

Workshop Manual



This manual covers all Cezeta and N-Zeta models

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NZETA Scooter Repair Manual

Introduction

This book represents the Repair Manual for owners of NZETA scooters made by the world famous CZ Motorcycle Works in Strakonice Czechoslovakia then assembled and finished by Jawa New Zealand. The reliability of this machine is well known to be exceptional, its owner having nothing more to do than normal servicing according to the Owner Handbook supplied with every machine. This Manual is intended for Service Repair Shops and for those of the NZETA owners who prefer to carry out repairs on their machines after many years of service. That is why the necessary information for the repairs of the crankshaft and connecting rod mechanism and electrical equipment is provided. Because the maintenance and repairs of the cycle part are, due to the NZETA scooter monocoque bodywork, restricted to the minimum and are well described in the Owner Handbook, only the most essential matters shall be discussed here. It is necessary to warn NZETA scooter owners that, they should consider their mechanical abilities carefully and to only undertake jobs which they are able to complete successfully. It may be preferable to seek help in service workshops. When describing individual repair jobs reference will be made to the special tools supplied by the manufacturers, nevertheless the design of the NZETA scooter makes it possible for most jobs to be done with normal tools or, where necessary, with universal pullers found in the equipment of every service repair shop

Carburettor Cleaning and Maintenance

On most occasions, carburettor faults are due to impurities entering with the petrol or air. The time for regular carburettor cleaning will depend on the manner in which the machine is used. It is not recommended to carry out any carburettor repairs apart from washing it in clean petrol and setting according to the maker's instructions. Any departure from the basic carburettor setting may be carried out with a view to the condition of the scooter, its use in varying climatic conditions, or the fuel used. In these cases, keep within narrow limits keeping a careful check of the fuel consumption and performance after the differing setting has been carried out.

Other carburettor defects which may occur in operation should be remedied by repairing or, replacing of its parts. This applies to the throttle valve which, in case of excessive play in the mixing chamber, should be replaced with a new one or in the case of seizure should be repaired using fine emery cloth or sharpening stone. One should never omit, to wash the throttle valve in petrol after it has been repaired, to remove the fine emery which might cause wear of the mixing chamber.

Another carburettor trouble is its constant flooding. This may be due to a leaky float or lack of tightness of the float needle / dirt under the needle. To repair the float, it has to be soldered after drying out or replaced. Lack of tightness of the float needle in its seat in the float chamber top will be removed by grinding using lapping paste or by replacing the parts. In case of damage to the throttle valve needle the needle has to be replaced.

All these jobs are done without removing the carburettor from the crankcase, the carburettor being accessible after opening the side door. The main jet is also accessible through the side door. To clean it, fine horse hair should be employed and not a piece of wire or any other hard object. Removal of the jet will be described for each carburettor separately. To clean the carburettor, it is necessary to first remove it from the crankcase through the side door.

Jikov 2924 M 13 carburettor Fig.1

This model has been employed in the 501/01 and 501/03 scooter models. It is a monoblock type carburettor. The main jet #19 is located in the float chamber. It is accessible after removal of the float chamber top #20

To Dismantle The Float Chamber, Proceed As Follows:

Close the fuel tap first and remove the fuel supply pipe. After unscrewing the four screws #32, remove the float chamber top together with the gasket #21 and float #31. To assemble, proceed in the reverse manner.

The throttle valve needle #7 is located in the middle of the throttle valve #4 and is accessible after its removal from the mixing chamber after unscrewing the mixing chamber top #8. After compressing the spring #5, free the control cable from the throttle valve notches #4 and thereby the spring resting against the needle circlip #6 and throttle valve. The circlip #6 secures the correct position of the needle #7. To assemble, proceed in the reverse manner.

The idling jet #17, the pilot, air screw #18 and the throttle valve stop screw #15 are located on the R. H. side of the carburettor and are accessible through the bodywork side door. When repairing the float, push out the float spindle #31a first thus freeing the float #31. Repair the float or replace it and assemble proceeding in reverse manner. The float spindle is secured against working free by two screws #32 which fasten the float chamber top #20. In case of loss of any of these four screws, it is necessary that the float chamber top should be always fastened with two screws on the sides of the spindle. Dismantling or assembling the float chamber top with float it is always necessary to handle carefully these parts in order not to damage the, float stop which would alter the fuel level.

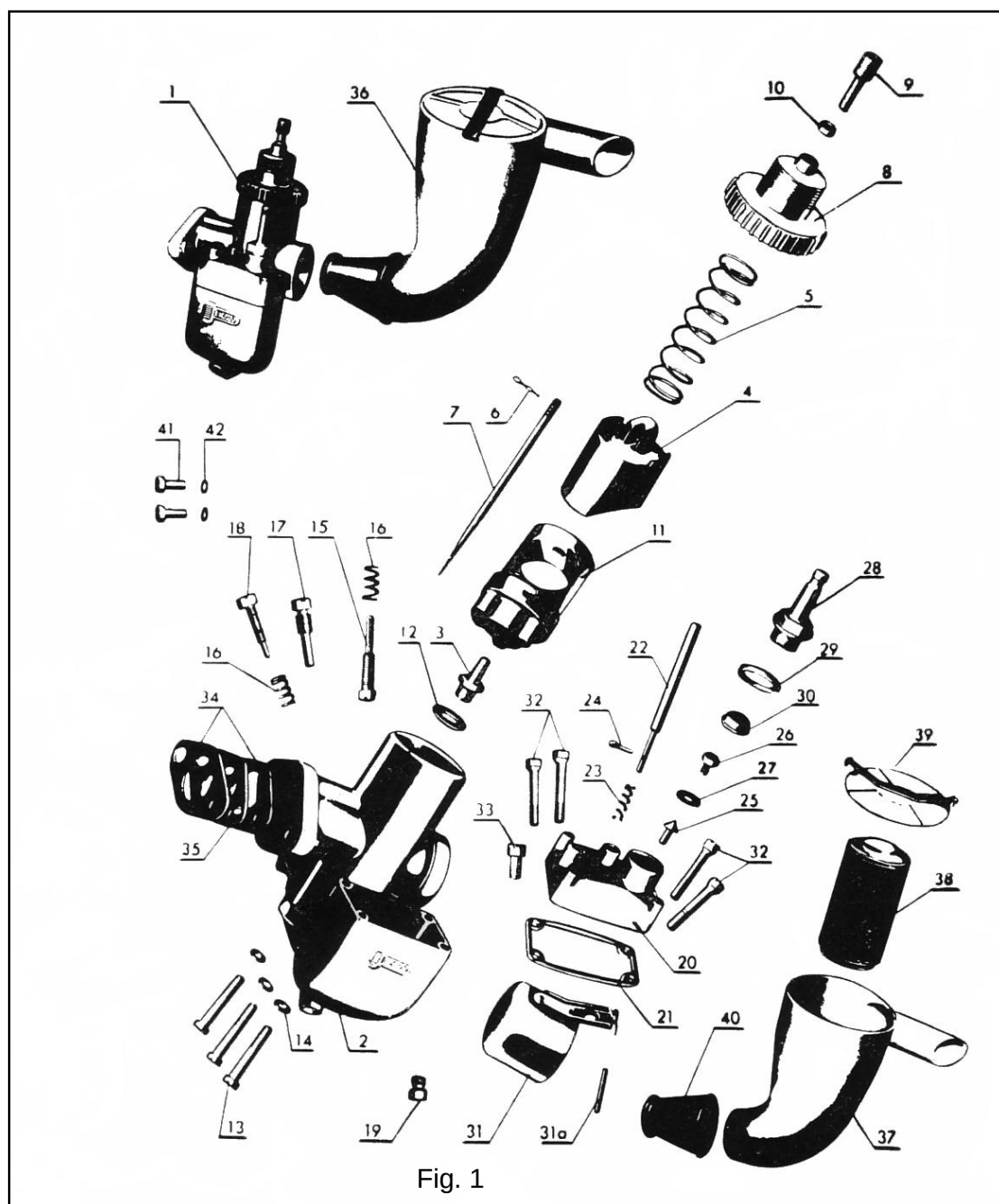
**To Set The Carburettor According To The Manufacturers Specifications,
Proceed As Follows:**

First check the throttle valve needle position / how to assemble the throttle valve has been described in the preceding paragraph / slacken the lock nut #10, screw the cable guide #9 into the mixing chamber top #8 thus freeing the throttle valve #4. After removing the float chamber top, unscrew the main jet #19 and check its value.

The pilot air screw #18 serves to set the idling speed. Tighten the pilot air screw first /clockwise/ and then slacken it /anticlockwise/ by the value prescribed for setting. With the engine running, its idle speed is set by means of the throttle valve stop screw #15. By unscrewing the cable guide, the throttle cable slack can be taken up and the cable guide is then secured with the lock nut #10.

The carburettor is set in the Works for running in, and it has to be reset after the first 2000 km / 1200miles to the following values:

Main Jet	100 to 102 to Solex
Idling Jet	55 to Solex
Needle position	3 rd notch from the top
Pilot air screw	slacken by $\frac{3}{4}$ of a turn from tight /anticlockwise/



Jikov 2924 S 11 Carburettor for the 501/03 to /05 models;

Jikov 2924 S 13 Carburettor for the 502/00 to /01 model Fig.2

These are monoblock type carburettors. They are also equipped with a choke device for making the mixture rich to assist in starting the engine when cold. The main jet #24 is located in the jet carrier #23 and is accessible after being unscrewed. The throttle valve needle #4 is eccentrically located in the throttle valve #3 and is accessible after the removal of the valve from the mixing chamber when the mixing chamber top #7 has been first removed.

After compressing the spring #6, free the control cable from the throttle valve #3 notch and thereby the spring resting against the needle circlip #5 and the throttle valve. The circlip #5 secures the correct position of the needle #4. To assemble, proceed in the reverse manner. The idling jet #26, the pilot air screw #27 and the throttle stop screw #29 are located on the RH side of the carburettor and are accessible through the bodywork side door.

To Dismantle The Choke Device, Proceed As Follows:

Having unscrewed the choke screw #16, remove the slide #13 suspended on the cable. Unscrewing the cable screw #14 and the slide #13, will free the cable. To assemble, proceed in the reverse manner.

To Set The Carburettor According To The Manufacturers Specifications,

Proceed As Follows:

First check the throttle valve #4 needle position. Slacken the lock nut #8; screw the cable guide #9 into the mixing chamber top #7 thus freeing the throttle valve #3. After unscrewing the jet carrier #23, check the correct value of the jet. To set the idling speed, use the pilot air screw #27. First tighten the pilot air screw /clockwise/ and then slacken it /anticlockwise/ to the prescribed setting value.

With the engine running, its idling speed is set by means of the throttle valve stop screw #29. To take up the throttle cable play, unscrew the cable guide #9 and secure the guide with the lock nut# 8.

The carburettor is set in the Works for running in, and it has to be reset after the first 2000 km / 1200miles to the following values:

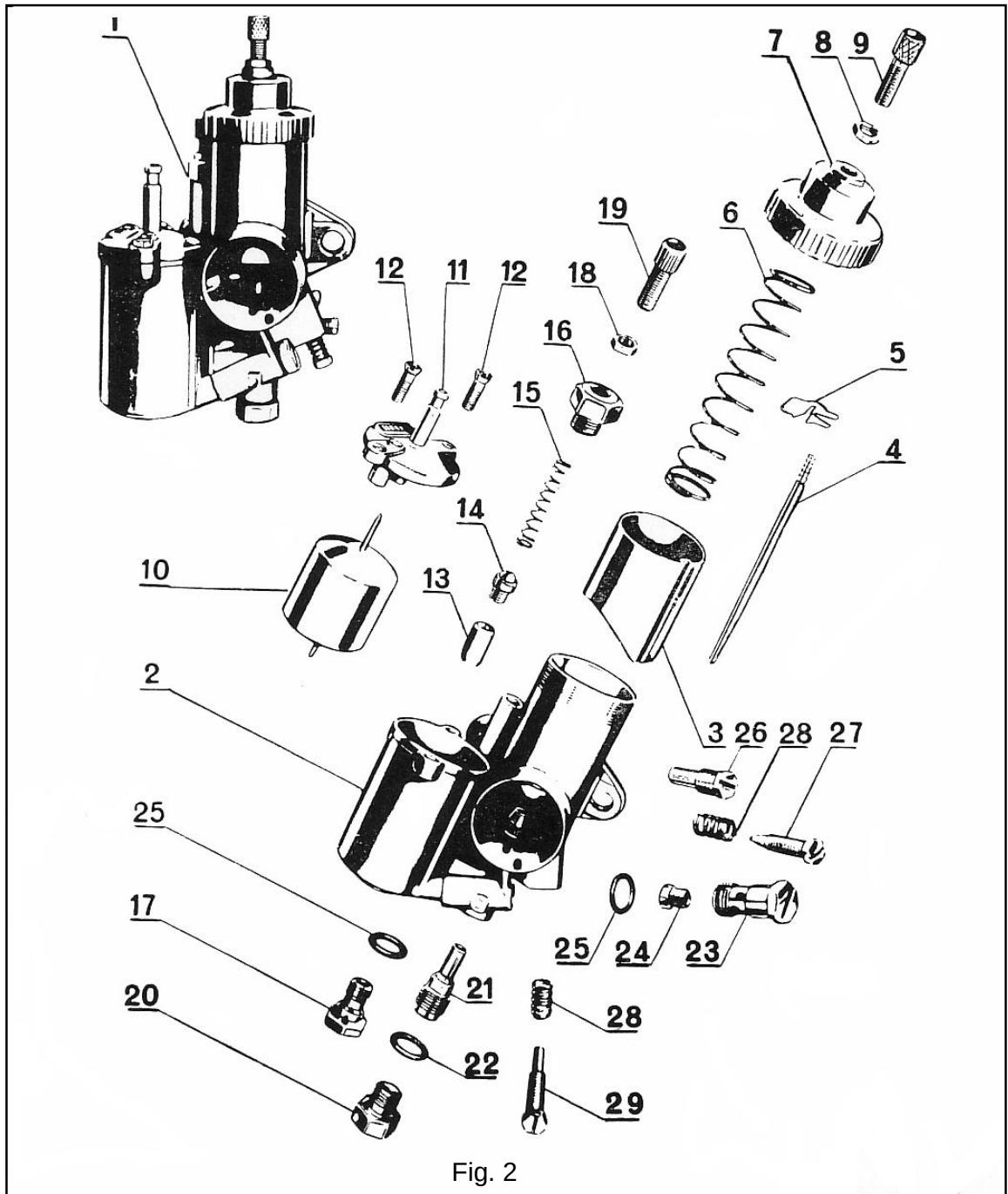
2429 S 11 Carburettor on the 501/03 to 05 models

