ČEZETA Scooter Repair Manual

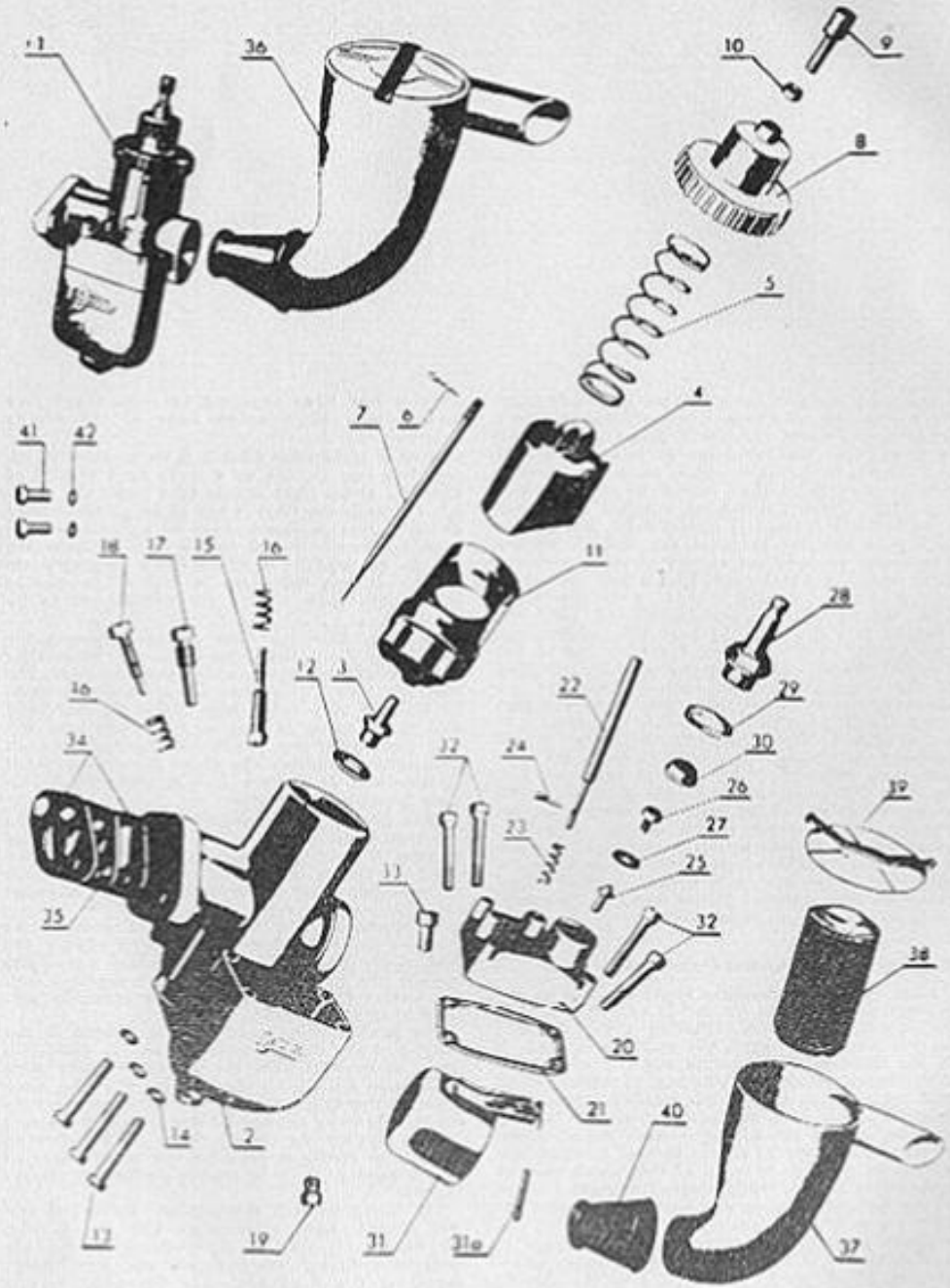


Fig. 1

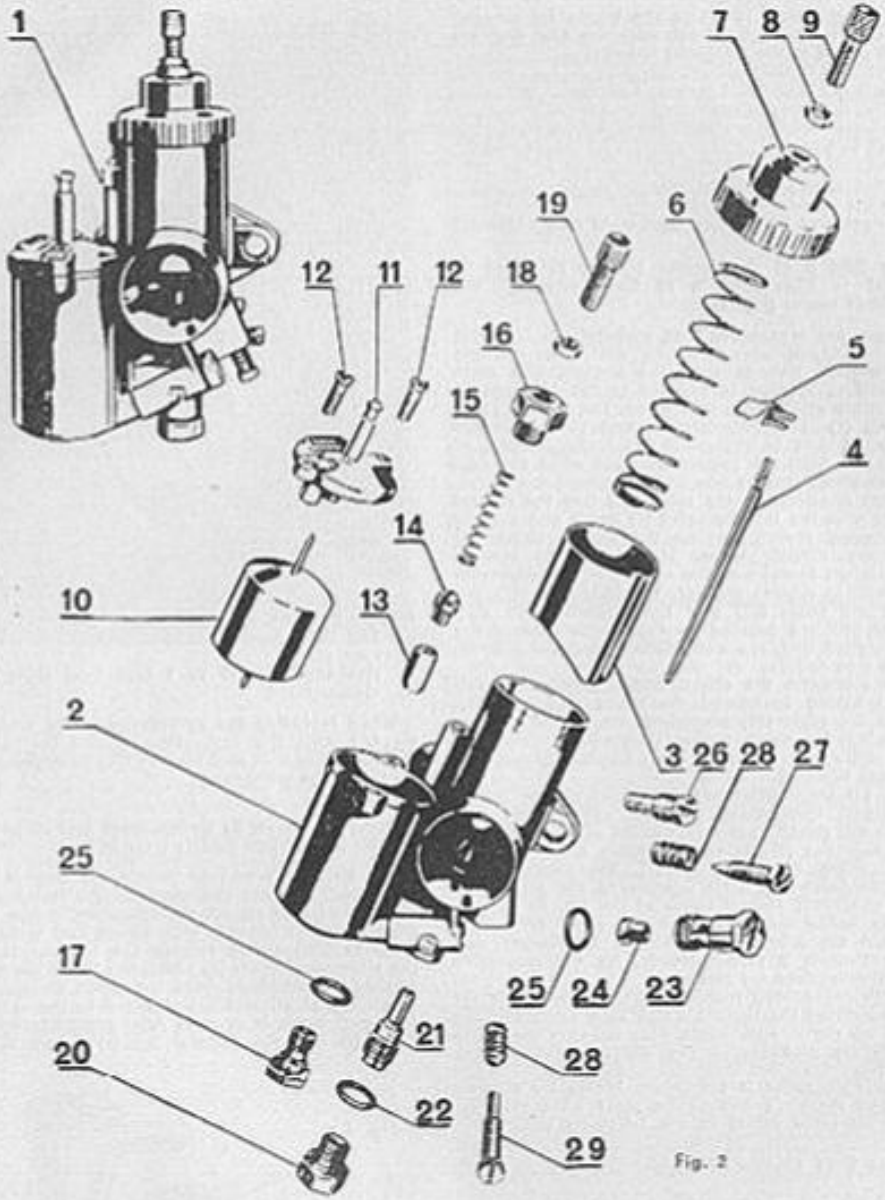


Fig. 2

loss of any of these four screws (32) it is necessary that the float chamber top (20) should be always fastened with two screws (32) on the sides of the spindle (31a). 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 carburetter according to the instructions 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) freeing thus the throttle valve (4). After removing the float chamber top (20), 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 tiding speed is set by means of the throttle valve stop screw (15). By unscrewing the cable guide (9) the throttle cable slack can be taken up and the cable guide (9) is then secured with the lock nut (10).

