

**LOOK  
LISTEN  
DO IT BETTER**



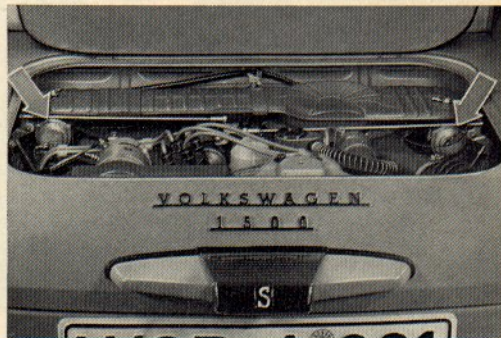
**TWIN-CARBURETOR SYSTEM**

**Slide Series N<sup>o</sup> 20**

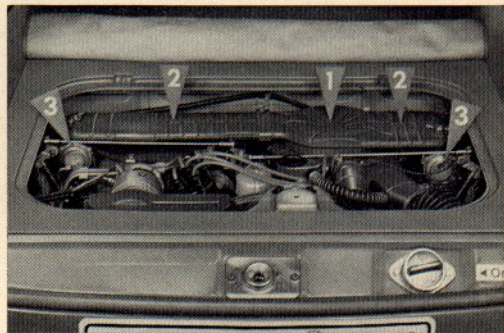


# TWIN-CARBURETOR SYSTEM

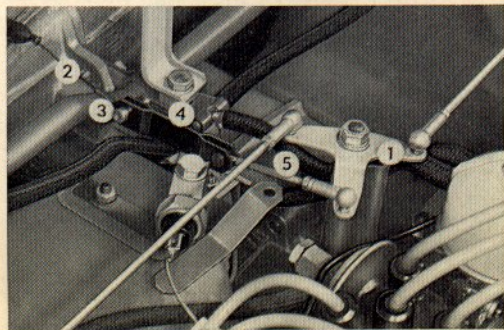
**20/1** The 1.5 liter engine which is fitted in the Volkswagen 1500 'S' and Karmann Ghia Coupé models has two carburetors. You will be called upon to service these vehicles which are now appearing on our streets in ever increasing numbers. The adjustment of the twin-carburetor system in particular, requires considerable care and skill. This slide series has been produced to show you the new carburetor and its adjustment in detail.



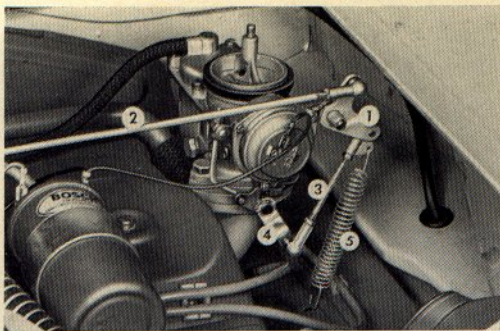
**20/2** The flat design of the oil bath air cleaner (1) is particularly noticeable in this picture. The filtered air passes through two ducts (2) to the downdraft SOLEX 32 PDSIT carburetors (3).



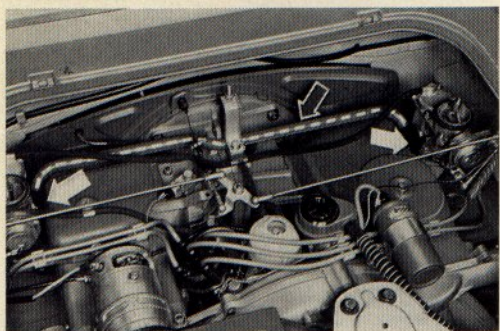
**20/3** The twin-carburetor system only works properly if both carburetors are operated as uniformly as possible and this will only be the case if the carburetor linkage is adjusted correctly. The center point of the linkage is the three-arm lever (1). The accelerator cable (2) is attached to the link (4) by a clamp screw (3). The small pull rod (5) connects the link and the three-arm lever. The connecting rods leading to the carburetors are also attached to the three-arm lever.