Main Jet	105 to Solex
Idling Jet	55 to Solex
Needle position	2 nd notch from the top
Pilot air screw	slacken by $\frac{3}{4}$ of a turn from tight /anticlockwise/

2429 S 13 Carburettor on the 502/00 to 01 models

Main Jet	109 to Solex
Idling Jet	40 to Solex
Needle position	2 nd notch from the top
Pilot air screw	slacken by $\frac{1}{2}$ to 1 turn from tight /anticlockwise/

When refitting the carburettor to the engine, do not omit the carburettor base gasket taking care not to damage it. Tighten the carburettor uniformly to the crankcase.



Induction Silencer Maintenance and Cleaning

For the 501/01 – 03 – 05 models fig. 3

The silencer serves to reduce the engine noise level and replaces the normal air cleaner at the carburettor. For its correct operation, it must be maintained as follows:

After about 3000 – 5000 km / 2000 – 3000 miles, rotate and remove the silencer top #1, and then remove the silencer element #3. The element must be thoroughly washed in clean petrol. Moisten the clean element with a mixture of oil and petrol to the ratio of 1:1 and leave it to drip. After replacing the element, the silencer top is secured against working free by rotating the top to engage the fitting clips to the silencer body #22. Care should be taken to ensure that the rubber sleeve #4 connecting the induction silencer to the carburettor does not become distorted or damaged to prevent dirt entering the engine. The drain hole in the sleeve must always face downwards.

A loose silencer top will manifest as a roaring noise when the engine is running. In such a case, the element may fall out resulting in dirt entering the engine as well as the mixture becoming lean and the engine losing power at high r.p.m. and overheating. On the other hand, with the element excessively dirty, the mixture will become too rich resulting in increased fuel consumption and the engine running lumpy / four-stroking.

The induction silencer is fitted to the bodywork with 2 bolts #26 which are accessible after the removal of the silencer top and the element. The Induction silencer is accessible after removal of the under seat luggage compartment and seat / this job will be described in a following chapter dealing with the bodywork/.

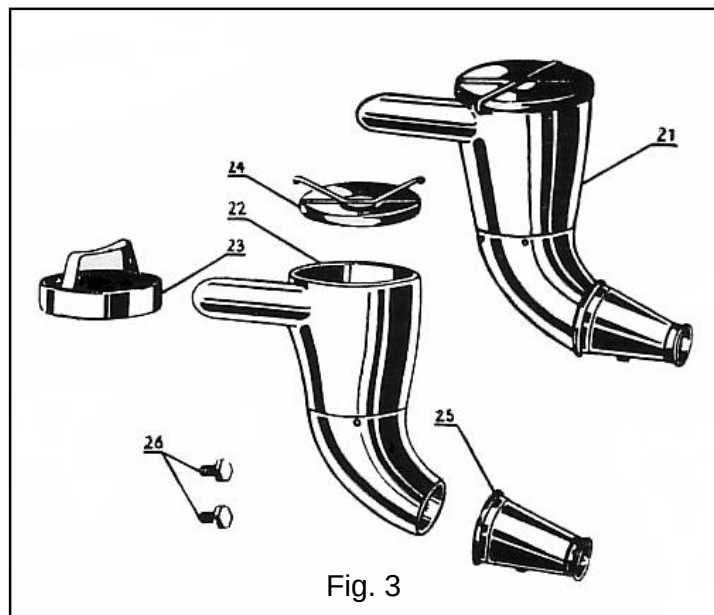


Fig. 3

Engine

The following jobs can be carried out without removing the engine from the bodywork:

Removal of the cylinder barrel and head for replacement, re-boring or decoking, cleaning or replacement of the piston, replacement of the connecting rod small end bush, ignition advance setting, removal of the ignition and dynamo, replacement of the gearbox chain sprocket, the primary drive chain and final drive chain, replacement and adjusting of the clutch and gear change mechanism, removal of the cooling fan.

Cylinder Head and Cylinder Barrel Removal.

First remove the luggage compartment – this job is described in the Bodywork chapter. Dismantle the cooling fan - this job is described in the next chapter. For the 501 model, unscrew the two exhaust pipe nuts, for the 502 model, unscrew the bolt fastening the exhaust pipe and remove the pipes from the cylinder barrel.

With the 14mm box spanner, unscrew the four nuts fastening the cylinder head and remove the head through the top opening in the bodywork. Fig. 4

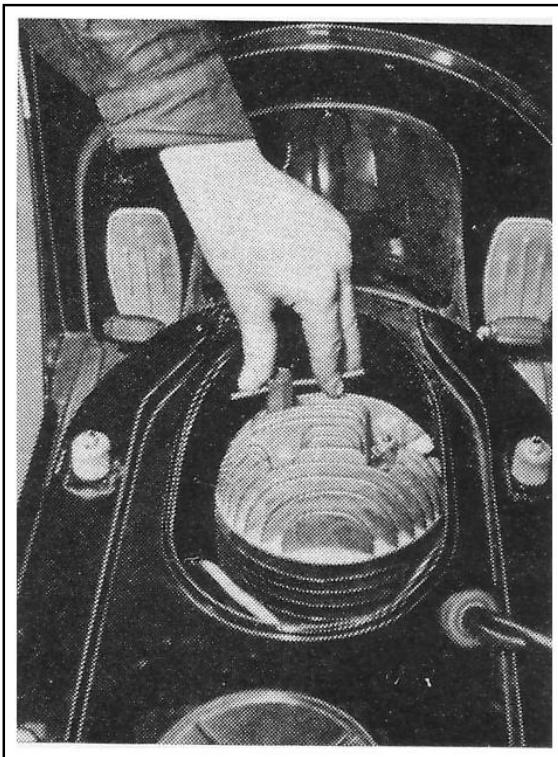


Fig. 4

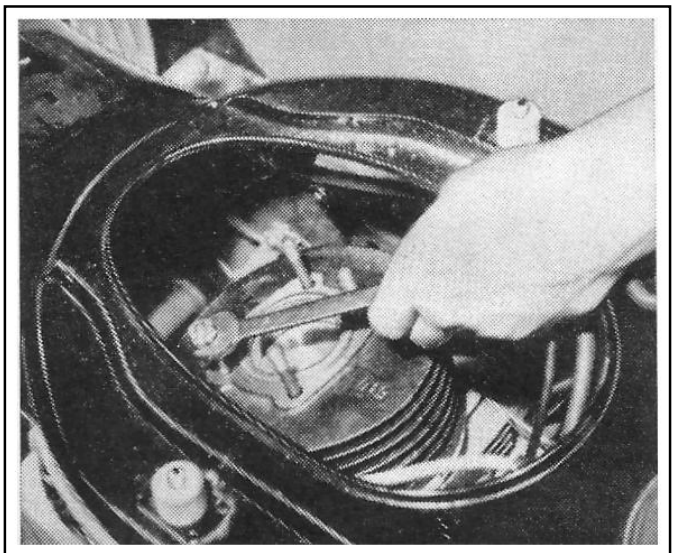


Fig. 5

To dismantle the cylinder barrel, it is necessary to first unscrew the studs fastening the cylinder barrel to the crankcase. Thread two nuts onto the studs and tighten them onto each other. Now unscrew them together with the stud by turning the bottom nut. In this manner, remove all four studs. fig.5

To free the cylinder barrel, carefully lever it using screwdrivers after having first brought the piston to BDC with the kick-starter pedal. Having removed the cylinder barrel, cover the hole in the crankcase under the piston with a clean cloth; it is now possible to proceed to decoke, to take off the piston or to replace the small end bush. Using the S-3 special pliers or 3 tin foils, remove the piston rings. The piston should be removed only when it is to be replaced or when the gudgeon pin or small end bush have to be replaced. For the original piston with the pressed in gudgeon pin / scooters 501/01 – 03 up to engine N°. 132252/ puller S-38 should be used for extracting the gudgeon pin. For the new piston with floating pin / model 501/05 and 502/00 – 01/ use the locating pins S-3 and push out the gudgeon pin with light pressure by hand. When dismantling the piston, first remove the two circlips securing the gudgeon pin. Never drive out the gudgeon pin as there is danger of bending the connecting rod.

Piston

For scooter model 501/01, 03 and 05, new piston Part N°. 356-12-241 should be employed only. Together with this piston, setting of the 2924 M 13 carburettor has to be modified as indicated. Pistons are marked on the top with letters according to the manufacturers dimensions determining their assemble with cylinder barrels and gudgeon pins. The marking consists of two letters, the first of which A, B, C determines the piston diameter and thereby its suitability for the corresponding cylinder barrel marking. The second letter Y, Z marks the dimensions of the gudgeon pin diameter.

Piston Grading According To Diameter D2 – Model 502 Fig.6

	A – 0.01	B – 0.01	C – 0.01	Nº.
Standard	57.860	57.870	57.880	450-12-026
1 st rebore	58.110	58.120	58.130	450-12-027
2 nd rebore	58.360	58.370	58.380	450-12-028
3 rd rebore	58.610	58.620	58.630	450-12-029
4 th Rebore	58.860	58.870	58.880	450-12-030

Piston Grading According To Diameter D2 – Model 501 Fig.6

	A – 0.01	B – 0.01	C – 0.01	Nº.
Standard	57.875	57.885	57.895	356-12-241
1 st rebore	58.125	58.135	58.145	356-12-242
2 nd rebore	58.375	58.385	58.395	356-12-243
3 rd rebore	58.625	58.635	58.645	356-12-244
4 th Rebore	58.875	58.885	58.895	356-12-245

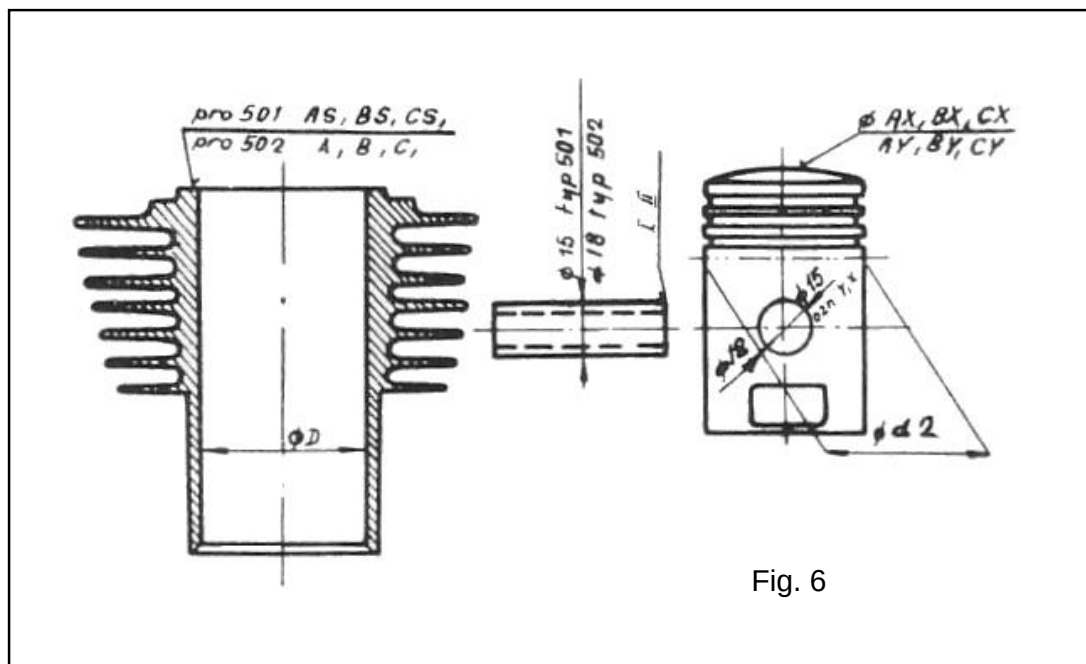


Fig. 6

Cylinder

For model 501 scooters, only cylinders with increased bore by 0.01mm as compared to the motorcycle engines have to be employed. Cylinder bores for the individual gradings are indicated in this table; the cylinder barrels are marked on the top flange beside the letter A, B, C determining the corresponding pistons with the letter "S".