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

Main jet
100 to 102 to Solex
Idling jet
55 to Solex
Needle position
3rd notch from top
Pilot air screw
slackened by 3/4 turn from tight (anticlockwise)

Jikov 2924 S 11 Carburetter for the 501/03 to 05 model — Jikov 2924 S 13 Carburetter for the 502/00-01 model (Fig. 2)

These are monoblock type carburetters. They are also equipped with a choke device for making the mixture rich to start the engine. The main jet (24) is located in the jet carrier (23) and is accessible after being unscrewed. The throttle valve needle (4) is excentrically 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 removed first.

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 reverse manner. The idling jet (26), the pilot air screw (27) and the throttle valve stop screw (29) are located on the R. H. side of the carburetter 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) the cable will be freed (to assemble proceed in reverse manner).

To set the carburetter according to the manufacturers' instructions 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 (27) (clockwise) and then slacken it (anticlockwise) by the respective value prescribed for setting.

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 carburetter is set in the Works for running in and therefore has to be reset after the first 2000 km (1200 miles) to the following values:

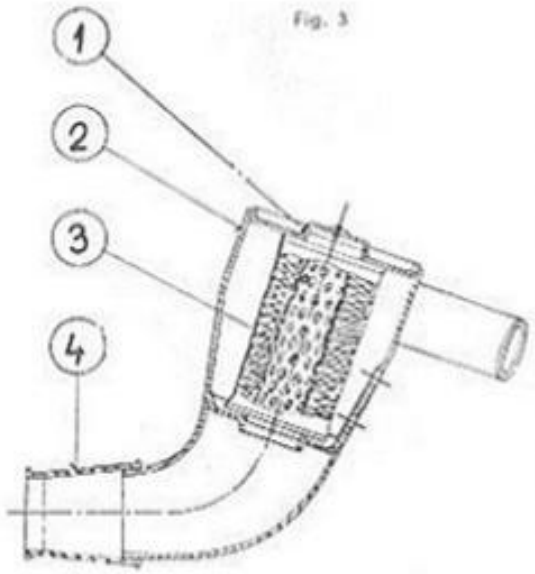
2924 S 11 Carburetter model 501/03-05

Main jet
110 to Solex
Idling jet
55 to Solex
Needle position
2nd notch from top
Pilot air screw
slackened by 3/4 turn from tight (anticlockwise)

2924 S 13 Carburetter model 502/00-01

Main jet
109 to Solex
Idling jet
40 to Solex

Fig. 3



Needle position
2nd notch from top
Pilot air screw
slackened by 1/2 to 1 turn from tight (anticlockwise)

When replacing the carburetter in the crankcase do not omit the carburetter gasket taking care not to damage it and tighten the carburetter uniformly to the crankcase.

Induction silencer, its 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 carburetter. For its correct operation it has to be maintained as follows: after about 3000 to 5000 km (2000 to 3000 miles) remove the silencer top (1), the silencer element (3) which has to be thoroughly washed in petrol. Moisten the clean element with a mixture of oil and petrol mixed to the rate of 1 to 1 and leave it to drip. After replacing the element (3) and the silencer top (1) secure the top

Fig. 4

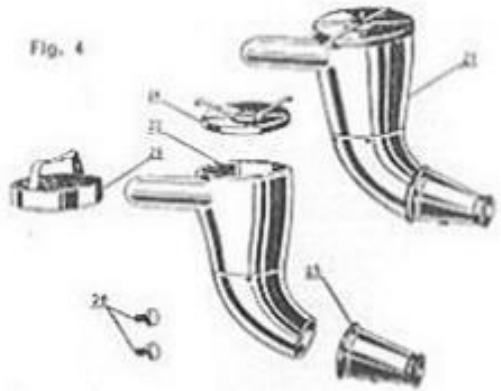


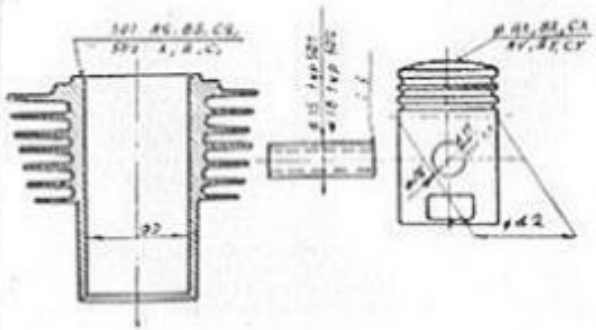
Fig. 5

against working free by fitting the clips to the silencer body (2) claws.

Care should be taken that the rubber sleeve (4) connecting the induction silencer with the carburetter should not become damaged and distorted as it prevents dirt to enter the engine. The rubber sleeve draining hole has to face always downwards.

The silencer top worked free will manifest itself by a roar when the engine is running. In such a case the element (3) may fall out as well which would result in the mixture becoming lean and the engine would lose its power at high r. p. m. and overheat. On the other hand with the element (3) excessively soiled the mixture will become too rich, the fuel consumption increase, engine running will be lumpy or the engine will four-stroke.

Fig. 7



The induction silencer is fitted to the bodywork with two screws inside the silencer body which are accessible after the removal of the silencer top (1) and the element (3). The induction silencer is accessible after the removal of the dual seat together with the luggage compartment (this job will be described in the next chapter dealing with the bodywork).

