubbles. See the following Section.

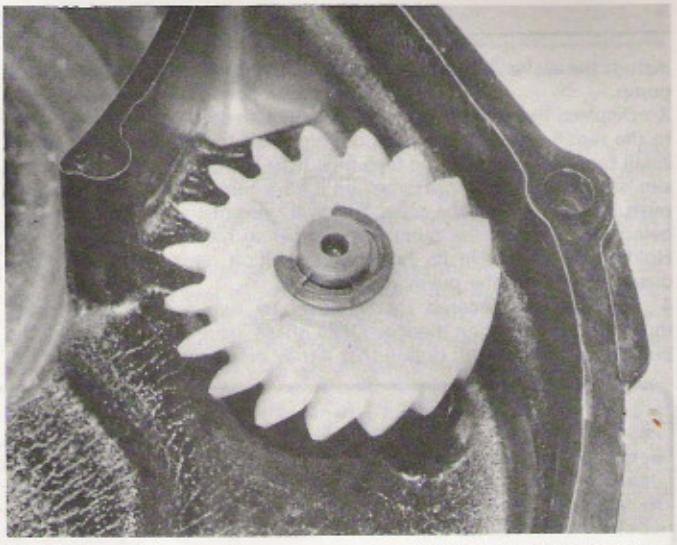
Fig. 3.4 Air cleaner and reed valve assembly

1 *Reed valve assembly – 2 off*
2 *Petal – 2 off*
3 *Stopper plate – 2 off*
4 *Screw – 4 off*
5 *Gasket – 2 off*
6 *Inlet stub – 2 off*
7 *Bolt – 8 off*
8 *Balance pipe*
9 *Clip – 2 off*
10 *Clamp – 2 off*
11 *Clamp – 2 off*
12 *Air cleaner box*
13 *Rubber adaptor – 2 off*
14 *Clamp – 2 off*
15 *Air duct*
16 *Element holder*
17 *Sealing ring*
18 *Screw – 6 off*
19 *Element*
20 *Cover*
21 *Air inlet duct*
22 *Seal*
23 *Screw – 2 off*
24 *Washer – 2 off*
25 *Screw*
26 *Washer*
27 *Grommet*
28 *Spacer*
29 *Bolt*

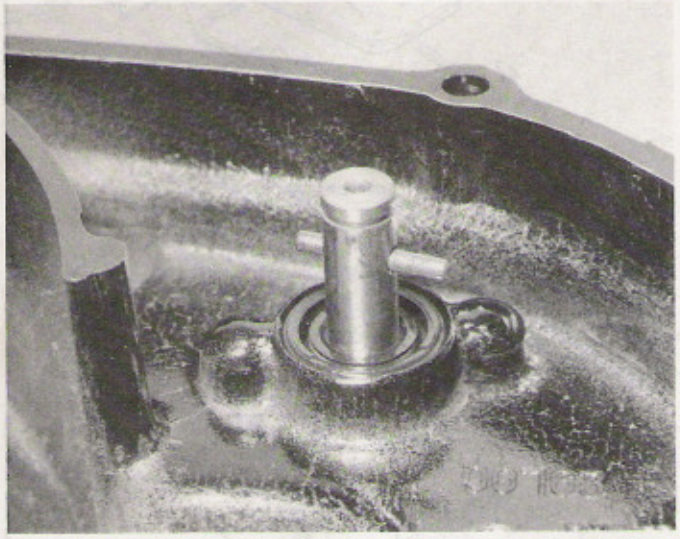




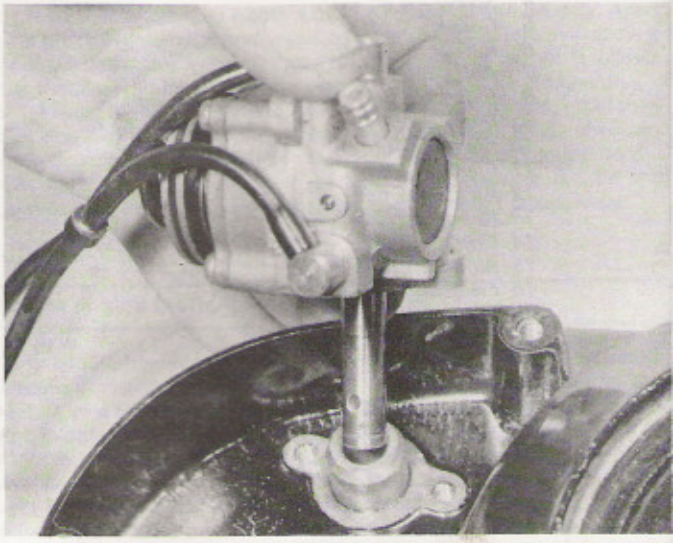
13.4a Oil pump is retained to cover by two screws