Fig. 7 shows the cylinder barrel, piston and gudgeon pin.

Assembly Table For Models 501/01, 03, 05

	A-S	B-S	C-S	Nº.
Standard?	58.01 + 0.01	58.02 + 0.01	58.03 + 0.01	356-12-241
1 st rebore	58.26 + 0.01	58.27 + 0.01	58.28 + 0.01	356-12-242
2 nd rebore	58.51 + 0.01	58.52 + 0.01	58.53 + 0.01	356-12-243
3 rd rebore	58.76 + 0.01	58.77 + 0.01	58.78 + 0.01	356-12-244
4 th rebore	59.01 + 0.01	59.02 + 0.01	59.03 + 0.01	356-12-245

Assembly Table For Models 502/00, 01

	A	B	C	N °.
Standard?	58.01 + 0.01	58.02 + 0.01	58.03 + 0.01	502-12-020
1 st rebore	58.26 + 0.01	58.27 + 0.01	58.28 + 0.01	502-12-021
2 nd rebore	58.51 + 0.01	58.52 + 0.01	58.53 + 0.01	502-12-022
3 rd rebore	58.76 + 0.01	58.77 + 0.01	58.78 + 0.01	502-12-023
4 th rebore	59.01 + 0.01	59.02 + 0.01	59.03 + 0.01	502-12-024

The cylinder barrel for model 502 scooters are marked on the top flange only with letters indicating grading A, B, C.

Gudgeon Pin Bush For Models 501/01, 03, 05

Gudgeon pin bush diameter is $15.025 \pm 0.01\text{mm}$ for standard gudgeon pin grading

I = dia. $15.000 - 0.0025\text{mm}$, grading II = dia. $14.9975 - 0.0025\text{mm}$ and $15.125 - 0.01\text{mm}$ for oversize gudgeon pin dia. $15.1 - 0.004\text{mm}$.

For Models 502/01, 00

Gudgeon pin bush diameter is $18.25 \pm 0.01\text{mm}$ for standard gudgeon pin grading

I = dia. $18.000 - 0.0025\text{mm}$, grading II = dia. $17.9975 - 0.0025\text{mm}$ and $18.125 + 0.01\text{mm}$ for oversize gudgeon pin dia. $18.1 - 0.004\text{mm}$.

After every replacement of the bush this has to be reamed to the prescribed diameter after pressing into the connecting rod small end. If the reaming is done without removing the engine from the bodywork, it is necessary to cover the crankcase very well to prevent bronze chips from entering the engine. Before fitting the bush, it is advisable to heat the connecting rod small end to about $80^\circ\text{C} / 176^\circ\text{F}$ using a blowtorch or similar. This causes the hole into which the bush is to be fitted to become slightly expanded and the bush will be more easily pressed in. To fit and remove the gudgeon pin and bush employ puller S-34,

Fitting The Piston

First slip the gudgeon pin into the piston from one side, position the piston over the connecting rod and use guide pin S-13 to push the gudgeon pin through the connecting rod small end and into the other side of the piston. Locate the pin between the circlip grooves and then insert the clips into their grooves. Only then should the piston rings be fitted into their appropriate grooves.

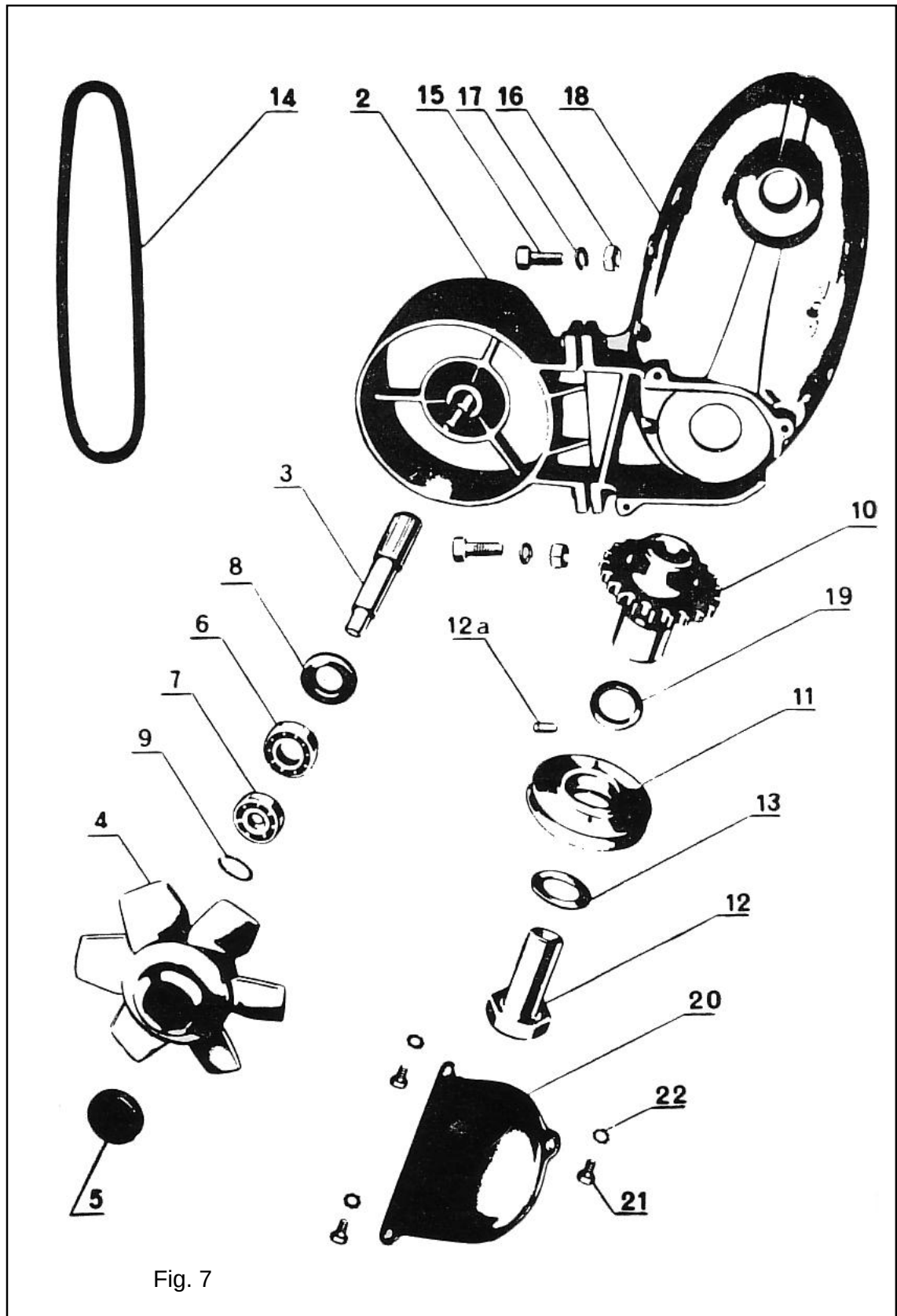
Fitting The Cylinder Barrel And Cylinder Head

Clean the Crankcase seating face and preferably a new gasket under the Cylinder Barrel. Provide the Cylinder Barrel with a coating of clean oil inside, move the piston to TDC by means of the kick starter pedal and then fit the barrel. When fitting the cylinder barrel, take care to have the piston rings correctly placed with their ends to the peg in the piston groove.

With the piston and rings sliding in the cylinder barrel, slip the barrel onto the crankcase taking care not to damage the gasket and then screw the studs into the crankcase in the reverse manner to their removal. Place preferably a new gasket under the cylinder head and do not omit to fit the washer under each cylinder head nut. It is easy to locate them by sliding them down a screwdriver or suitable sized piece of rod. Tighten the cylinder head nuts sequentially.

Cooling Fan Fig.7

The method of removal with the engine in the bodywork is the same for both models of scooter. After removing the Vee-belt #14 from the pulley, unscrew the two nuts #16 from the connecting bolts #15 in the L.H. engine side cover. Remove the bolts and take the fan assembly #2 off the engine and out through the bodywork side door. Fig. 8



After removing the fan assembly from the bodywork, remove the rubber cover #5 from the rotor hub. Free the circlip #9 and pull the fan rotor #4 together with the bearings #6, 7 off the fan body shaft #3 using a universal puller or S-37 with extension S-48. Using a suitable bar Ø14mm inserted from the side of the larger bearing and seal, drive the smaller

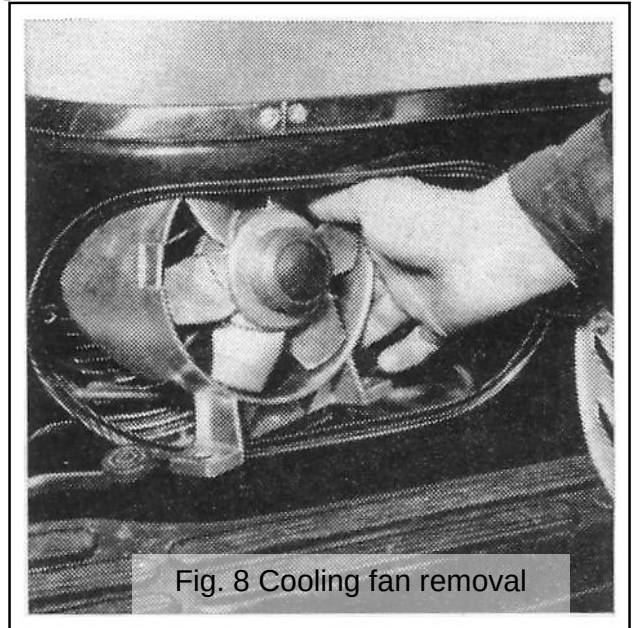


Fig. 8 Cooling fan removal

bearing #7 out. The larger bearing #6 can now be driven out along with the seal #8 from the other side of the rotor. The fan body shaft should only be removed for replacement after part drilling the riveted end and pressing it out. The new shaft can be secured in place once it is pressed in by riveting the hollowed end using a suitable tool with a 90 ° tapered end. Care must be taken not to damage the cylindrical end of the shaft during this operation and the shaft must be inserted perpendicular to the fan body plane.

By unscrewing the bolts #21, the pulley cover #20 will be freed and thereby access to the bottom pulley. After securing the pulley #11 with the special spanner S-50 against rotation, unscrew the nut #12 with a box spanner and remove the pulley along with its washer #19. Fig. 9

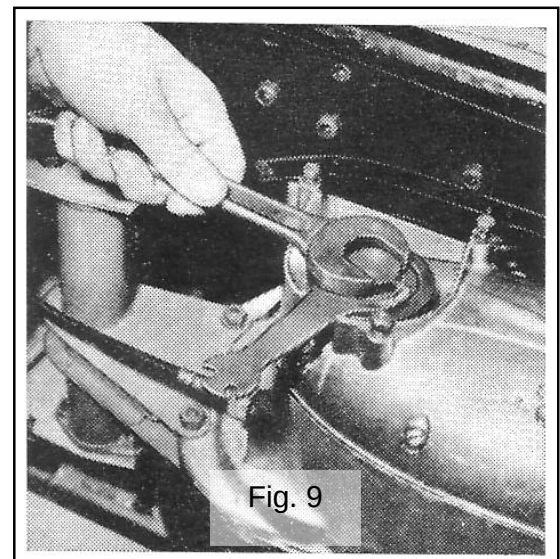


Fig. 9

The fan required very little maintenance. After approximately 10,000 km / 6,000 miles, remove the fan rotor from its shaft, clean away any old grease from the space between the bearings and apply a small amount of motor grease to the space. It is necessary to check the Vee-belt from time to time for wear. If it is faulty, it must be replaced, if slack, its tension has to be adjusted by means of inserts under the fan body seating lugs. First slacken the fastening bolts connecting the fan body to the LH crankcase cover #15. It is only necessary to loosen the nuts a few threads Fig. 11. Place the inserts between the seating face of the fan body and the and the LH crankcase cover, one to each bolt so that the recess in the insert fits over the bolt. Retighten the bolts and recheck the tension of the Vee-belt. These inserts are supplied with each scooter / two per set/.