Induction silencer for the 502/00-01 model (Fig. 4)

22 silencer body
23 cleaner element
24 silencer top
25 neck
26 fastening screws

ENGINE

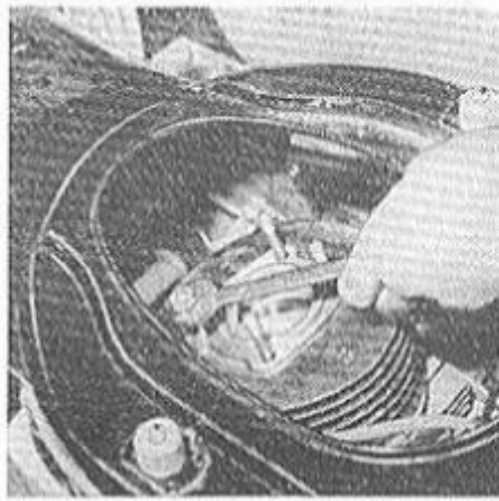
The following jobs can be carried out without removing the engine from the bodywork: removal of the cylinder barrel and cylinder head for replacement, regrinding or decoking, cleaning or replacement of the piston, replacement of the connecting rod small end bush, ignition advance setting, removal of the ignition and dynamo, replacement of the gearbox sprocket, the primary drive, both front and rear 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 (the job will be described in the bodywork chapter), dismantle the cooling fan (the job will be described in the next chapter). For the 501 model unscrew the two exhaust pipe nuts, for the 502 model unscrew the screw fastening the exhaust pipe and remove the pipes from the cylinder barrel.

With the box spanner 14 unscrew the four nuts fastening the cylinder head (Fig. 5) and remove the head through the top opening in the bodywork. To dismantle the cylinder barrel it is necessary first to unscrew the studs fastening the cylinder barrel to the crankcase. First screw two nuts onto the stud and tighten them to each other. After that unscrew them together with the stud by

Fig. 6



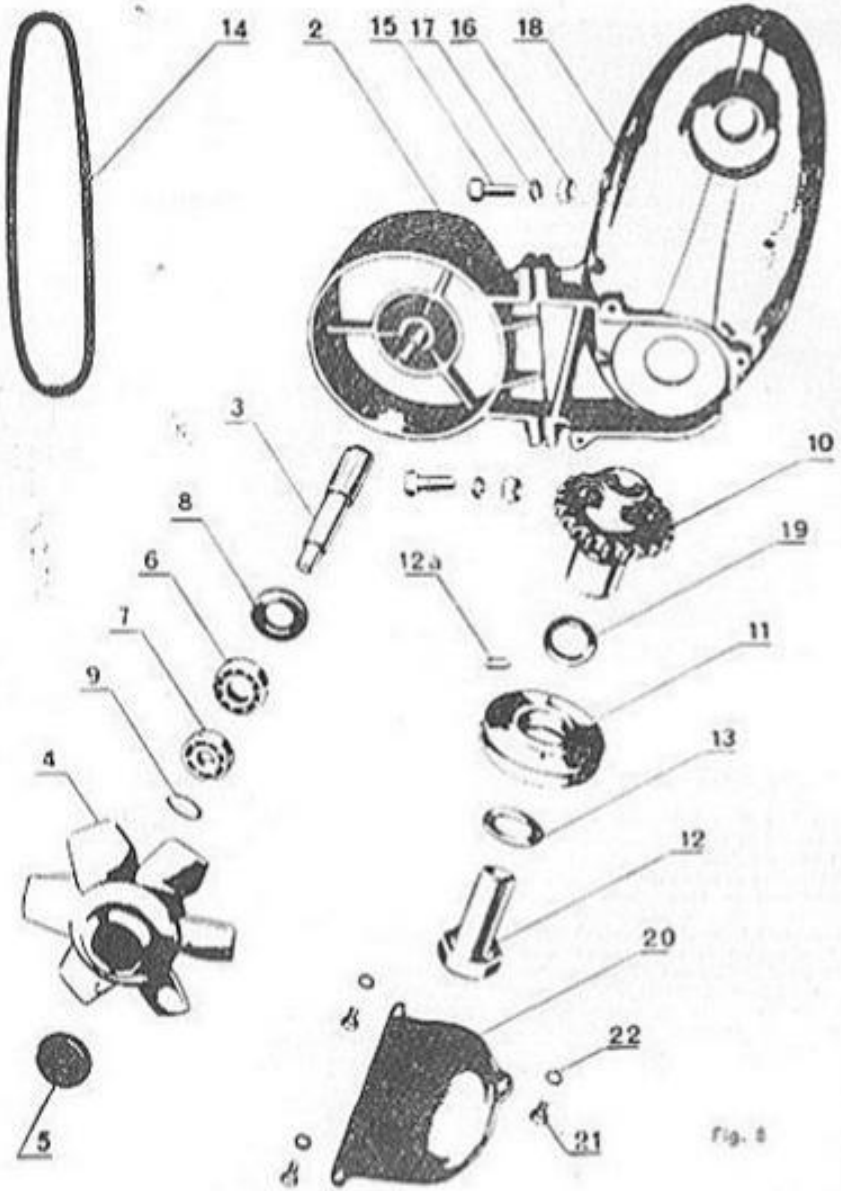


Fig. 8

turning the bottom nut. Fig. 6 applies to both models. In this manner remove all four studs.

To free the cylinder barrel lever it using screwdrivers after having first brought the piston into BDC with the kickstarter pedal. Having removed the cylinder barrel cover with a clean cloth the hole in the crankcase under the piston; 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 three 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 changed. For the original piston with the pressed in gudgeon pin (scooters 501/01-03 up to engine No. 132252) puller S 38 should be used for driving out the gudgeon pin, for the new piston with floating pin (model 501/05 and 502/00-01) use the locating pins S-13 and push out the gudgeon pin with light pressure by hand. When dismantling the piston remove first the two circlips securing the gudgeon pin; never drive out the gudgeon pin as there is danger of bending the connecting rod.

Piston

For the scooter model 501/01, 03, 05 new pistons part No. 356-12-241 should be employed only. Together with this piston setting of the 2924 M13 carburetter has to be modified as indicated. Pistons are marked on the top with letters according to their manufacturing dimensions determining their assembly 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, X) marks the dimension of the opening for the gudgeon pin.

Piston grading according to diameter D 2 — model 502 (Fig. 7)

	A-0,01	B-0,01	C-0,01	Drawing No.
Standard	57,860	57,870	57,880	450-12-026
1st rebore	58,110	58,120	58,130	450-12-027
2nd rebore	58,360	58,370	58,380	450-12-028
3rd rebore	58,610	58,620	58,630	450-12-029
4th rebore	58,860	58,870	58,880	450-12-030

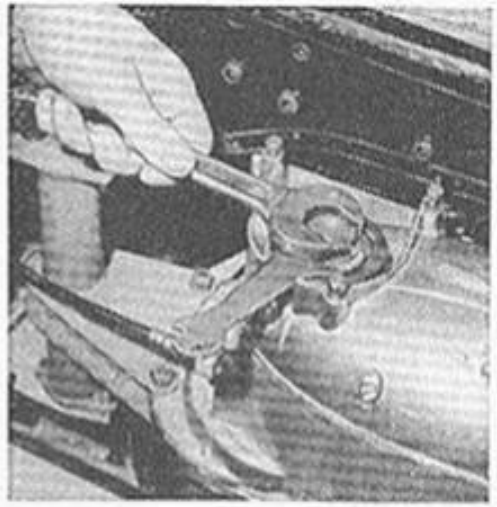


Fig. 10

Piston grading according to diameter D 2 — model 501 (Fig. 7)

	A-0,01	B-0,01	C-0,01	Drawing No.
Standard	57,875	57,885	57,895	356-12-241
1st rebore	58,125	58,135	58,145	356-12-242
2nd rebore	58,375	58,385	58,395	356-12-243
3rd rebore	58,625	58,635	58,645	356-12-244
4th rebore	58,875	58,885	58,895	356-12-245

Cylinder

For the scooter 501 model only cylinders with increased bore by 0,01 mm as compared to the motor cycle engines have to be employed. Cylinder bores for the individual grading are indicated in the table; the cylinder barrels are marked on the top flange besides the letter (A, B, C) determining the corresponding assembly with the piston also with the letters "S", (Fig. 7 shows the cylinder barrel, piston and gudgeon pin).