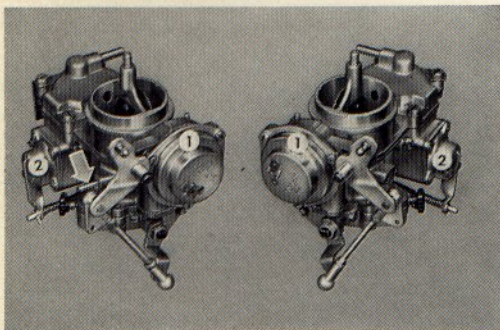




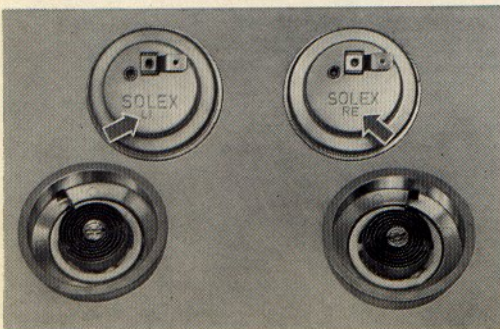
**20/4** Here is the other part of the linkage. A relay lever (1) transmits the movement of the connecting rod (2) via the pull rod (3) to the throttle valve lever (4). The return spring (5) hooked to the pull rod closes the throttle valve when the accelerator pedal is released.



**20/5** The balance pipe marked in white here connects the intake pipes of the two carburetors. This pipe is fitted to smooth out fluctuations in the gas flow between the two sides of the engine. The light arrows point to the small hoses which connect the balance pipe to the intake pipes. Please ensure that these hoses are fitted properly so that no secondary air can be drawn in.

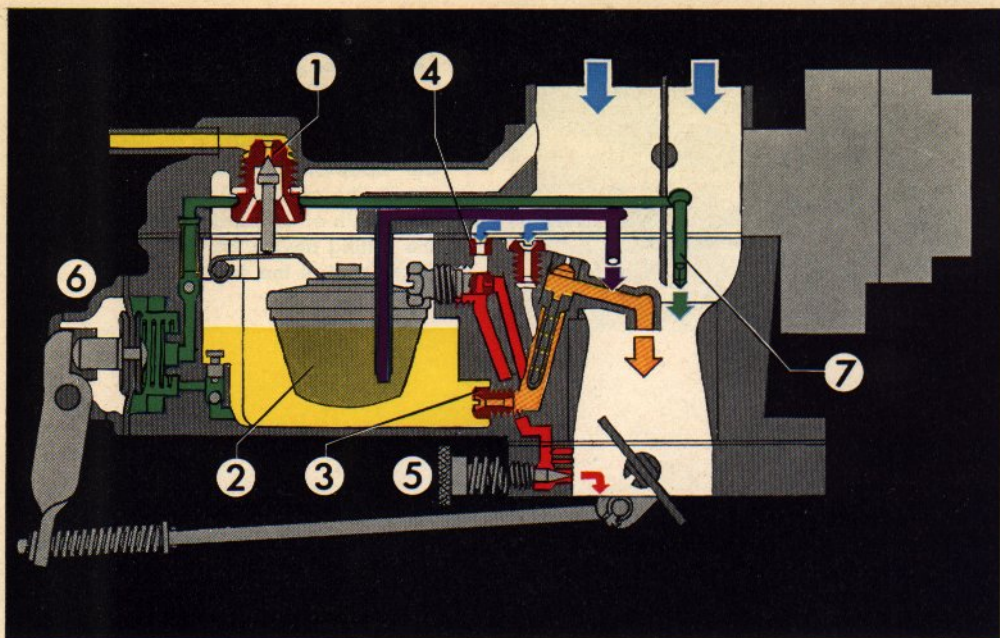


**20/6** Here are the two downdraft SOLEX 32 PDSIT carburetors. They also have automatic chokes (1) and accelerator pumps (2). The light arrow indicates the vacuum connection for the spark advance mechanism which is only fitted to the left carburetor. The carburetors are left and right handed but otherwise identical internally and externally. The left carburetor has a figure 2 behind the letters PDSIT and the right one has a figure 3.