Setting The Ignition Advance

The ignition advance should be set or checked always when the cylinder head is being removed. As a matter of routine ignition advance setting, however, is done without removing the cylinder head. But if the cylinder head has been removed, the piston position can be measured with a sliding calliper and the setting is more accurate. The ignition advance is prescribed by the markers as $3.4 \pm 0.3\text{mm}$ before piston TDC and the procedure as described in the Owner's Handbook has to be followed.

Removal Of The Dynastarter – is the same for both models.

First slacken the RH side cover bolts and remove the cover. After disconnecting the electric leads from the dynastart terminal base, slacken the four fastening screws #10 Fig. 10. and remove them together with the clamp washers.

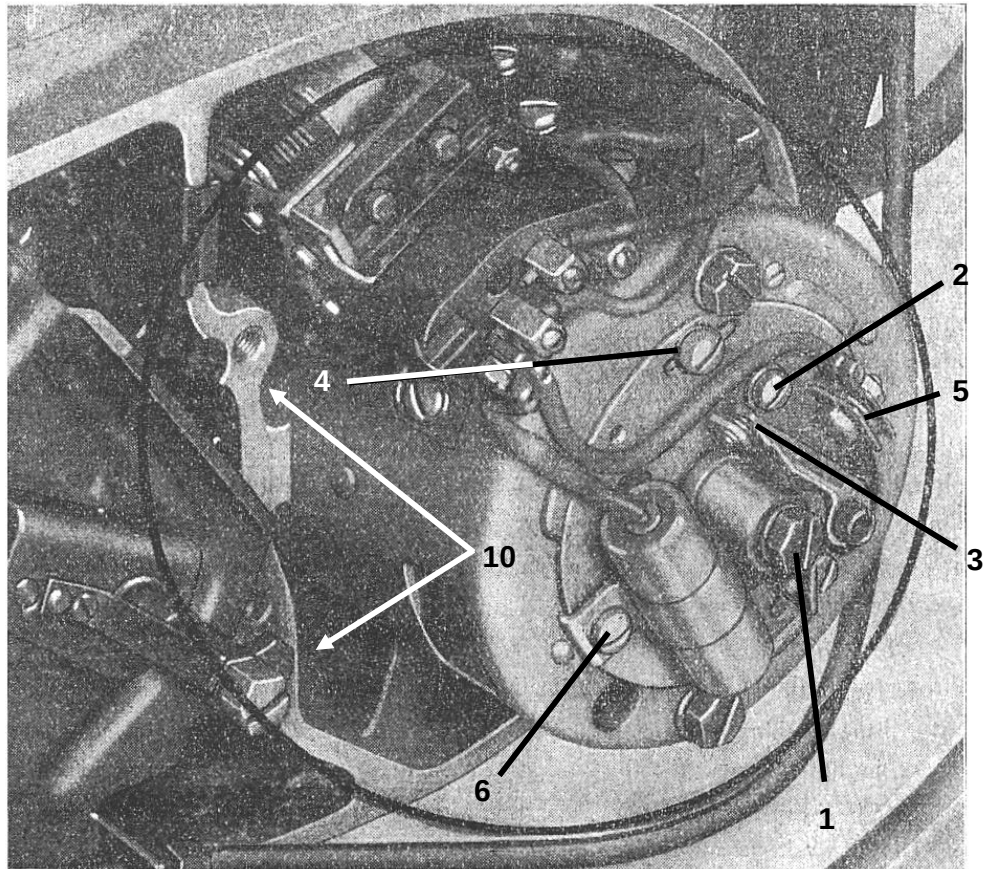


Fig. 10

After pushing out the carbon brushes, take the dynastarter out of the crankcase. Slacken the cam bolt #1 and tap the cam lightly from side to side taking care not to mark it and remove it from the shaft. Screw puller S-49 or a long M10 bolt /one can be obtained from under the luggage compartment securing the rear suspension unit to the bodywork/, into the hole in the centre of the rotor. Turn the bolt while holding the rotor with the other hand until the rotor slides off the shaft. To reassemble, proceed in reverse manner.

To Dismantle The Clutch Operating Bracket.

Remove the RH crankcase side cover. Free the clutch cable after that. Unscrew the three bolts and remove the bracket with levers. Remove from the

gearbox sprocket shaft the clutch operating rod. The bracket should be dismantled further only when some of the bracket parts are worn.

Removal Of The Gearbox Sprocket - is the same for both models.

After removing the RH crankcase side cover and the clutch operating bracket, straighten the tabs of the lock washer under the sprocket nut. It is possible to use the straightener S-4 and the box spanner for slackening the nut. Disconnect the drive chain after that. Using puller S-24, pull off the sprocket. To refit, proceed in the reverse manner.

To Dismantle The Clutch And Primary Drive – is the same for both models.

Unscrew the draining plug on the crankcase bottom and drain the oil. To gain easier access to the engine, remove the batteries from their holders and lay the scooter on its RH side. Remove the gear change rod, the gear change pedal and the kick starter pedal / on 502 model, the extension. Now remove the cooling fan. Using a suitable screwdriver, unscrew all the LH side cover bolts –Fig. 11. Free the cover using two screwdrivers and tapping the cover lightly with a wooden hammer.

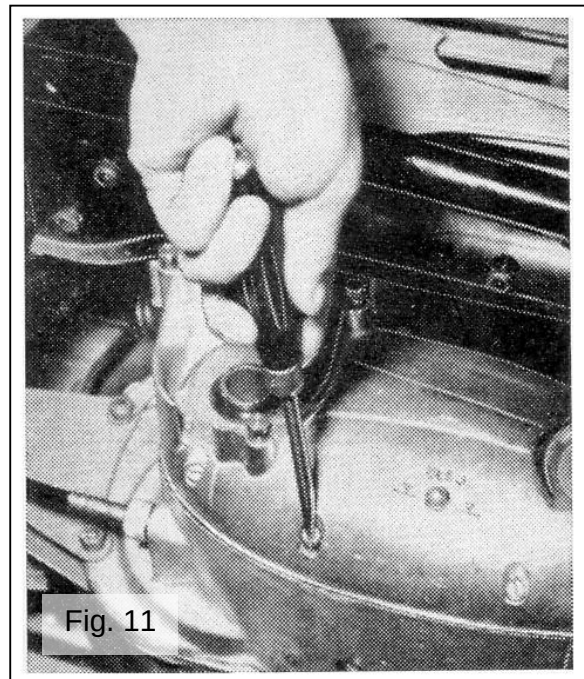




Fig. 12

Remove the recessed pins on the clutch pins compressing the clutch springs with the special tool S-9, or with a screwdriver Fig. 12 or possibly with a flat spanner. Push the pin out of the opening and remove the spring from the can. Remove the clutch pressure plate and all the clutch plates Fig. 13. With the straightener S-4 or a screwdriver, straighten out the securing washer under the nut.

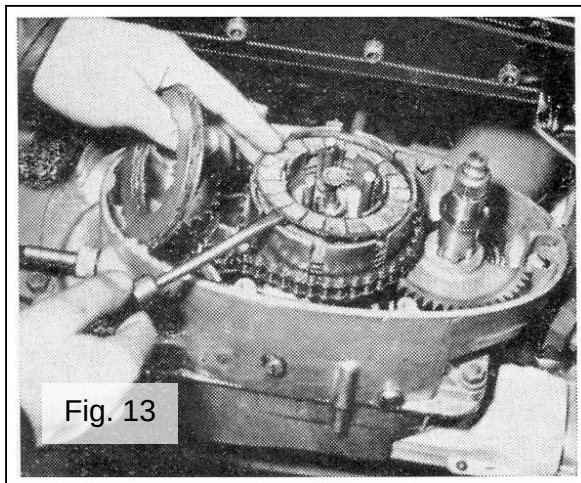


Fig. 13

Locate the securing tool S-10 between the engine sprocket and the clutch drum securing the drum against rotation. Locate the securing plate S-11 between the clutch drum and the hub complete thus securing the clutch. Now slacken the clutch nut Fig. 14 and the engine sprocket nut with the box spanner. The engine sprocket of scooters with cooling fans will already be freed when the fan pulley was removed. After that, take out the clutch hub. Lift out the clutch drum a little along the shaft, then remove the bearing from inside the hub and take out the clutch drum together with the primary chain. To pull the engine sprocket off the crankshaft, use puller S-24.

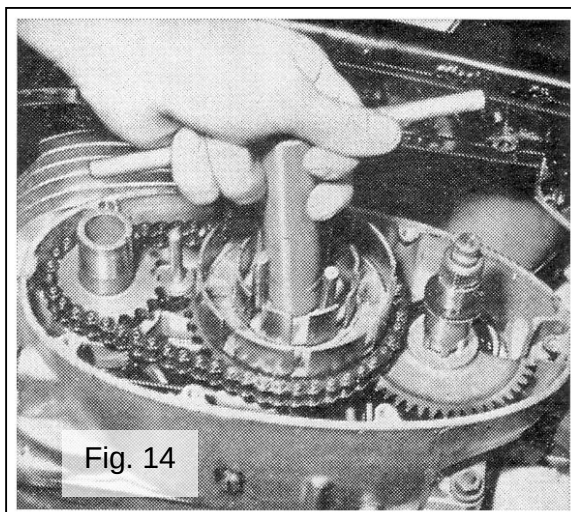


Fig. 14

Locate the securing tool S-10 between the engine sprocket and the clutch drum securing the drum against rotation. Locate the securing plate S-11 between the clutch drum and the hub complete thus securing the clutch. Now slacken the clutch nut Fig. 14 and the engine sprocket nut with the box spanner. The engine sprocket of scooters with cooling fans will already be freed when the fan pulley was removed. After that, take out the clutch hub. Lift out the clutch drum a little along the shaft, then remove the bearing from inside the hub and take out the clutch drum together with the primary chain. To pull the engine sprocket off the crankshaft, use puller S-24.

To Remove The Kick Starter Quadrant.

Remove the kick starter quadrant together with the return spring from the gear change shaft. **Take care of the return spring when taking the parts off.** Further remove the spacer which is on the gear change shaft. To assemble, proceed in the reverse manner. When refitting the quadrant on the gear change shaft, first insert the return spring into the groove in the crankcase by rotating the whole quadrant clockwise.

To Dismantle The Gear Change Shaft

The gear change shaft can be removed after the RH crankcase side cover and the clutch operating bracket have been taken off. Using the punch S-44, drive

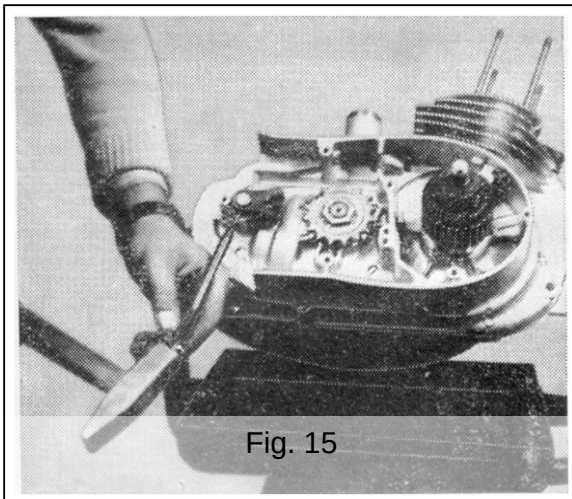


Fig. 15

out the cam securing pin from below Fig. 15 and remove the cam. Take care of the shims between the crankcase and the cam. From the clutch side, put the pawl securer S-51 Fig. 16 onto the gear change shaft. To assemble, proceed in the reverse manner taking care of the pawls which are spring loaded and have to be secured again with the S-51 tool. The cam securing pin must always be driven in from above.

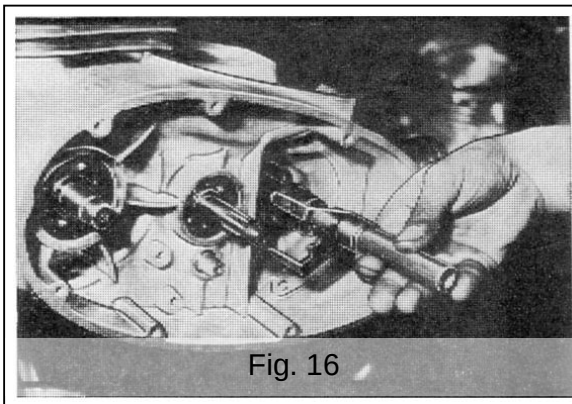


Fig. 16

To Replace The Crankshaft and Gearbox Output Shaft Seals

When replacing the seals on the crankshaft RH end, it is necessary to first remove the dynastarter as described in the paragraph dealing with its removal. Next remove the three screws securing the seal holder and remove the holder and seal together. Punch the seal out of the holder and press in a new seal. To assemble, proceed in the reverse manner.