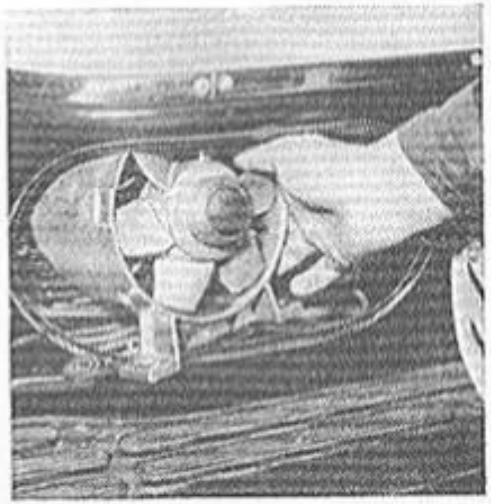


Fig. 9

Assembly table for the 501 (01, 03, 05) models

A-S	B-S	C-S	Drawing No.
58,01 ± 0,01	58,02 ± 0,01	58,03 ± 0,01	356-12-241
1st rebore 58,26 ± 0,01	58,27 ± 0,01	58,28 ± 0,01	356-12-242
2nd rebore 58,51 ± 0,01	58,52 ± 0,01	58,53 ± 0,01	356-12-243
3rd rebore 58,76 ± 0,01	58,77 ± 0,01	58,78 ± 0,01	356-12-244
4th rebore 59,01 ± 0,01	59,02 ± 0,01	59,03 ± 0,01	356-12-245

Assembly table for the 502/00-01 models

A	B	C	Drawing No.
58,01 ± 0,01	58,02 ± 0,01	58,03 ± 0,01	502-12-020
1st rebore 58,26 ± 0,01	58,27 ± 0,01	58,28 ± 0,01	502-12-021
2nd rebore 58,51 ± 0,01	58,52 ± 0,01	58,53 ± 0,01	502-12-022
3rd rebore 58,76 ± 0,01	58,77 ± 0,01	58,78 ± 0,01	502-12-023
4th rebore 59,01 ± 0,01	59,02 ± 0,01	59,03 ± 0,01	502-12-024

The cylinder barrel for the scooter model 502 is marked on the top flange only with letters indicating grading (A, B, C).

Gudgeon pin bush for model 501/01-03-05

Gudgeon pin bush diameter is 15,025 ± 0,01 mm for standard gudgeon pin grading I = dia 15,000 −0,0025 mm, grading II = dia 14,9975−0,0025 mm and 15,125 ± 0,01 mm for oversize gudgeon pin dia 15,1 −0,004 mm.

For model 502/01-00

Gudgeon pin bush dia is 18,025 ÷ 0,01 mm for standard gudgeon pin grading I — dia 18,000—0,0025 mm, grading II — dia 17,9975—0,0025 mm and 18,125÷0,01 for oversize gudgeon pin dia 18,1—0,004 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 up well the crankcase against bronze chips penetrating into the engine. Before fitting the bush heat the connecting rod small end with an open flame, for example with a soldering torch to about 80° C (176° F), whereby the opening will become bigger and the bush will be easily pressed in. To fit and remove the gudgeon pin employ puller S-34.

Fitting the piston

First slip the gudgeon pin into the piston from one side, pull the piston over the connecting rod and using guide pin S-13 push the gudgeon pin through the connecting rod small end and piston between the circlip grooves into which the circlips have to be inserted. Only then should the piston rings be fitted each into the groove in which it had been before dismantling.

Fitting the cylinder barrel and cylinder head

Clean the crankcase seating face and place a preferably new gasket under the cylinder barrel; provide the cylinder barrel with a coat of oil inside, move the piston into TDC by means of the kickstarter pedal and then fit the cylinder 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.

After that slip the cylinder barrel into the crankcase taking care not to damage the gasket and screw the studs into the crankcase. Place a preferably new gasket under the cylinder head and do not omit the washer under each nut; it is easy to slip the washers on the studs using a rod or screwdriver.

Cooling fan (Fig. 8)

The method of removal with the engine in the bodywork is for both models the same. After removing the Vee-belt (14) from the pulley, unscrew the nuts (16) from the connecting bolts (15) with the L. H. engine side cover, remove the bolts and take the fan body (2) off the engine through the bodywork side door (Fig. 9).

After that remove the rubber cover (5 — Fig. 8) off the rotor hub, free the circlip (9) and pull the fan rotor (4) together with the bearings (7, 6) off the fan body shaft (3) using the universal puller S-37 with extension S-43. Using a suitable bar (dia 14 mm) inserted from the side of the larger bearing and seat drive the bearing (7) out pressing onto the inner race. The bigger bearing (6) should then be driven out together with the seal (8) from the other side of the rotor (1) again with a suitable diameter bar. The fan body pin (3) should be removed only for replacement after part drilling of the deriveted end by driving or pressing out. The new pin after pressing into the body has to be secured against working free by deriveting the hollow end with a suitable tool with a 90° taper end. Care has to be taken not to damage the cylindrical part for the bearing when pressing in and that the pin should be located perpendicular to the fan body plane.

By unscrewing the screws (21) the top (20) will be freed and thereby access to the bottom pulley

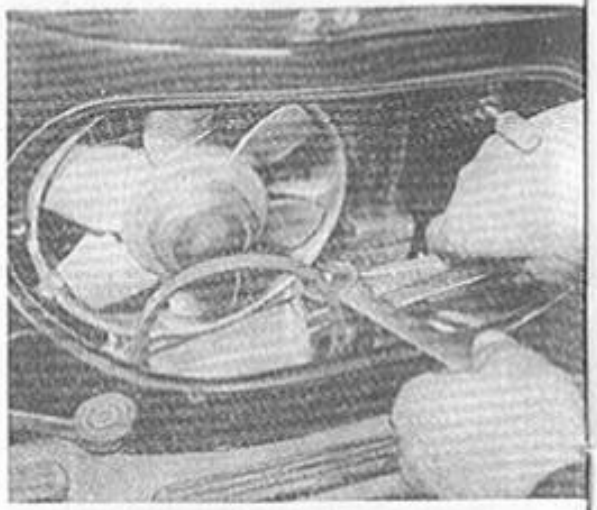


Fig. 11

obtained. After securing the pulley (11) with the special spanner S-50 against rotation unscrew the nut (12) with the box spanner and remove the pulley (11) with the washer (18), Fig. 10.