**20/7** The automatic choke covers must not be interchanged because the bi-metal coils are also left and right handed. This can be seen at the hooked ends. The covers are marked on the outside as shown by the arrows. The right one is marked "Re" and the left one "Li".

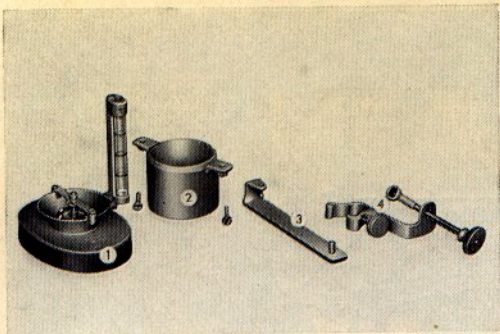




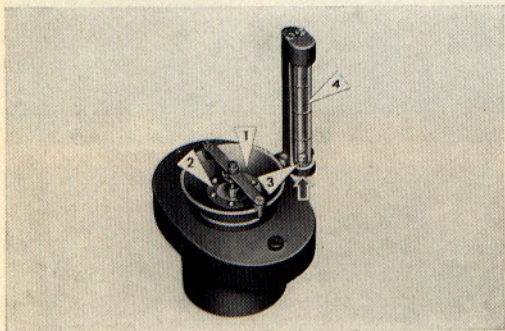
**20/8** Here is a sectional view of the carburetor which shows the internal construction and the idling, normal running, acceleration and power fuel systems. The carburetor works in the same way as the other well-known downdraft type. The fuel — shown in yellow — flows through the float needle valve (1) into the float chamber which houses the float (2). It then passes through the main jet (3) into the mixing well which extends upwards. The idling system — shown in red — begins at the bottom of the mixing well. A drilling leads from here up to the pilot

air bleed drilling (4) and the pilot jet. From here the idling mixture passes down to the volume control screw and the by-pass ports. Glance back again to the main jet (3) where the normal running system also begins. If you follow the yellow marking you will see the mixing well with the emulsion tube and the discharge arm. On the left is the accelerator pump (6). The drillings of the accelerator system are shown in green and lead across to the right to the injection tube (7). Finally there is the power fuel system which is shown in violet.

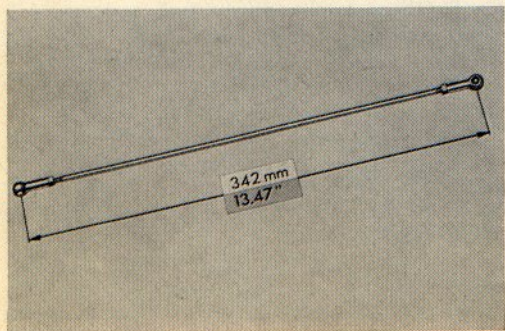




**20/9** We now turn to the adjustment of the twin-carburetor system. The Synchro-Test device and locally manufactured parts VW 691 are required for this. The adjustment is checked with the Synchro-Test device (1) which is supplemented by the adaptor (2). You also require the measuring gauge (3) to check and adjust the length of the carburetor pull rods and the setting device for the three-arm lever (4) to control the engine speed.



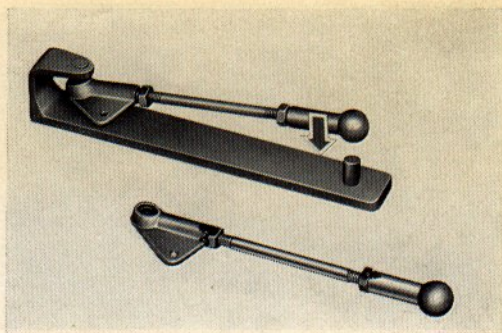
**20/10** The air flow through the carburetors can be equalised with the Synchro-Test device by simply measuring the vacuum. In the base plate of the device is a funnel-shaped opening (1). The area of the funnel opening can be varied with an adjustable throttle disc and thus adapted to the speed of the engine. At the narrowest point of the funnel is a drilling which leads to the top of the measuring glass (4). The piston (3) is lifted by air pressure when a vacuum is created in the funnel and shows the amount of air flowing into the engine. The arrow points to a hole which connects the space below the piston to the atmosphere.