To replace the gearbox output shaft seal, remove the gearbox sprocket and pull off the spacer, remove the seal using a slide puller; to reassemble, press a new seal into the crankcase and insert the spacer.

To Remove The Engine From The Frame

Disconnect the leads connected to the terminal block and to the ignition coil, remove the spark plug lead and further disconnect the speedometer drive, the rear wheel brake cable from the brake pedal, the gear change rod from the gear change pedal, the clutch cable in the engine, the fuel pipe, the throttle cable and the choke cable, the exhaust pipe with the exhaust silencer. In the case of the 501 model, first unscrew the four front engine plate bolts, the two pivoted rear fork bolts, remove the luggage compartment and slacken off the two rear suspension blocks. Now remove the power unit.

In the case of the 502 model, proceed as follows: Unscrew the four front engine plate bolts, the two fork pivot bolts and slacken the two rear suspension unit bolts. When being removed, the engine has to be supported. To replace the power unit, proceed in the reverse manner. How to disconnect the pivoted rear fork is described in the chapter dealing with the cycle part.

To Dismantle The Gearbox And Crankshaft Mechanism

To separate the crankcase halves, dismantle the gearbox and crankshaft assembly are very exacting jobs which should be done under the supervision of an experienced motorcyclist, or entrusted to a service repair shop; this is preferable as the workshops are equipped with special tools supplied by the manufacturers. The method of dismantling and assembling described here is that with special tools employed.

The crankcase can only be dismantled after the engine has been removed from the body work. If repairs or replacement of parts are to be done on the RH crankcase half, the crankcase will be dismantled but the LH half left as it is.

Before dismantling the crankcase, the RH engine side cover has already been removed and as described in the respective paragraph, the dynastarter has now to be taken out. Remove on the LH side of the engine the gear change pedal, the kick starter pedal / model 501 /, the extension / model 502 /. Unscrew the oil draining plug And drain the oil into a suitable container. Remove the LH side cover; dismantle the clutch and primary drive as described in the respective paragraph. Slacken the screw and remove the speedometer drive in the LH crankcase. Take off the carburettor and its gasket. Remove the clutch operating bracket, the clutch operating rod; pull off the gearbox sprocket, and the gear change operating cam. Further remove the cylinder head and the cylinder barrel and the base gasket. Slacken all the RH crankcase half securing screws and expel the crankcase dowels using drift S-2. Pull the RH crankcase half off the crankshaft assembly with the universal puller S-37 Fig. 17

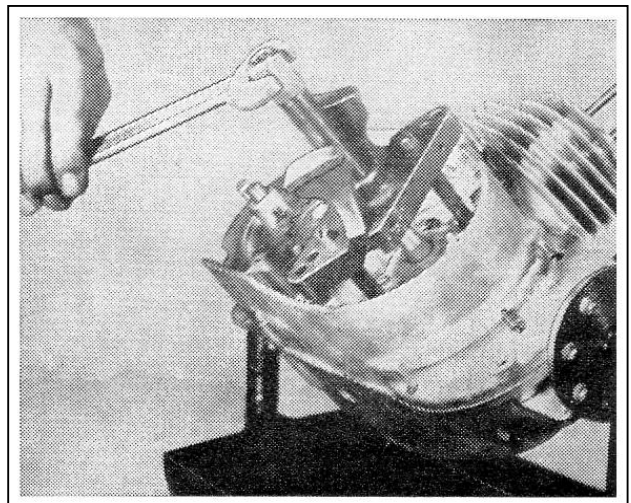


Fig. 17

If the driving gear with hub or the seal are not to be replaced, the gearbox sprocket need not to be removed before separating the crankcase halves. Remove the gear change shaft, the selector fork guide rod and the gears with shafts. Slacken the four screws holding the cam plate to the LH crankcase and remove the cam plate. *When refitting the cam plate, take care to locate the stepped screw in the central position.* Now drive the crankshaft assembly out of the LH crankcase half.

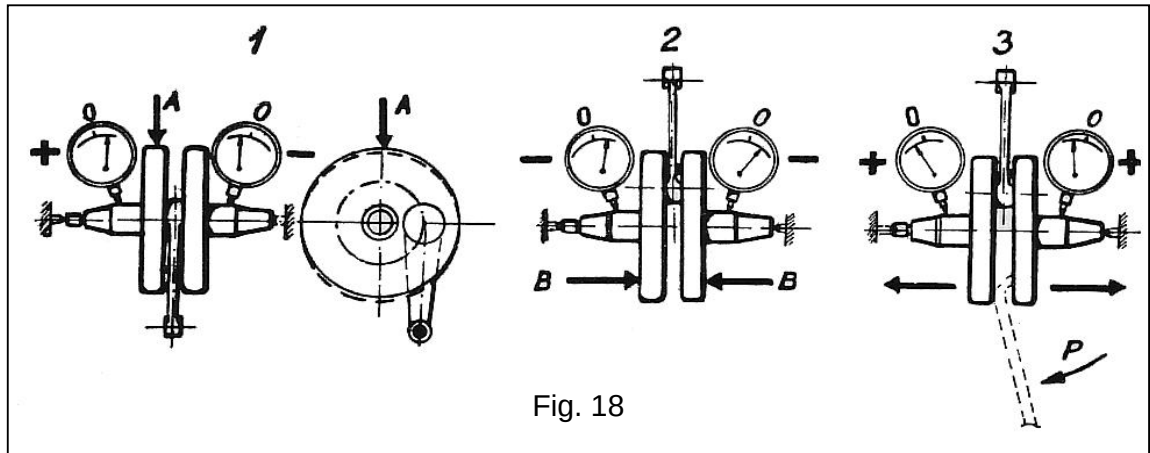
To refit the bearings into the crankcase, heat the case to 80°C / 176°F preferably in an oil bath. When dismantling and reassembling, the circlips securing all bearings must not be forgotten and omitted.

Dismantling The Crankshaft Assembly

The crankshaft assembly should only be dismantled in a specialist workshop equipped with a hydraulic press capable of exerting a pressure of 3,500kg to 5,000kg / 7,700lb to 11,000lb pressure, a measuring table with centres and indicator dials. The job should be entrusted to an experienced engineer. When pressing the crankshaft apart, care has to be taken not to damage the left thread on the pin. Care should also be taken not to alter the position that the pins were pressed together. Of particular importance is the position of the RH crankshaft pin in which there is an opening for the rotor locating pin. Wrong assembly of this pin will result in incorrect alignment and affect the ignition advance. As stated above, the crankshaft assembly should only be repaired by a service workshop familiar with this type of engine.

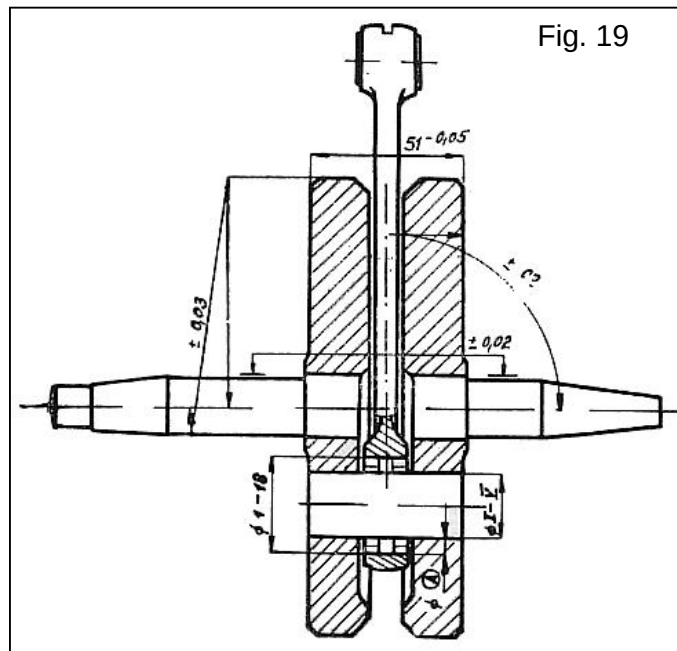
If any parts, i.e. the connecting rod pin, connecting rod or its rollers are to be replaced and if the complete unit is not being changed, it is necessary always to fit only parts of the same grading according to the assembly table. For models 501/00 – 501/04, complete crankshaft assemblies of the ČZ 350 and 450 motorcycle models can be used for replacement.

Checking method before pressing together the crankshaft assembly and of the pressed together components. The crank pin with the crank web has to be checked on the measuring table between two centres by means of the indicating dial Fig.18.



Lateral run-out - deflection from the perpendicular may not exceed 0.2 mm. Measuring is done on the side of the crank web along its circumference. Eccentricity on the crank web circumference may not exceed 0.03 mm.

Deflection from the perpendicular will be easily remedied by striking the crank web in the spot of the maximum deflection with a wooden hammer. Radial eccentricity /along the circumference/ cannot be remedied. It is not permitted to attempt adjustment by lathe machining. Pressing together of the entire crankshaft assembly is to 51.00 minus 0.05mm width Fig.19.



Connecting Rod – Rollers - Crank Pin Fig.19 - Crankshaft Assembly 356

Assembly Table For The 501 Model

Corresponding grading of the connecting rod and crank pin	Roller grading marked														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Connecting rod	6	6	6	4	2	12	12	12	10	8	18	18	18	16	14
Crank pin	V	III	I	I	I	V	III	I	I	I	V	III	I	I	I
Connecting rod		5	5	3	1		11	11	9	7		17	17	15	13
Crank pin		IV	II	II	II		IV	II	II	II		IV	II	II	II
Connecting rod		4	4	2			10	10	8			16	16	14	
Crank pin		V	III	III			V	III	III			V	III	III	
Connecting rod			3	1				9	7				15	13	
Crank pin			IV	IV				IV	IV				IV	IV	
Connecting rod			2					8					14		
Crank pin			V					V					V		

Crankshaft Assembly According To Graded Groups – 502 Model

Rollers Connecting Rod Groups - Arabic numeral
Crank Pin Groups - Latin numerals

A	6														
	V														
B	6	5			4										
	III	IV			V										
C	6	5			4			3			2				
	I	II			III			IV			V				
D	4	3			2			1							
	I	II			III			IV							
E	2	2													
	I	II													

Connecting Rod For The 501 Model – 356-12-230

502 Model – 450-12-230

Roller – 353-12-012

Crank pin – 355-12-141

353-12-012

450-12-141

Inner diameter
marked 1

Outer diameter
marked A

Outer diameter
marked I

1	29.900 + 0.002	A	4.002 - 0.002	I	21.900 - 0.001
2	29.902 + 0.002	B	4.000 - 0.002	II	21.899 - 0.002
3	29.904 + 0.002	C	3.998 - 0.002	III	21.897 - 0.002
4	29.906 + 0.002	D	3.996 - 0.002	IV	21.895 - 0.002
5	29.908 + 0.002	E	3.994 - 0.002	V	21.893 - 0.002
6	29.910 + 0.002	F	3.982 - 0.002		
7	29.860 + 0.002	G	3.980 - 0.002		
8	29.862 + 0.002	H	3.978 - 0.002		
9	29.864 + 0.002	I	3.976 - 0.002		
10	29.866 + 0.002	J	3.974 - 0.002		
11	29.868 + 0.002	K	4.027 - 0.002		
12	29.870 + 0.002	L	4.025 - 0.002		
13	29.950 + 0.002	M	4.023 - 0.002		
14	29.952 + 0.002	N	4.021 - 0.002		
15	29.954 + 0.002	O	4.019 - 0.002		
16	29.956 + 0.002				
17	29.958 + 0.002				
18	29.960 + 0.002				

Assembling The Engine

Before assembling the engine all its parts have to be washed with petrol and dried. The seating faces of the crank case halves and of the L.H. side' cover have to be cleaned from the old sealing compound by careful scraping. Any unevenness on the seating faces should be smoothed out on a lapping plate with paste. All the parts have to be checked, damaged and worn ones replaced with original parts supplied by the manufacturers. If one, of the crankcase halves is damaged, both halves have to be replaced, because they are machined together and made to match.

Before assembly, put the individual parts on a clean piece of paper on the work table. All moving parts such as pins, shafts, pinions etc. should be provided with a coat of oil.

Proceed as follows:

1. Only the bushes are pressed in the two crankcase halves.
2. Fit the bearing circlips into the L.H. crankcase half.
3. Heat both crankcase halves in an oil bath to approx. 70-80°C / 158-176°F/.
4. Press all the ball bearings in so as to make them sit on the circlips.
5. Fit the crankshaft assembly into the L.H crankcase half not omitting to locate an accurate distance piece between the crank webs; after pressing in remove the distance piece through the cylinder opening Fig.20.