The fan requires very little maintenance. After approximately 10000 km (6000 miles) remove the fan rotor from the pin, clean away the remainders of the old grease from the space between the bearings and fill again with fresh motor car grease. It is necessary to check from time to time the Vee-belt for wear; if faulty the belt has to be replaced, if slack its tension has to be adjusted by means of inserts under the fan seating lugs. First slacken the fastening bolts (15) connecting the fan body with the crankcase, slackening the nuts only by a few threads (Fig. 11). Place the inserts between the seating faces of the fan body and the L. H. cover, each to one side so that the connecting bolts pass through the recess in the inserts. After that retighten the bolts. These inserts are supplied with each scooter with fan (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 caliper and the setting is more accurate. The ignition advance is prescribed by the makers as 3,5±0,3 mm before piston TDC and the procedure as described in the Owner's Handbook has to be followed.

Removal of the dynamo — is the same for both models

First slacken the R. H. side cover bolts and remove the cover. After disconnecting the electric leads from the dynamo terminal base slacken the two fastening screws (19 — Fig. 12). After pushing out the two carbon brushes remove the dynamo stator. Then slacken the cam bolt (1 — Fig. 12), tap the cam from the side lightly and remove it from the rotor with the screwdriver. Using puller S-47 pull the rotor off the pin. Into the cam bolt opening (1) screw the puller S-47 or a long M 8 screw. Hold the rotor with one hand and with the other turn the screw until the rotor slides off the pin. After that remove the rotor locating pin off the pin. To assemble proceed in reverse manner.

Removing the dynastart — is the same for both models

First slacken the R. H. side cover bolts and remove the cover. After disconnecting the electric leads from the dynastart terminal base slacken the four bolts and remove them together with the clamps. After pushing out the carbon brushes take the dynastart out of the crankcase. Slacken the cam bolt, tap the cam lightly and using the screwdriver remove the cam. Screw puller S-49 or a long M 10 screw into the bolt opening. Holding the rotor with one hand, turn the screw with the other until the rotor slides off the crankcase. To replace proceed in reverse manner.

To dismantle the clutch operating bracket

First remove the R. H. side cover. Free the clutch cable after that. Unscrew the three screws 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.

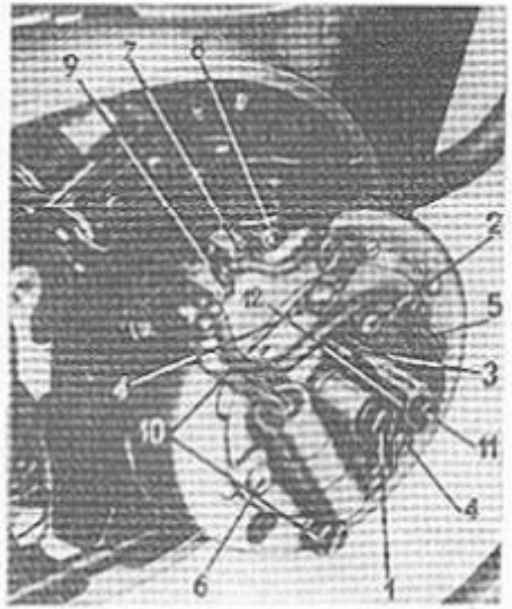
Removal of the gearbox sprocket — is the same for both models

After removing the R. H. side cover and the clutch operating bracket straighten the securing tongues of the washer under the sprocket nut; it is possible to use the straightener S-4 and the box spanner for slackening the nut. Disconnect the chain after that. Using puller S-24 pull off the sprocket. To fit proceed in reverse manner.

To dismantle the clutch and primary drive — both models

Unscrew first the draining plug on the crankcase bottom and drain the oil. To obtain easier

Fig. 12



access to the engine remove the batteries from the luggage compartment and lay the scooter on its R. H. side. Remove the gear change rod, the gear change pedal and the kickstarter pedal (on model 502 the extension). Now remove the cooling fan. Using a suitable screwdriver unscrew all the L. H. side cover bolts — Fig. 13. Free the cover using two screwdrivers and tapping the cover lightly with a wooden hammer. Remove one after the other the recessed pins on the clutch pins compressing the clutch spring either with the special tool S-9 or with the screwdriver (Fig. 14) or possibly with a flat spanner. Push the free pin out of the opening and remove the spring from the cam. Remove the clutch pressure plate and all the clutch plates (Fig. 15). With the straightener S-4 or a screwdriver straighten out the securing washer under the nut. Locate the securing tool S-10 between the engine sprocket and the clutch drum securing the clutch 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. 16) and the engine sprocket nut with the box spanner. The engine sprocket of the scooter with cooling fan will be freed already when the fan is being removed. After that take out the clutch hub, push out the clutch drum a little sliding it along the shaft and then remove the spacer 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 kickstarter quadrant

Remove the kickstarter 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 reverse manner. When refitting the quadrant on the gear change shaft insert first 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 R. H. side cover and the clutch operating bracket have been taken off. Using the punch S-44 drive out the cam securing pin (Fig. 17) and remove the cam. Take care of the shims between the crankcase and the cam. From the clutch side pull onto the gear change shaft the pawl securer S-51 (Fig. 17a) and push the shaft out to the left. To assemble proceed in reverse manner taking care of the pawls with spring which have to be secured again with the S-51 securer. The cam securing pin has always to be driven in from above.

To replace the sealing rings

When replacing the sealing rings on the crankshaft R. H. side it is necessary first to remove the dynamo or the dynastart as described in the paragraph dealing with the dynamo removal. After slackening three screws remove the seal top together with the ring. To remove the ring proper use a punch on the three openings in the top. After pressing in the sealing ring proceed with the assembly and if necessary replace the damaged seal under the top. To remove the sealing ring under the gearbox sprocket proceed as follows: after removing the gearbox sprocket and pulling off the spacer, remove the sealing ring using the spring puller; to refit press the sealing ring into the crankcase and insert the spacer.

To remove the engine from the frame

Disconnect the leads leading to the terminal base and to the ignition coils, remove the sparking 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 on the engine, the fuel pipe, the throttle cable and the choke cable, the exhaust silencer. In the case of the 501 model first unscrew the four front engine plate bolts, the two pivoted rear fork pivot bolts, remove the luggage compartment and slacken the two rear suspension block bolts. Now remove the power unit.

In case of the 502 model proceed as follows to remove the engine: 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 reverse manner. How to disconnect the pivoted rear fork is described in the chapter dealing with the cycle part.