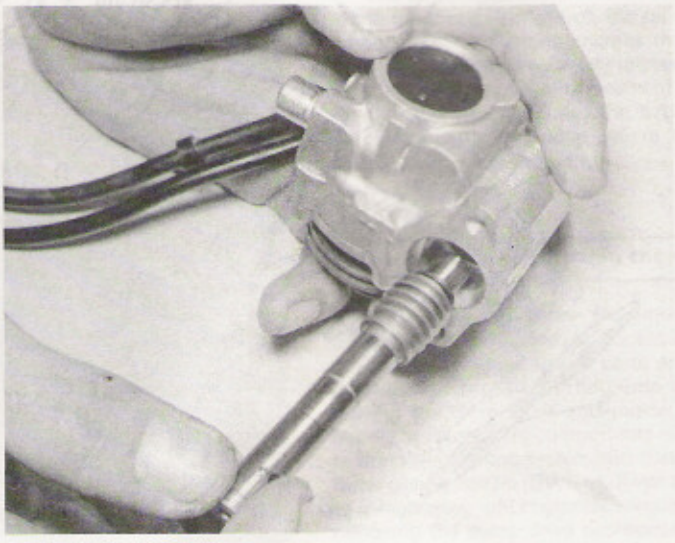
13.4b Pump pinion can be removed after circlip has been prised off