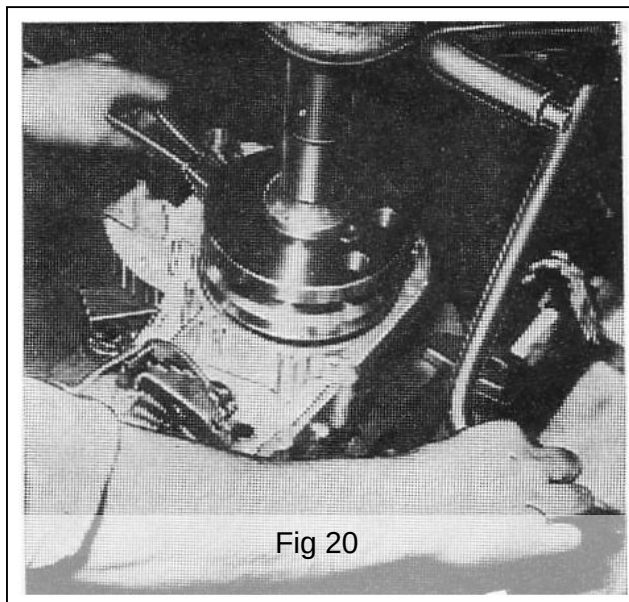
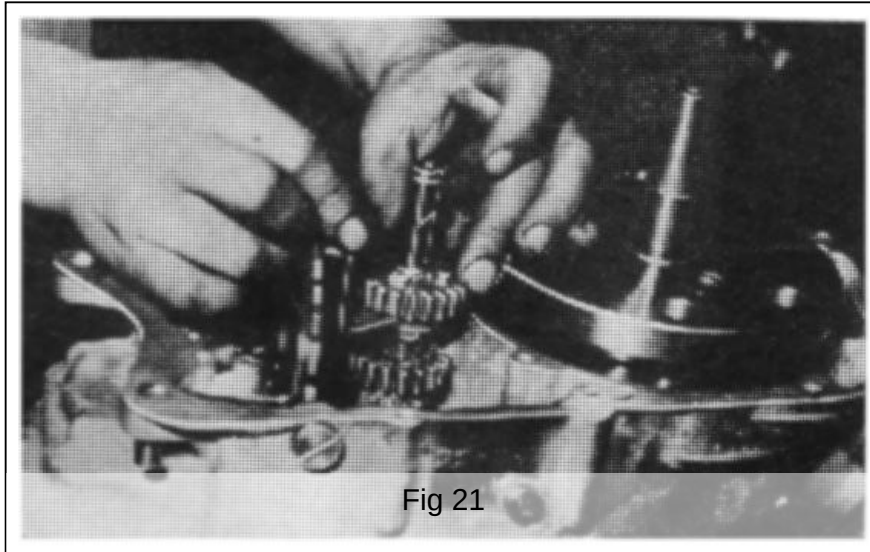
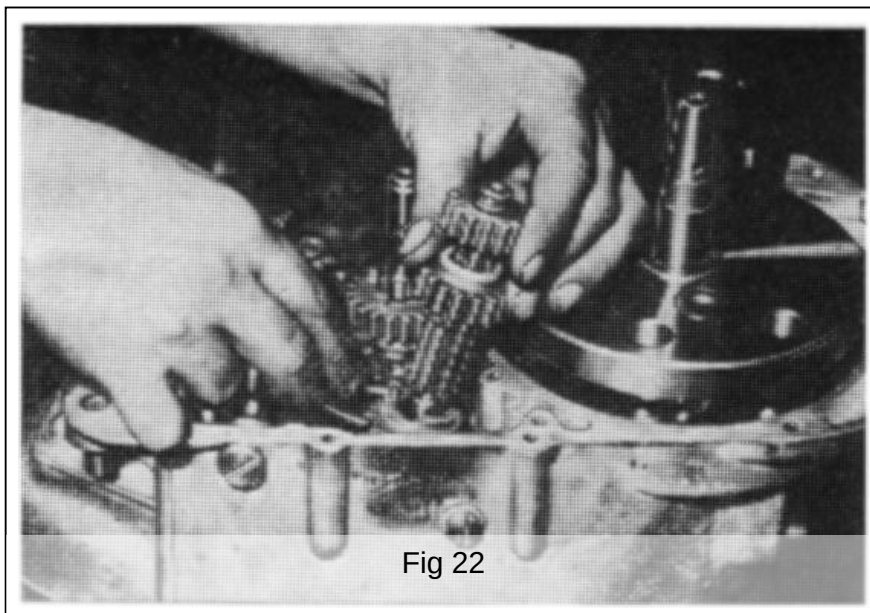


Fig 20

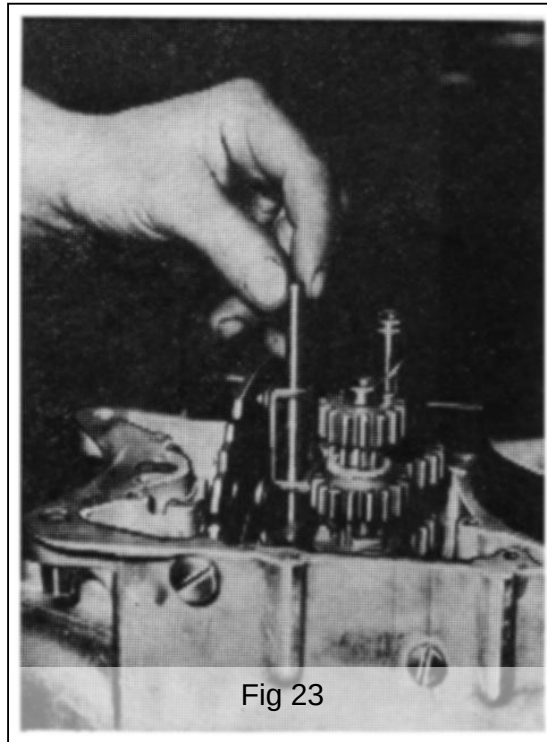
6. Screw the cam plate to the L.H crankcase half taking care of the location of the centring screw.
7. Locate the assembled main shaft, with the bottom, second and third gear pinions, into the L.H crankcase half / for model 502 do not omit to secure the second gear pinion with the spring ring Fig. 21.



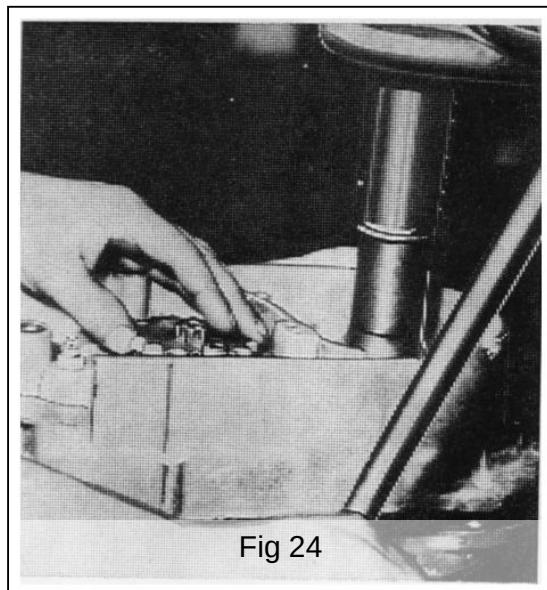
8. Insert the bottom selector fork into the third gear pinion and the cam plate.
9. Locate the lay shaft bottom gear pinion into the crankcase and after that, the lay shaft second gear pinion with the selector fork; insert the selector fork into the cam plate. Fig. 22.



10. Fit the lay shaft with the lay shaft third and top gear pinions
11. Insert the rod into the selector forks and tighten the securing screw. Fig.23.



12. Press the driving gear with hub into the R.H. crankcase half.
13. Turn the crankcase over and press in the sealing ring with the spacer.
14. Knock the gear box sprocket on, fit the securing washer and tighten the nut.
15. Provide both crankcase halves with a coat of sealing compound knock in the dowel bushes using drift S-2 and tighten fast. For tightening make use of the gearbox sprocket turning it round. Fig.24.



The assembly of the clutch and L.H side cover, the dynastarter, the clutch operating bracket and the L.H. side cover has been described in the preceding paragraphs

Cycle Part

The cycle part of both the 501 and 502 NZETA models looks alike and consists of monocoque bodywork: reinforced in the rear portion for the fastening of the spare wheel brackets. The 502 model employs a new suspension of the pivoted rear fork which makes it impossible to replace this bodywork with the model 501 bodywork. The differing method of dismantling of the 501 and 502 models will be described separately

Model 501 Removal Of The Rear Sprocket

This job is carried out after the pivoted arm has been removed. Using a screwdriver, straighten the wheel spindle nut securing washer, unscrew the nut, remove the securing washer and take the sprocket with hub off the spindle. To assemble proceed in the reverse manner.

Model 502 - Removal Of The Rear Sprocket

Before removing the rear sprocket, the wheel and chain case has to be removed and the rear chain disconnected / the description of the procedure will be found below/. Unscrewing the nut on the sprocket spindle will free the sprocket which can then be taken out of the fork. Drive out the sprocket spindle, remove the seal using the circlip pliers, remove the circlip and finally drive out the bearing. To assemble proceed as follows: first fit the circlip into the groove inside the hub., then press in the bearing from the right tight on the circlip and secure the bearing with the second circlip. Fill the bearing with motor car grease.

In the end, press in the sealing ring from each side of the bearing as well as the sprocket spindle.

Model 501 - Removing The Rear Drive Chain

To replace the rear chain in the 501 model proceed as follows: first remove the R.H. engine side cover to obtain access to the gearbox sprocket. Then remove the pivoted arm rear cover /release the spring clips /*remove the screws that surround it*/ obtaining in this manner access to the rear sprocket. Rotating the road wheel bring the chain connecting link to the sprocket.

After disconnecting the chain connect an old chain to it and by removing the chain from the pivoted arm the, old chain is being pulled at the same time; the old chain will make the fitting of the, new, or serviced chain easier. Having removed the chain, carry out its maintenance, shorten it if required using de-riveter S-6,

When replacing the serviced and shortened chain, or fitting a new chain, connect it to the old chain left in the pivot arm and removing this old chain pull the new chain through the pivot arm chain adjuster. Now disconnect the old chain and connect the new one. Replace the rear cover and the R.H. engine side cover. When adjusting the chain tension see to it that the rear wheel is aligned with the front wheel. Check the stop switch as well.

Model 502 - Removing The Rear Drive Chain

To replace the rear chain on the 502 model proceed as follows: first remove the RH engine side cover to obtain access to the gearbox sprocket. After removing the rubber strap and unscrewing the screw, disengage the chain case. Slackening the nut, free the rear wheel spindle. Finally slacken the nut freeing in this manner the dog clutch with the sprocket.

After that slacken the chain adjuster front nuts on the rear wheel spindle and then the rear adjusting nuts as well. Rotate the rear wheel to bring the connecting link on to the sprocket and release the connecting link clip with pliers or a screwdriver. By removing the connecting link the chain will be disconnected. To the chain in the chain case, connect an old chain which will be pulled into the chain case while, the disconnected chain is being removed.

Carry out the maintenance of the chain or its shortening, using de-riveter S-6. When replacing the chain, connect the new or the serviced and shortened chain to the old chain in the chain case. By removing the old chain, the new chain will be pulled through the chain case. Now disconnect the old chain and connect the new one. After that bolt the chain case together and secure it with the rubber strap. Before fitting the rubber strap on the chain case place a piece of wire over the chain case to which the strap has to be attached. This will make the fitting of the rubber strap over the top portion of the chain case easy.

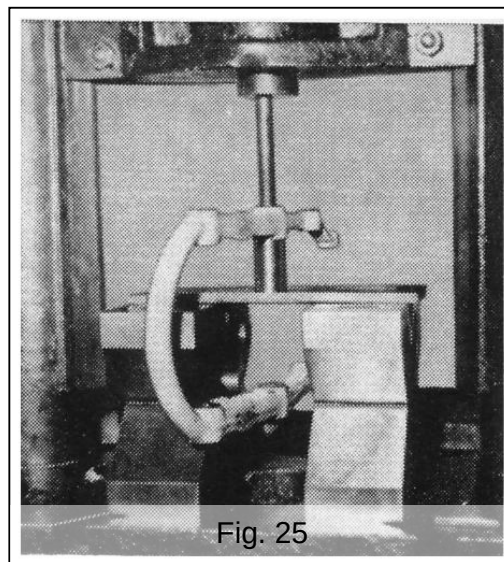
Chain Maintenance

The most important servicing of the chain is its correct tension which should be adjusted after every 600 to 750 miles /1,000 to 1,200 km/. Depending on the kind

of ground over which the machine is ridden and the medium in which it is employed the chain has to be greased approx. after every 1,200 to 3,000 miles / 2,000 to 5,000 km/. First wash the chain in paraffin. After drying, place the chain for about 3 hours in a lightly heated graphite lubricant / tallow mixed with 10% colloidal graphite/. The heated lubricating mixture will penetrate the links better. Now remove the chain, leave the lubricant to solidify and wipe the excess off with a cloth. Replace the chain and take care that the connecting clip should face with its open end in the opposite direction of the chain rotation.