To dismantle the gearbox and the crankshaft mechanism

To separate the crankcase halves, dismantle the gearbox and the crankshaft mechanism are very exacting jobs which should be done under the supervision of an experienced motor cyclist 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 the special tools employed.

The crankcase can be dismantled only after the engine has been removed from the bodywork. If repairs or replacement of parts are to be done in the R. H. crankcase half, the crankcase will be dismantled but the L. H. half left as it is.

Before dismantling the crankcase the R. H. engine side cover has already been removed and as described in the respective paragraph the dynamo or dynastart has now to be taken out. Remove on the L. H. side of the engine the gear change pedal, the kickstarter pedal (model 501), the extension (model 502). Unscrew the oil draining plug and drain the oil into a bowl. Remove the L. H. side cover, dismantle the clutch and primary drive as described in the respective paragraph. Slackening the screw remove the speedometer drive in the crankcase. Take out the carburettor with the gasket. Remove the clutch operating bracket, the clutch operating rod, pull off the gearbox sprocket (see removal of the gearbox sprocket) and the gear change operating cam. Further remove the cylinder head and the cylinder barrel with gasket. Slacken in the R. H. crankcase half all the clamping screws and expell the crankcase dowel bushes using drift 5-2. Pull the R. H. crankcase half off the crankshaft mechanism with the universal puller 5-37 (Fig. 18). If the driving gear with hub or the sealing ring are not to be replaced the gearbox sprocket need not be removed before separating the crankcase halves. Remove the gear change shaft, the selector fork guide rod and the gears with shafts. Slackening four screws remove from the L. H. crankcase half the cam plate. When refitting the cam plate take care of the stepped screw which is central. Now drive the crankshaft mechanism out of the L. H. crankcase half. To replace the bearings heat the crankcase to 80° C (176° F) preferably in an oil bath. When dismantling and reassembling the circlips securing all bearings must not be forgotten.

Dismantling the crankshaft mechanism

The crankshaft mechanism should be dismantled only in a specialist workshop equipped with a press of 3500 to 5000 kg (7700 to 11000 lbs) pressure, a measuring table with centres and indicator dials. The job should be entrusted to an experienced mechanic. When pulling 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 of the pins in which they were pressed together. Important is particularly the position of the crankshaft R. H. pin in which there is the opening for the rotor locating pin. Wrong pressing of this pin would affect the ignition advance. As stated above the crankshaft mechanism should be repaired by a service workshop of the make. If any parts, i. e. the connecting rod pin, the connecting rod or the 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, 501/01, 501/02, 501/03 and 501/04 complete crankshaft mechanisms of the CZ 356 and 450 motor cycle models can be used for replacement.

Checking method before pressing together the crankshaft mechanism 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. 19). 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. Excentricity 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 excentricity (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 0,05 mm width (Fig. 19a).

Connecting rod — rollers — crank pin (Fig. 19b) — crankshaft assembly 356 — Assembly table for the 501/01, 02, 05 model

Corresponding grading of the connecting rod and crank pin	Roller grading marked				
	A	C	D	E	F
Connecting rod	6	6	6	4	2
Crank pin	V	III	I	I	I
Connecting rod		5	5	3	2
Crank pin		IV	II	II	II
Connecting rod		4	4	2	
Crank pin		V	III	III	
Connecting rod			3	1	
Crank pin			IV	IV	
Connecting rod			2		
Crank pin			V		

Connecting rod for the 501 model - 356-12-230
502 model - 450-12-230

Roller — for the 501 and 502 model — 353-12-141

Crank pin — for the 501 model — 355-12-141
502 model — 450-12-141

Fig. 13

Fig. 14

Fig. 15

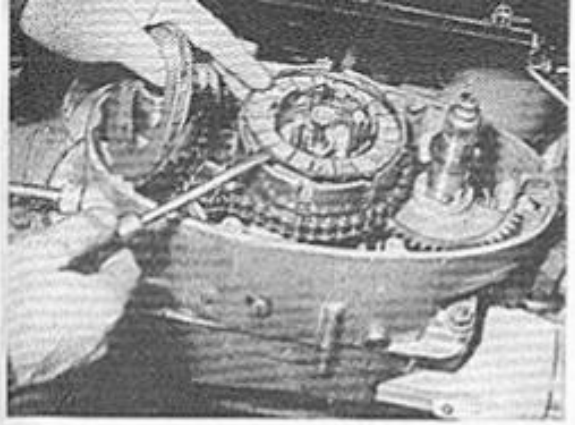


Fig. 16

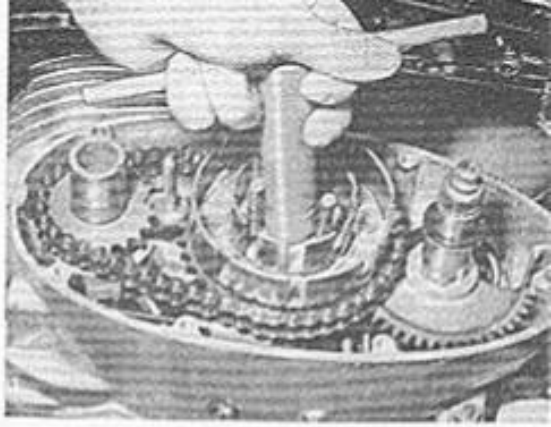


Fig. 17

Fig. 17a

Crankshaft assembly 450 (Fig. 19b) according to graded groups — 502 model

Corresponding grading crank pin — rollers	Grading of conecting rods 1	2	3	4	5	6	7	8	9	10
Crank pin	II	I	II	I	II	I	II	I	II	I
Rollers	E	E	D	D	C	C	B	B	A	A
Crank pin	IV	III	IV	III	IV	III	IV	III		
Rollers	D	D	C	C	B	B	A	A		
Crank pin		V		V		V				
Rollers		C		B		A				

Connecting rod Inner diameter		Rollers Outer diameter		Crank pin Outer diameter	
1	29,900 ± 0,002	A	4,006 — 0,002	I	21,900 — 0,001
2	29,902 ± 0,002	B	4,004 — 0,002	II	21,899 — 0,002
3	29,904 ± 0,002	C	4,002 — 0,002	III	21,897 — 0,002
4	29,906 ± 0,002	D	4,000 — 0,002	IV	21,895 — 0,002
5	29,908 ± 0,002	E	3,998 — 0,002	V	21,893 — 0,002
6	29,910 ± 0,002	F	3,996 — 0,002		
7	29,912 ± 0,002				
8	29,914 ± 0,002				
9	29,916 ± 0,002				
10	29,918 ± 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 crankcase 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 the lapping 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 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 or air bath approx. to 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 mechanism 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).
6. Screw the cam plate to the L. H. crankcase half (taking care of the centering screws).
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 layshaft bottom gear pinion into the crankcase and after that the layshaft second gear pinion with the selector fork; insert the selector fork into the cam plate. Fig. 22.
10. Fit the layshaft with the layshaft third and top gear pinions.
11. Insert the rod into the selector forks and tighten the orsesting 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 5-2 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 dynamo and dynastart, 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 CEZETA models looks alike and consists of the 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 chainwheel

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

Model 502 — Removal of the rear chainwheel

Before removing the rear chainwheel the rear wheel and chaincase have to be removed and the rear chain disconnected (the description of the procedure will be found below). Unscrewing the nut on the chainwheel spindle will free the chainwheel which can then be taken out of the fork. Drive out the chainwheel 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 chainwheel spindle.