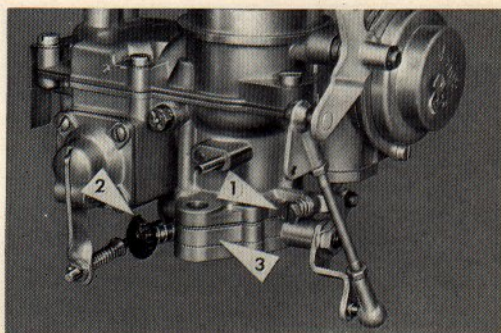
**20/11** All pull and connecting rods of the carburetor linkage are adjustable in length and the ball sockets have left and right hand threads. Do not forget to tighten the locknuts after making adjustments. The picture shows the left connecting rod. The length need only be checked if the rod has been bent or a ball socket replaced. The length between the center of the ball sockets should be 342 mm (13.47").



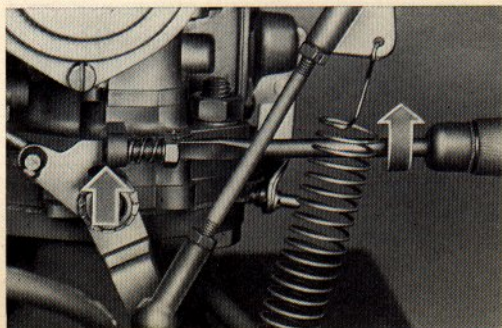
**20/12** The length of the pull rods is set at the factory and the locknuts sealed with paint. If the paint is missing or damaged, check the rods on the measuring gauge VW 691 as shown in this picture and seal the locknuts again with paint.



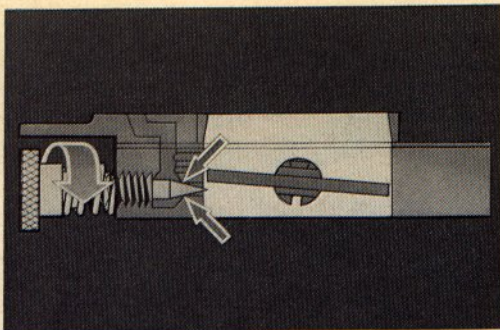
**20/13** Here you see the two idling adjusting screws: (1) the idle adjustment screw and (2) the volume control screw which is fitted in the throttle valve part (3).



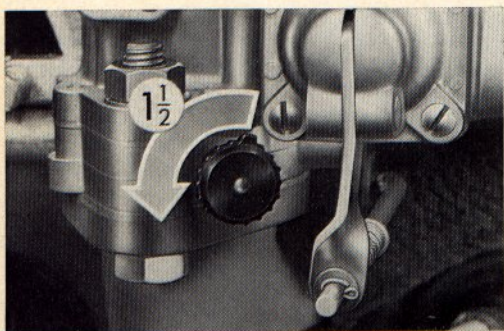
**20/14** The first thing to do is to set the carburetors as uniformly as possible with the engine not running. This means to set the throttle valves to the same angle and the mixture control screws to the same position. The choke valves must be fully open when this is done. Switch the ignition on so that the heated bi-metal coils can open the choke valves and then check that the fast idle cams are in the idling position. Take the right-hand connecting rod off and turn the idle adjustment screw out until the throttle valve is completely closed. Then turn the screw in slowly until it just touches the throttle valve lever as shown by the arrow on the left. Now turn the screw in one half turn further.