Front Fork Removal

Model 501 will be described first. Slacken the bolts fastening the oil damper and the bolts fastening the rubber blocks and the mudguard to the fork. After unscrewing the bolts, remove the suspension rocker. Take out the rocker pins and drive the bushes out of the pivoted arm using puller S-20. Drive out the rubber bushes with a press using drift S-18 Fig. 25. Unscrew the grub screw securing the rubber buffers and remove the buffers. Now drive out the spacer bushes holding the oil damper in the fork and pivoted arm with drift S-18. To assemble, proceed in the reverse manner.



For model 502, first unscrew the bolts fastening the suspension units, slacken the nuts and remove the washer. Now remove the suspension units. After unscrewing the nuts, remove the washers and then the bolts securing the now freed pivoted arm Fig. 26 and the mudguard. After unscrewing two more bolts, the mud

guard will be completely separated from the fork. Now take out the pins from the pivoted arm and using puller S-20, drive out the bushes. Press the rubber bushes out of the fork. After replacing all worn parts, reassemble by proceeding in the reverse manner.

Model 501-Removal Of The Suspension Damper

This damper disposed so as to avoid the necessity of frequently topping up the damper liquid. For this reason the damper will be removed only when it has to be replaced. It is recommended to have the damper oil changed or any possible repairs done in a repair shop. To dismantle the damper remove first the rubber cover, unscrew the outer tube nut, pull the piston rod, valves and seal out of the working inner cylinder. The damper dismantled in this manner can be again filled with damper liquid. Remove the working cylinder and valve out of the outer cylinder. Now take the nut of the piston rod, pull the piston with the bottom and top valve, guide, sealing parts and nut with rubber stop off.

Having replaced any worn parts it is possible to reassemble the damper. To reassemble, reverse the procedure. Screw the protecting cap S-41 on the piston rod to avoid damaging the seal. Correct operation of the oil damper depends on the accuracy of assembling the bottom and top valve parts.

Model 502 – Dismantling The Rear And Front Suspension Units

The 502 model employs substantially the same front and rear suspension units. Different is the fixing of the front suspension unit.

To dismantle proceed as follows: first compress the bottom cover and remove the trip. This will free the bottom cover which can now be removed together with two rings, the spring and the top cover. After unscrewing the nut of the outer cylinder, pull the piston with piston rod, the valves and seal out of the working cylinder. The suspension damper dismantled in this manner can be refilled with damper liquid. To dismantle the unit further employ the same method as described for the damper employed on the 501 model. To reassemble reverse the procedure.

Chain Case Removal

This applies to model 502 if the rear chain is to be serviced or replaced. After removing the rubber strap, unscrew the screw and separate the chain case halves. After disconnecting and removing the chain, it is possible to remove the chain case

towards the rear of the machine. To replace proceed in reverse manner.

To Dismantle The Pivoted Rear Arm

In this respect the two models differ. Model 501 will be described first. For the 501 model, the pivoted rear arm can be dismantled only when the power unit has been taken out of the bodywork. First remove the rear wheel /see the corresponding paragraph/ and then remove the chain. After unscrewing the bolt connecting the bracket with the rear support the arm can be pulled towards the rear out of the crankcase extension. Now remove three bolts and the nuts fastening the rear suspension block. After unscrewing the seven bolts connecting the two arm halves, separate the halves. Pull the arm pivot out of the L.H. half, remove the chain adjuster with spring and pin. Use drift S-22 to drive out the arm bushes. To reassemble proceed in reverse manner; it is of advantage to fit the chain to the gearbox sprocket before connecting the two arm halves.

Model 502 – Dismantling The Pivoted Rear Fork

To dismantle the pivoted rear fork of the 502 model, proceed as follows: remove the rear wheel first, take off the chain case and chain. Now remove the dog clutch with chain wheel Fig.27. Do not omit to free the rear suspension units by unscrewing two bolts. After unscrewing the two pivoted rear fork bolts and removing them together with the washer, free the fork pivot which has now to be pushed out to the right. Before removing the rear fork pivot slacken the

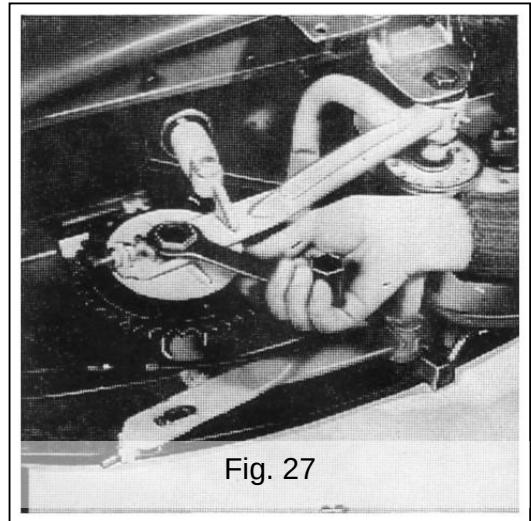


Fig. 27

engine front plate bolts and support the engine. When removing the fork, remove at the same time the washers and seals. Take the spacer bush out of the fork. The fork bushes must only be replaced in a workshop. The bushes have to be driven out under a press with a suitable diameter bar. New bushes have to be now pressed in and the cups fitted to the bushes before pressing in. After pressing the bushes in it is necessary to ream them to $\varnothing 27$ H8 the alignment of the two bushes having to be kept within tolerance of ± 0.1 . To reassemble, proceed in reverse manner. Do not omit to retighten the engine plate bolts.

Dismantling The Headlamp - Both Models

First slacken the screw and remove the headlamp assembly. Compressing the cap and rotating it clockwise take the cap off and together with it the bulb holder with the bulb. To replace the headlamp glass, proceed as follows: Remove the cotter pin and turn out the screw with rubber wash. After compressing the spring located in the headlamp rim remove the reflector. Bend the lugs with the screwdriver and remove the glass and seal. To assemble the headlamp, proceed in reverse manner.

To Dismantle The Fuel Tank

Disconnect the fuel line first. In model 501, remove the cotter pin thus disconnecting the extension, In model 502, by removing the cotter pin, the fuel tap control will be disconnected. Now remove and disconnect the headlamp. After unscrewing the screws and removing the washers, take the luggage carrier off. Slacken the nuts, remove the bolts and take off the decorative moulding with ring. After driving out the pin, remove the fuel tank cap. Now slacken four nuts and remove the fuel tank with seal. To reassemble proceed in reverse manner.

Luggage Compartment Removal

This has to be done when dismantling the cylinder, the procedure being the same for both models. Free the batteries first and remove them. For the 501 model, the voltage regulator has to be disconnected as well. After slackening the six nuts Fig.28 and removing the washers, take off the luggage compartment with the seat. The seat hinge is then fastened by means of two nuts. The decorative mouldings fastened to the luggage compartment have to be removed after unscrewing the screws. To remove the handle, unscrew the two securing bolts. Reverse the procedure for assembly

Removing The Bodywork And Its Accessories

First carry out the removal of the front wheel, front fork, handle bars, fuel tank, the power unit with the rear wheel and the luggage compartment, then proceed to remove the bodywork accessories. First take the instrument box door off. In model 501 the cotter pins have to be taken out first whereby the door with the switch box will be freed. Having removed the cotter pins take the spring and the finger off and the button out.

In model 502 remove the cotter pin thereby freeing the bodywork door. Removal of the pin will free the lock and this can now be taken out. The bodywork door will be freed after the cotter pin has been removed. To dismantle the catches in model 501, proceed in the same manner as for the instrument box door. In model 502, having taken out the cotter pin, remove the washer and screw. To assemble proceed in reverse manner.

Remove the bumper after unscrewing the three bolts. The model 501 decorative mouldings are fastened by screws. In model 502, slacken the nuts inside the bodywork and remove the mouldings. After that remove the rubber footboards which are pressed into the bodywork.

To Dismantle The Choke Device

After freeing the choke valve control cable, slacken the nut and remove together with the nut the washer and the cable. Now take the choke control out of the bodywork. To reassemble, proceed in reverse manner.

Dismantling The Fuel Tap Control

Model 501 - after removing the cotter pin, take the taper extension off. Model 502 - remove the cotter pin first, then hold the extension with one spanner and slacken the lock nut with another spanner. Screw the extension off together with the nut and after that, take the lever out of the bodywork. Reverse the procedure for reassembling.

When fitting the lever with extension to the fuel tap it is necessary to ensure the correct "reserve" position. For this reason the pin on the fuel tap is set to one side. If the pin directs downwards, the main fuel supply is open. It is in this position that the control lever with extensions has to be fitted to the fuel tap. Fit the extension to the fuel tap so that the pin is in the extension groove and secure the extension with the circlip on the side. Then set the correct lever position so that the lever is directed downwards and secure the extension with lever with the lock nut.

To Dismantle The Gear Change Pedal

Without using any tools, remove the gear change rod from the ball joints first. Slacken the nut and remove the ball joint, slacken the nut off the joint holding the joint with a spanner inside the bodywork, remove the nut with the washer. After

pushing out the joint, remove the gear change pedal. To reassemble, proceed in reverse manner.

To adjust the gear change pedal position, slacken the rod lock nuts and either screw the rod into or out of the socket.

Electrical Equipment

Dynamo

The DC 45 W 6 V dynamo serves as the source of the electric current. It supplies the current to the ignition circuit /terminal I A/ and into the lighting circuit /terminal 51/. The dynamo is six pole, shunt type fitted with an automatic voltage regulator and current switch. The dynamo stator is held by two bolts to the crankcase. It carries the contact breaker, condenser and base plate.

The rotor is fitted on the crankshaft and fastened by an M 6 bolt together with the cam which controls the contact breaker. It consists of six iron sheet discs insulated from each other. On the circumference, grooves are stamped into which field coils inserted and interconnected in a certain manner forming the rotor windings. Dynamo repairs require that the workshop be equipped with current and voltage measuring instruments. To repair and take measurements, proceed as follows:

The six stator field coils are series connected. In case of defect it is necessary to measure the series interconnection of the field coils and the resulting winding resistance of all the field coils. In case of lesser resistance the winding of one of the field coils is shorted on the stator frame; if there is no current coming through the winding or interconnection of the field coils has been cut, the field coils have to be disconnected and the faulty one replaced.

The dynamo rotor winding outlets are soldered to the commutator plates. Check the field coil outlet connection to the commutator and whether there is a short between the field coils and the frame. If the ampere meter registers more than 2 to 2.2 amps, it means that one of the coils is damaged. A worn commutator has to be lathe machined and the insulation between its plates removed with a suitable tool up to a depth of 0.5mm to the plate level. Sharp commutator edges have to be chamfered.

The carbon brushes have to have free movement in the guides and be pressed by the spring arms so that they sit correctly with their whole face on the rotor commutator. Carbon brushes shorter than 8mm have to be replaced. Newly fitted brushes have to be bedded in and this can be speeded up by grinding their faces with fine emery cloth wound on the dynamo rotor and then by rotating it. There should be minimal sparking between the carbon brushes and the commutator when the engine is running. Sparking signifies that the spring pressure is weak or that the commutator is eccentric.

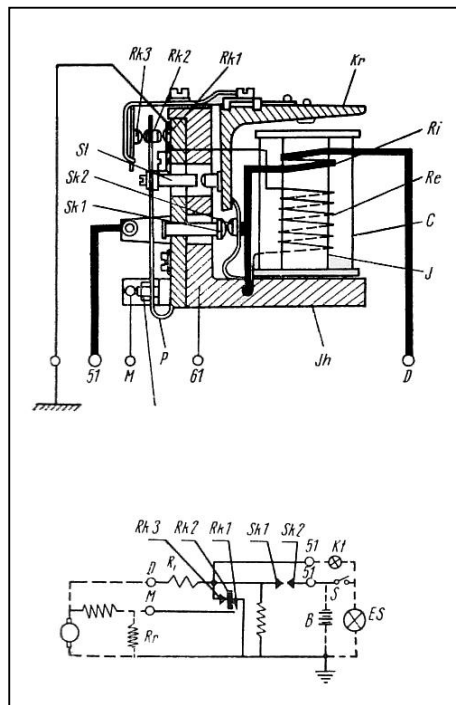


Fig. 28

PAL Voltage Regulator 6 V Fig. 28

The PAL 6 V regulator and the mechanical setting of the individual contact gaps is the same as that of the 12V dynastart regulator. The difference between the 6V and 12V regulators is in the voltage and current coil winding which is always adapted to the voltage. Always check the mechanical setting of the regulator according to the diagrammatic illustration where the individual regulator contacts are marked. In the table, the gap values between the individual regulator contacts will be found. /See Paragraph Dynastart – Mechanical check of the regulator with contactor.