Removing the rear 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 (releasing the spring clips) obtaining in this manner access to the rear chainwheel. Rotating the road wheel bring the chain connecting link to the chainwheel.

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 derivetor 5-6.

When replacing the serviced and shortened chain or fitting a new chain, connect it with the old chain left in the pivoted arm and removing this old chain pull the new chain through the pivoted arm and 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.

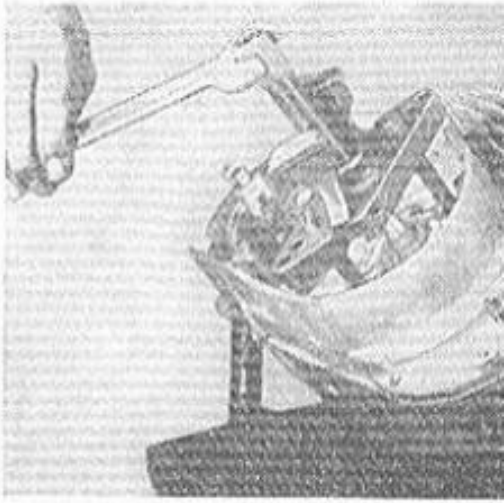


Fig. 18

Model 502 — Removing the rear chain

To replace the rear chain on the 502 model proceed as follows: first remove the R. H. engine side cover to obtain access to the gearbox sprocket. After removing the rubber strap and unscrewing the screw disengage the chaincase. Slackening the nut free the rear wheel spindle. Finally slacken

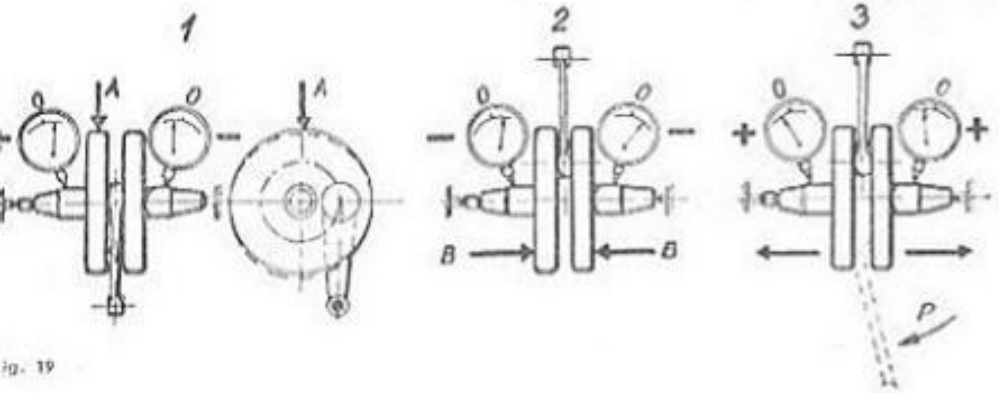


Fig. 19

Fig. 19b

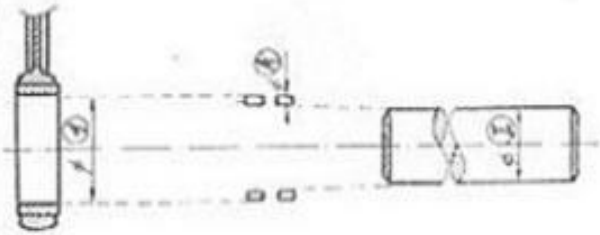
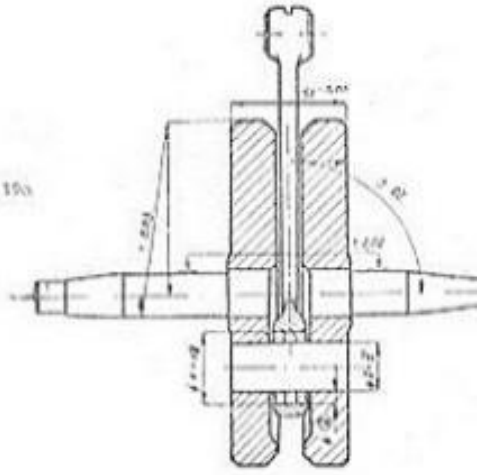


Fig. 19a



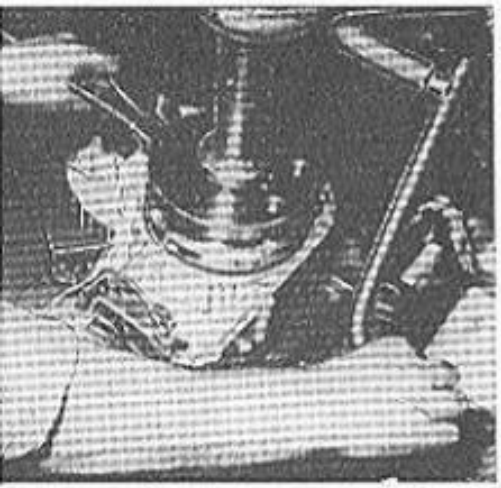


Fig. 20

he nut freeing in this manner the dog clutch with he chainwheel.

After that slacken the chain adjuster front nuts on the rear wheel spindle and then the rear adjusting nuts as well. Rotating the rear wheel bring the connecting link onto the chainwheel 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 chaincase connect an old chain which will be pulled into the chaincase while the disconnected chain is being removed.

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

Fig. 21

Chain maintenance

The most important servicing of the chain is its correct tension which should be adjusted after every 600 to 750 miles (1000 to 1200 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 1200 to 3000 miles (2000 to 5000 km). First wash the chain in paraffin. After drying place the chain for about three hours in a lightly heated graphited lubricant (tallow mixed with 10 % of colloidal graphite). The heated lubricating mixture will penetrate the links better. Now remove the chain, leave the lubricant to solidify and wipe the excess grease off with a cloth. Replace the chain and take care that the connecting ring clip should face with its open end 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 rocker. Take out the rocker pins and drive the bushes out of the pivoted arm using puller S-20. Drive out the rubber bushes under the press with drift S-18 (Fig. 25). Unscrewing the grub screws the rubber buffers will be freed. Now drive out the spacer bushes holding the oil damper in the fork and pivoted arm with drift S-18. To assemble proceed in reverse manner.