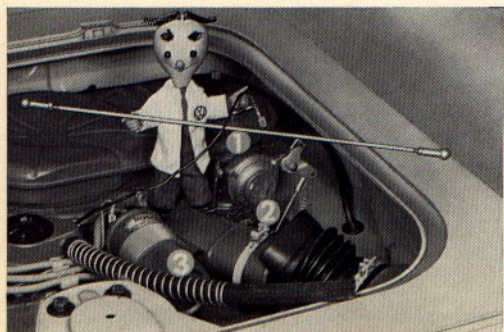




**20/15** Now turn the volume control screw on the same carburetor in until the point is touching the seating. Do this very carefully so that the tapered point is not damaged at the area indicated by the dark arrows.



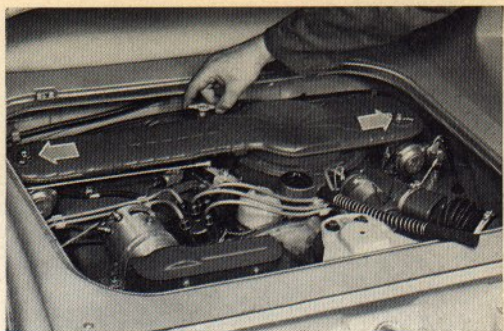
**20/16** Now turn the volume control screw out one and a half turns. The mark on the screw head will help you to do this accurately. Repeat the adjustment of the idling screw and volume control screw on the other carburetor in the same manner. The basic setting of the carburetor is then completed. This setting is not normally necessary when just adjusting the idling during a maintenance service. All the other adjustments must be carried out with the engine warm.



**20/17** When the engine has been thoroughly warmed up, the carburetor settings are checked with the Synchro-Test device after taking the air cleaner off. Disconnect the automatic choke cable from the right-hand carburetor and take the right-hand connecting rod off (1). Now loosen the clip (2) on the lower part of air cleaner and pull the rubber boot off. Disconnect the crankcase ventilation hose from the air cleaner lower part (3).

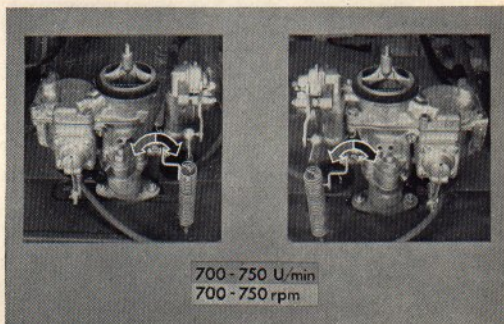


**20/18** Now unscrew the wing nut in the center and loosen the two outer wing nuts. The outer wing nuts remain in the air duct. Lift the cleaner out complete.

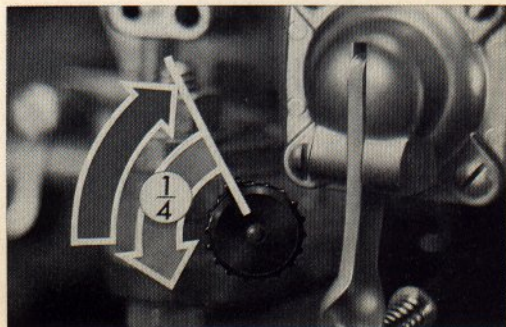


**20/19** Before you start the engine, connect the automatic choke cable to the right-hand carburetor. Check that the choke valves in both carburetors are wide open. The idling speed of the twin-carburetor engine should be between 700 and 750 rpm. If the engine is running too fast or too slow, adjust the idle screws on both carburetors until the speed is correct. Watch the Synchro-Test device while doing this and you will then see on which carburetor the throttle valve must be opened or closed.