Checking the charging by voltmeter connected to the dynamo terminal 61 and the machine frame with the fuse removed and the ignition key in position 5 / switch box with ampere meter or position 1 /car - type switchbox /. At approx. 1200 r.p.m. the regulator armature will connect - voltage $6.5 \pm 0.3V$. At 4500 to 5000 r.p.m. voltage $7.8 \pm 0.3V$. This value must never be exceeded! Any charging setting is to be done with the regulator nut #8.

Checking with the ampere meter connected instead of the fuse. Ignition key in position 1, approx. 1200 r.p.m., $6.5 \pm 0.3V$ value 5 amps. Ignition key position 3 /headlamp main beam/, 4500 to 5000 r.p.m. - $7 \pm 0.3V$ - 1 to 2 amps / values with fully charged battery/.

PAL Dynastarter

Details of design: the dynastart parts are similar to those in the 6V 45W dynamo. The rotor is provided with a winding, the outlets of which are soldered to the individual commutator plates. Inside the rotor there is a tapered opening for fitting on to the crank pin. On the outer side /at the commutator/ the opening is provided with a thread for the screwing on of the puller. The dynastart stator has four pole shoes each of which is provided with a double winding. The first winding is made of copper wire and serves as field winding when the engine is running, and for the operation of the dynastart as electric current source. The second current winding, made of copper strips, serves to excite the stator when operating as electric starter. The field coils of both kinds of windings are series connected, one end of both windings being connected to the frame, the second end of each winding being connected separately to a terminal. The winding for starting to the terminal marked S /starter/, the winding for stator exciting with the engine running to the terminal marked D /dynamo/.

Both the size and the windings of the dynastart / rotor as well as stator are well dimensioned and ensure reliable operation.

On the dynastart stator are located four holders for the carbon brushes, two of which operate the dynamo and the other two operate the starter. The terminals of two of the carbon brushes connect to the stator frame. The base plate with contact breaker and condenser on the stator face serves as ignition circuit contact breaker.

PAL 12V Regulator With Contactor - Fig. 29

The regulator with contactor is on a common plate and is protected by a cover. The regulator itself is mechanically identical to the PAL 6V regulator employed on motorcycles and scooters equipped with the 6V 45W Jawa dynamo. The difference is that both the voltage and current coil winding is adapted to 12V volts as well as the higher output required to operate the dynastart. Another difference is that the regulator leads are connected to the terminal base. The contactor, which switches the current onto the starter, is located on the same plate as the regulator. The primary current /switch/ circuit leads the current from the switch box with the – START - position to terminal 50 and then via the switch coil to the frame. The iron core has above it the toggle lever shaped armature, the bottom end of the toggle lever functioning as the contactor contact and with the armature attracted to the core, connects the electric starter current circuit.

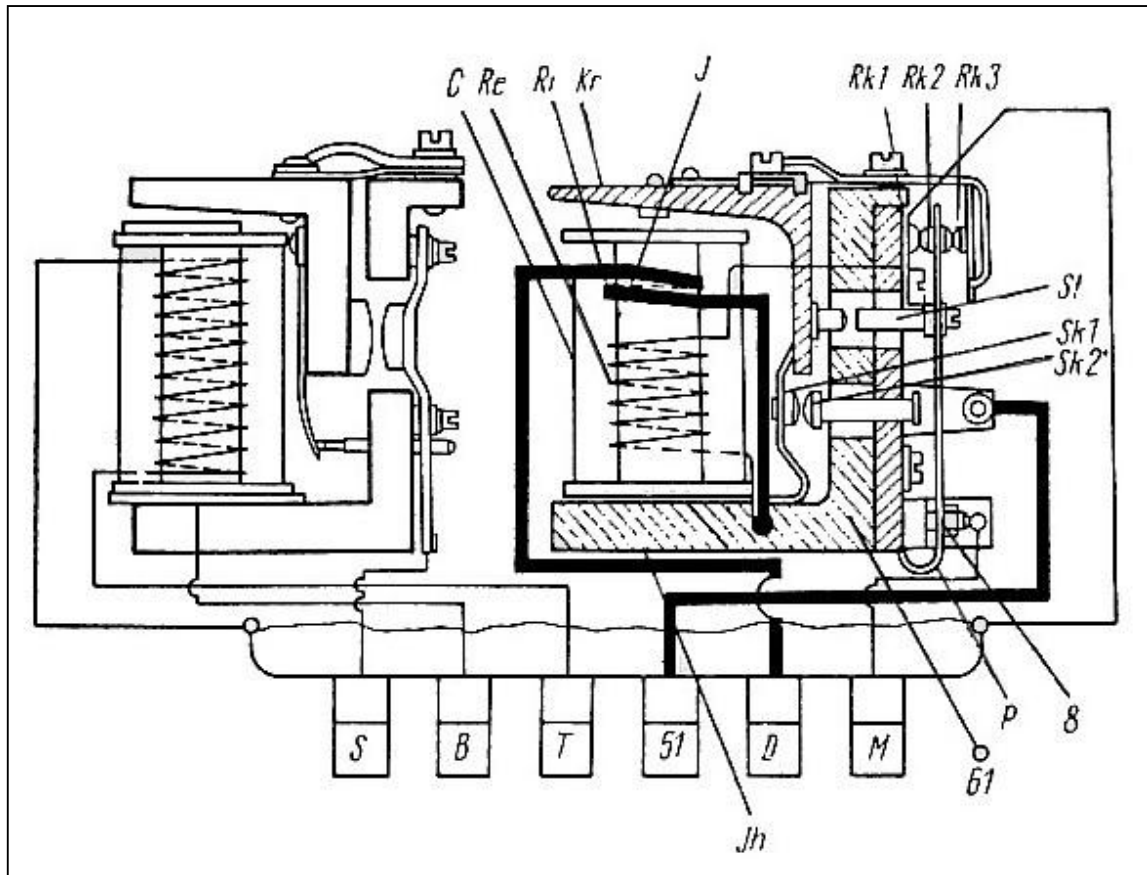


Fig. 29

Operation Of The Dynastart With The Regulator And Contactor

Starter

With the ignition key in starting position the current flows from the two six Volt 5 M S 12 starting batteries via the connected contacts in the switch box into the winding in the contactor, magnetising the contactor iron core and attracting the armature. Thereby the contactor contacts are connected and the electric starter current circuit proper is closed; through this flows electric current from the batteries into the stator starting winding, from there to one collector into the rotor winding and through the machine frame back to the terminal of the battery. In this way the dynastart is connected as a series DC motor with a powerful engagement torque at rest. The stator and rotor windings are series connected. The rotation of the armature is transmitted to the engine crankshaft assembly direct. The ignition is switched on and the engine will start firing. After the engine has started, the ignition key has to be released which will make it return to position 1 and disconnect the starting circuit.

Dynamo

With the engine running and the starting circuit disconnected, the starter field winding is without current and the dynastart operates as a dynamo with voltage regulator. The operation is similar to that of the 6V 45W dynamo with PAL regulator. The remaining magnetism in the pole shoes excites current in the rotating rotor, the voltage of which grows in proportion to its speed. When the prescribed value has been attained, the regulator armature is attracted to the core of the voltage and current coil, the return switch contacts SK 1 and SK 2 will be connected, and the dynamo will begin to supply current to the accessories. With the speed increasing further and the voltage increasing, contacts RK 1 and RK 2 will become disconnected due to stronger attraction of the regulator armature to the coil whereby the field winding current circuit will be closed via the resistance R of 10 Ohm value, the dynamo excitation will drop and the current again decrease to the prescribed value. At maximum engine r.p.m. the regulator armature is alternately completely attracted to the coil whereby contacts RK 2 and RK 3 are connected and the stator winding is without current or is again disconnected and the winding is excited via the resistance. The voltage fluctuates about the maximum value due to the oscillating movement of the armature.

PAL 02-9421.04 Regulator With Contactor – Technical Data And Setting

1. Nominal output	100W
2. Nominal voltage	12V
3. Regulation at nominal output	12.5 to 13.7V
4. Regulation without load	16.5V
5. Connecting voltage	11 to 13.4V
6. Maximum return current /disconnected/	8 amps
7. Regulator operational voltage	13.5V
8. Highest admissible load	7.5 amps
9. Short time /maximum 1/2 hour/ admissible overload	11 amps
10. Mechanical setting values	same as regulator
11. Contactor contacts – starter circuit connecting voltage	from 6 V
12. Contactor contacts nominal current	28 amps.
13. Maximum short circuit current on contactor contacts	120 amps.

Regulator With Contactor - Mechanical Checking

Mechanical checking of the regulator with contactor has to be carried out in case of faulty regulator operation. The regulator has to be checked for completeness of parts, the contacts cleaned, metal filings and dirt removed from the regulating system. Checking of the correct contact gaps should be carried out with the armature free, measuring the following:

- A. The distance of the armature top edge Kr from the coil core 2.4mm
- B. Gap between contacts SK 1 and SK 2 0.25 to 0.35mm
- C. Gap between contacts RK 2 and RK 3 0.18 to 0.25mm

With the armature attracted to the coil, measuring the following:

- A. Distance of the armature from the coil core 0.18 to 0.25mm
- B. Distance of the spring end at contact SK 1 from the armature 0.2mm (min.)
- C. Gap between contacts RK 1 and RK 2 0.4mm
(minimum)

If the fault is not in the winding of the voltage and current coil and the dynamo supplies current of correct values and there is no connection fault or fault in the resistance /10 Ohms/, it will as a rule, be possible to remedy the defect by mechanical checking and setting.

Operation Checking

Setting the prescribed values on the regulator should be carried out with the dynastart in operation both under load with the prescribed nominal current and with the dynamo operating without load.

To be checked:

- A. The voltage with the return switch contacts connected.
- B. The regulation of voltage at maximum r.p.m.
- C. Maximum return current before the contacts of the return switch become disconnected.

The values are indicated in the technical data. The manner of checking is the same as that of the regulator with 6V 45W dynamo.

On the contactor the contacts should be checked for connecting so that a 6V battery is connected between terminal "T" and the regulator frame. The contactor contacts have to contact at this voltage.

PAL 02-9490.60 Dynastart – Technical Data

Dynamo

Nominal voltage	12V
Operational voltage	13.5 V
Nominal output	up to 100W
Nominal current	up to 7.5 amps,
Operational voltage r.p.m.	1,700

Starter

Nominal voltage	12V
Operational voltage at engagement torque	9 V minimum
Engagement torque at $20 \pm 5^{\circ} \text{C}$	7.2 lb.ft.
$68 \pm 9^{\circ} \text{F}$	1 kgm
Nominal cranking speed	300 r.p.m.
Current at engagement torque	110amps. min
Maximum starter operating time	10 seconds
Maximum number of starts without cooling the starter - 5 at 10 sec. each with intervals of $\frac{1}{2}$ min. between starts	

Dynastart – Mechanical Checking

- A. Carbon brushes have to move freely in their holders and sit with at least $\frac{1}{3}$ their face on the rotor commutator
- B. Arms with springs have to press the carbon brushes on to the commutator.
- C. Rotor / commutator/ may not be out of true by more than 0.05 mm.
- D. The commutator has to be clean, free of carbon brush dust, the individual grooves between the commutator plates have to be 0.5mm deep and the plate edges have to be lightly rounded.
- E. All leads from the carbon brushes and from the windings have to be securely fastened.

Operation Checking

Check for correct operation with the dynastart running in connection with the regulator and resistance for values indicated above.

Lights

The headlight is equipped with a two filament bulb, the bulb in the model with a dynamo is 25/25 W, that in the dynastart model is 35/35 W. Headlamp beam adjustment is by tilting the reflector after slackening the screw on the top of the headlamp nacelle. Having adjusted, the headlamp beam it is necessary to retighten the screw. Both scooter models have a 5W tail lamp bulb and a 15W brake light bulb. The direction indicators are fitted with 10W bulbs.

Electric Horn

In the 501 model the horn is located on the bodywork front shield. It is fed from the battery located under the seat in the luggage compartment. It is connected with one lead to terminal 30 on the switch box, the second lead goes into the handlebars to the push button. Model 502 has the horn located under the bodywork on the RH side of the partition.

Leads

Automotive varnished leads of various sections corresponding to the current load serve to connect the accessories. The leads are contained in a harness fastened inside the bodywork by metal clips. The ends of the individual leads are marked with coloured or numbered tags. The tag numbers correspond with the numerical markings of the instrument outlets. Leads marked with colours have to be connected according to the electric wiring diagram. Some of the outlets are provided with eyes for fastening with screws, the others are tin plated.

The electric wiring diagram will be found in the Owner's Handbook supplied with every machine.

This Workshop Manual is an OCR copy of the original NZETA Workshop Manual as supplied to dealers throughout New Zealand. It is an English translation of the CEZETA Workshop Manual, and as such, some parts may not apply to NZETA models as supplied. Ian's Bike Museum has attempted to change some of the grammar to make the document more easily understood. If a photo-copy of the original manual is required, one can be obtained from:

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