13.4c Pinion is located on shaft by this driving pin



13.4d Pump assembly can be removed together with shaft if required



13.4e Pump shaft can be withdrawn for examination

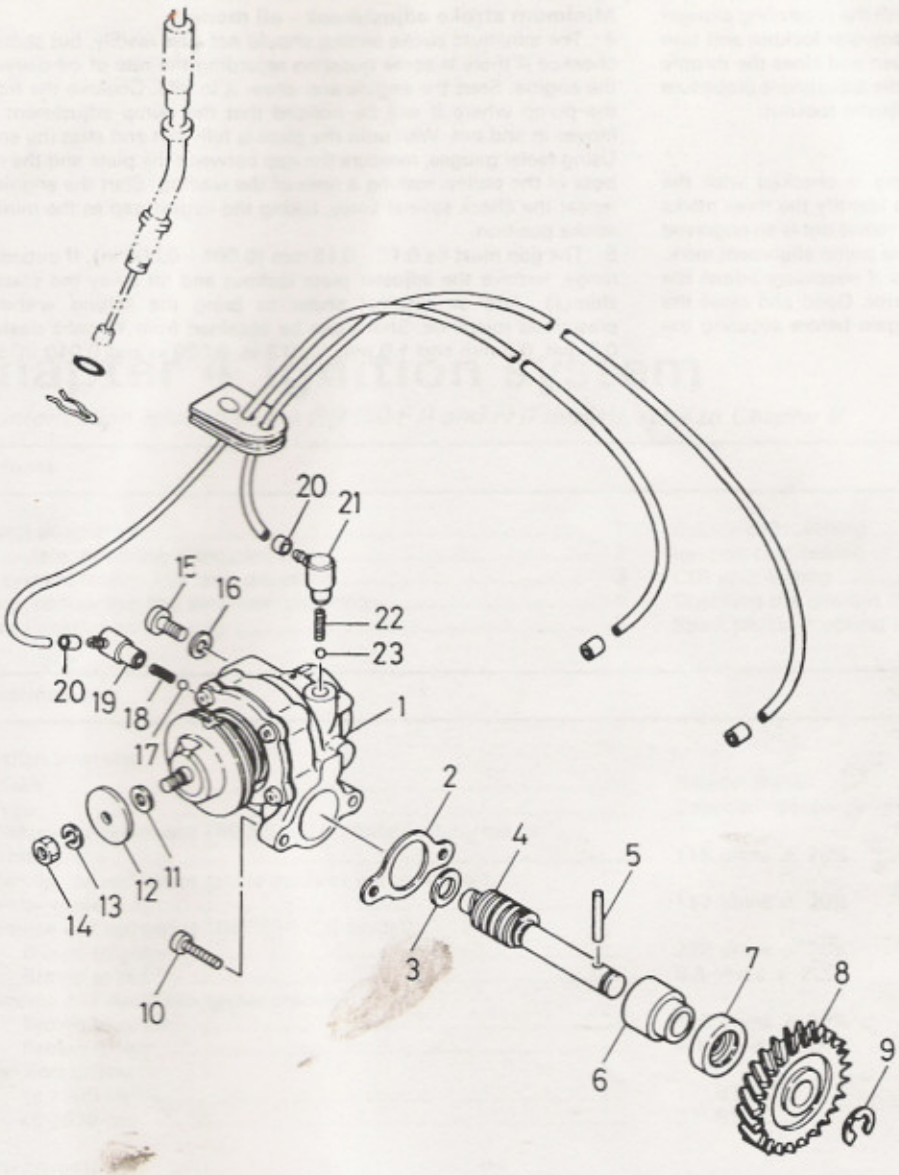


Fig. 3.5 Oil pump

1 *Oil pump*
2 *Gasket*
3 *Washer*
4 *Driveshaft*
5 *Drive pin*
6 *Collar*
7 *Oil seal*
8 *Drive pinion*
9 *Circlip*
10 *Screw – 2 off*
11 *Shim*
12 *Plate*
13 *Spring washer*
14 *Nut*
15 *Screw*
16 *Sealing washer*
17 *Steel ball*
18 *Spring*
19 *Pipe union*
20 *Spring clip*
21 *Pipe union*
22 *Spring*
23 *Steel ball*

14 Bleeding the oil pump

1 It is necessary to bleed the oil pump every time the main feed pipe from the oil tank is removed and replaced. This is because air will be trapped in the oil line, no matter what care is taken when the pipe is removed.

2 Check that the oil pipe is connected correctly, with the retaining clip in position. Then remove the cross-head screw in the outer face of the pump body with the fibre washer beneath the head. This is the oil bleed screw.

3 Check that the oil tank is topped up to the correct level, then place a container below the oil bleed hole to collect the oil that is expelled as the pump is bled. Allow the oil to trickle out of the bleed hole, checking for air bubbles. The bubbles should eventually disappear as the air is displaced by fresh oil. When clear of air, refit the bleed screw. DO NOT replace the front portion of the crankcase cover until the pump setting has been checked, as described in the next Section.

4 Note also that it will be necessary to ensure that the oil delivery pipes are primed if these have been disturbed. Unless this is checked the engine will be starved of oil until the pipes fill. The procedure required to avoid this is to start the engine and allow it to idle for a few minutes whilst holding the pump pulley in its fully open position by pulling the pump cable. The excess oil will make the exhausts smoke heavily for a while, indicating that the pump is delivering oil to the engine.

15 Checking the oil pump adjustment

1 As has been mentioned, the oil pump is regulated by the throttle twistgrip to ensure that the correct amount of oil is supplied to the engine at various engine speeds. It is important to ensure that the pump pulley is correctly synchronised with the carburettor throttle valves, otherwise the oil delivery rate will be incorrect. It follows that pump adjustment must be checked whenever the carburettors have been adjusted, and also that carburettor adjustment must precede pump adjustment. Having checked and adjusted the carburettors, remove the pump cover and proceed as follows.

RD350 LC II

2 Fully open the throttle twistgrip and hold this position; a pair of self-locking pliers clamped lightly around the twistgrip rubber can be useful if carrying out the check unaided. Check that the rectangular

mark on the edge of the pump pulley aligns with the projecting plunger pin. If this is not the case, slacken the cable adjuster locknut and turn the adjuster to obtain the required setting. Open and close the throttle a few times, then recheck the setting. Repeat the adjustment procedure as necessary, then tighten the pump cable adjuster locknut.

RD350 F and N

3 Unlike the LC II model, the pump setting is checked with the throttle **closed**. Look at the pump pulley and identify the three marks near the 9 o'clock position. On either side of a round dot is an engraved line, the shorter and lower of the two being the pump alignment mark. Check that the mark aligns with the pin and if necessary adjust the length of the cable to compensate for any error. Open and close the throttle a few times and check the setting again before securing the adjuster locknut.

Minimum stroke adjustment – all models

4 The minimum stroke setting should not alter readily, but should be checked if there is some question regarding the rate of oil delivery to the engine. Start the engine and allow it to idle. Observe the front of the pump where it will be noticed that the pump adjustment plate moves in and out. Wait until the plate is fully out and stop the engine. Using feeler gauges, measure the gap between the plate and the raised boss of the pulley, making a note of the reading. Start the engine and repeat the check several times, taking the largest gap as the minimum stroke position.

5 The gap must be 0.10 – 0.15 mm (0.004 – 0.006 in). If outside this range, remove the adjuster plate locknut and lift away the plate and shim(s). Add or subtract shims to bring the setting within the prescribed tolerance. Shims can be obtained from Yamaha dealers in 0.3 mm, 0.5 mm and 1.0 mm (0.012 in, 0.020 in and 0.040 in) sizes.