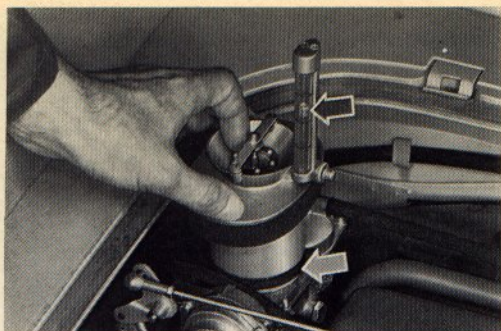
Turning in direction of dark arrow —  
Increases engine speed  
Turning in direction of light arrow —  
Decreases engine speed



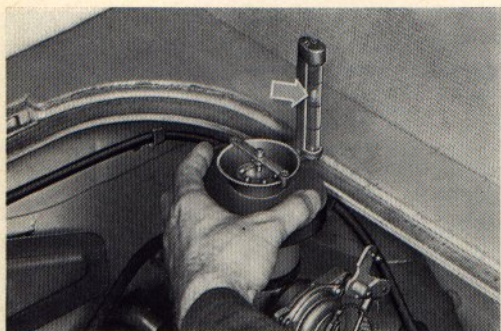
**20/20** Now adjust the idling mixture. Turn the volume control screw in the direction shown by the dark arrow until the engine speed drops. From this position turn the screw in direction shown by light arrow until the engine just begins to run smoothly. From this position the volume control screw should be opened about a quarter of a turn more to ensure a smooth transfer in the lower speed range. Do this very carefully as an over-rich mixture increases the fuel consumption. Adjust the volume control screw on the other carburetor in the same manner.



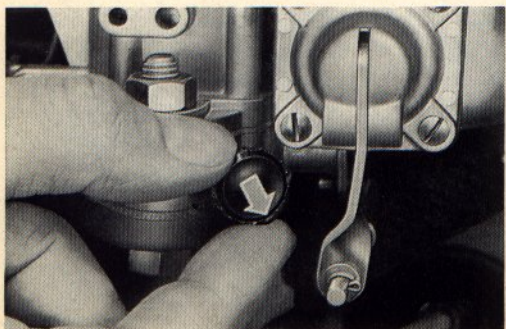




**20/21** How do we use the Synchro-Test device for the idling adjustment shown previously. Press the device against the rubber ring so that no secondary air can be drawn in. The rubber ring — light arrow — must be in good condition. Then adjust the throttle disc as shown here until the piston is roughly in the center of the measuring glass — dark arrow. Move the glass as necessary if it is not vertical and is causing the piston to stick.



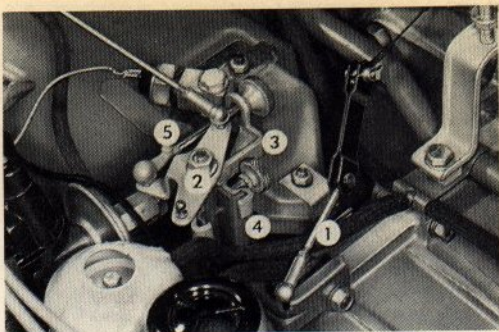
**20/22** When you place the device on the other carburetor you must not move the throttle disc any more. Note the position of the piston. If the position differs less than 10 mm from the position on the other carburetor, the idling screw adjustment is in order. If the position varies more than 10 mm, the idling screw on the second carburetor must be adjusted until the piston position is the same as on the other carburetor.



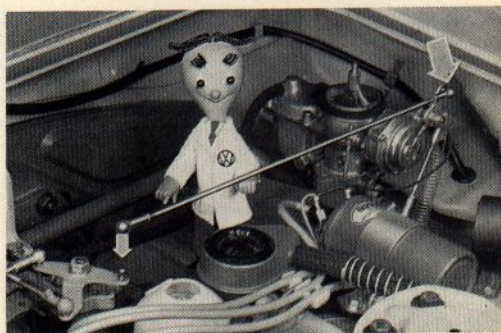
**20/23** Every time the idling screws are adjusted, the volume control screws on both carburetors must be re-set. Let us just go over the adjustment again briefly. Turn volume control screws in until engine speed drops. Then turn out until engine just begins to run smoothly. From this position open both volume control screws about a quarter of a turn.



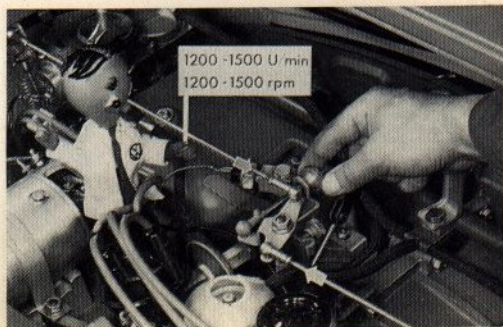
**20/24** Now disconnect the accelerator cable by taking the cable pull rod (1) off the three-arm lever (2). Install the setting device (3) for the lever on the bracket (4) and secure it with the knurled screw. Place the threaded rod (5) on the three-arm lever without disturbing the idling position.



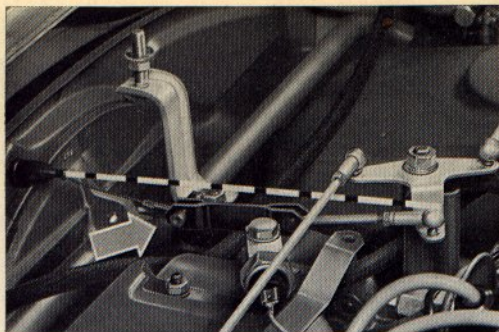
**20/25** When the right-hand connecting rod is fitted again, the idling adjustment is finished. Install the rod on the relay lever first as shown by the arrow on the right. The length of the rod is correct if you can locate the other ball socket on the three-arm lever ball without moving either end. If necessary, adjust the length.



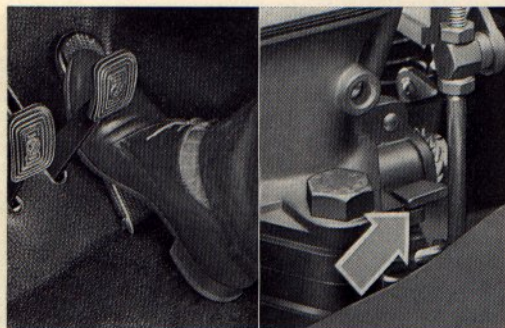
**20/26** When adjusting the twin-carburetor system, it is essential to also check the settings at a higher speed. Turn the knurled screw of the three-arm lever operating device in until the engine is running at 1200—1500 rpm. Check both carburetors with the Synchro-Test device after adjusting the device to the increased speed by turning the throttle disc out until the piston is in the center of the glass tube. If the piston position varies, alter the length of the right-hand connecting rod until both carburetors give the same piston position. Then check the carburetors again at idling speed. If you have made the adjustments carefully the difference between the carburetors shown by the Synchro-Test device should be less than 10 mm.



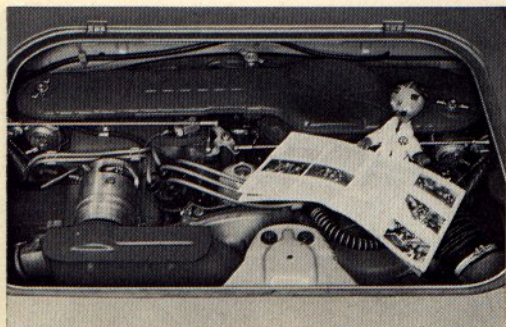




**20/27** Now switch the engine off, remove the three-arm lever setting device and connect the accelerator cable. The cable is correctly adjusted when the link hangs down slightly in the idling position as shown here. The imaginary black and white shows the sag clearly.



**20/28** This ensures that there is a gap of about 1 mm between the throttle valve lever and the stop on the throttle valve part when the accelerator pedal is fully depressed. Then install the oil bath air cleaner and road test the vehicle to check the operation of the twin-carburetor system.



**20/29** Once you have gained a little experience and got the feel of it, the adjustment of the twin-carburetor system will not cause you any trouble. Please work carefully and conscientiously and remember the instructions given in this leaflet.