For model 502 carry out the removal as follows:

First unscrew the bolts fastening the suspension units, slacken the nuts and remove the washer. Now remove the suspension units. After unscrewing the nut and washer remove the fastening bolts thus freeing the pivoted arm (Fig. 26) and the

Fig. 22

mudguard. After unscrewing two more bolts the mudguard 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 the worn parts reassemble proceeding in reverse manner.

Model 501 — Removal of the suspension damper

This damper is 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 seat. 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

Fig. 23

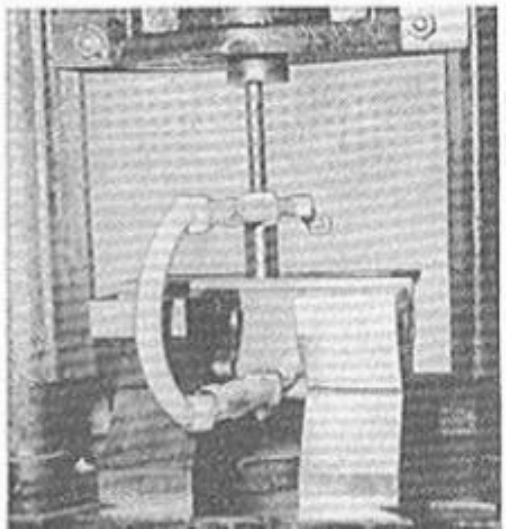


Fig. 25

Fig. 24

a thread for the screwing on of the puller. The dynastart stator has eight pole shoes each of which is provided with double winding. The first winding is 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 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).

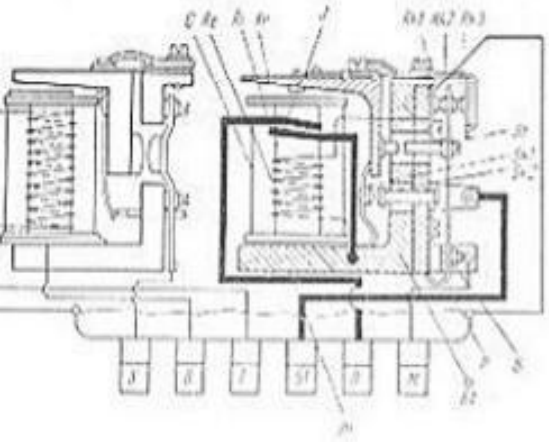
Both the size and the windings of the dynastart (rotor as well as stator) are well dimensioned and ensure reliable operation.

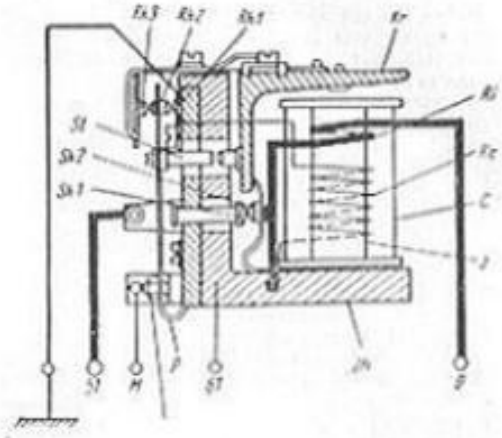
On the dynastart stator four holders with collectors — carbon brushes — are located, two of which serve for the dynamo operation and two for the starter operation. The outlets of two of the carbon brushes are connected to the stator frame. The base plate with contact breaker and condenser on the stator face serves as ignition circuit contact breaker.

PAL 12 V regulator with contactor — Fig. 30

The regulator with contactor is on a common plate and protected by a cover. The regulator itself is mechanically identical with the PAL 6 V regulator employed on motor cycles and scooters equipped with the 6 V 45 W Jawa dynamo. The difference is that both the voltage and current coils winding is adapted to the 12 V voltage as well as to the higher output of the dynastart. Another difference is that the regulator leads are connected to the terminal base. The contactor which serves for switching the current into 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 therefrom via the

Fig. 33





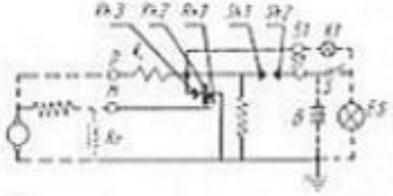


Fig. 29

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.

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 3 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 the 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 pole 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 mechanism 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 6 V 45 W 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 growing contacts RK 1 and RK 2 will become disconnected due to the tighter 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 excitement 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	100 W
2. Nominal voltage	12 V
3. Regulation at nominal output	12,5—13,7 V
4. Regulation without load	16,5 V
5. Connecting voltage	11 to 13,5 V
6. Maximum return current (disconnected)	8 amps.
7. Regulator operational voltage	13,5 V
8. Highest admissible load	7,5 V
9. Short time (maximum 1/2 hour) admissible overload	11 amps.
10. Mechanical setting values	same as re ator
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.

Fig. 26

Regulator with contactor — mechanical chec

Mechanical checking of the regulator with tactor has to be carried out in case of fa regulator operation. The regulator has to checked for completeness of parts, the cont cleaned, metal chips and dirt removed from regulating system. Checking of the correct tact gaps should be carried out with the arma free, measuring the following:

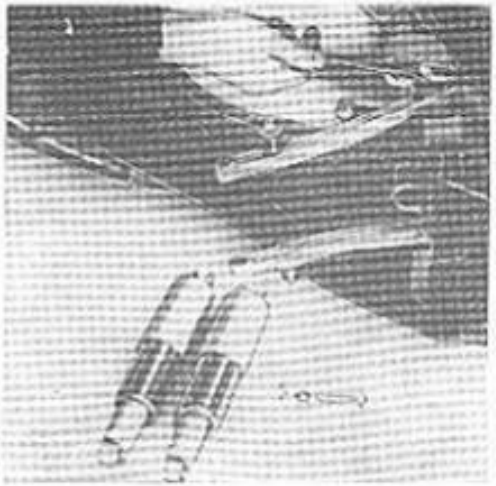
A) The distance of the armature top edge Kr from the coil core 2,4
B) Gap between contacts SK 1 and SK 2 0,25 to 0,35
C) Gap between contacts RK 2 and RK 3 0,18 to 0,25

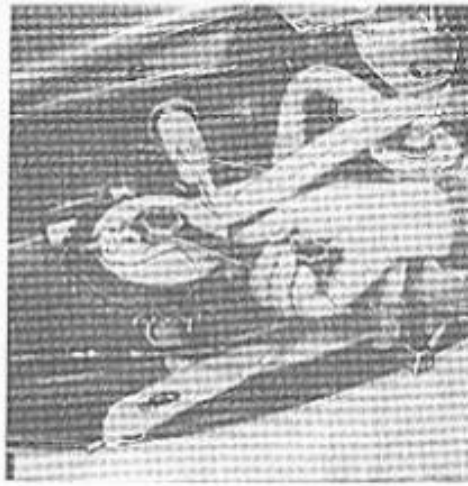
With the armature attracted to the coil, e suring the following:

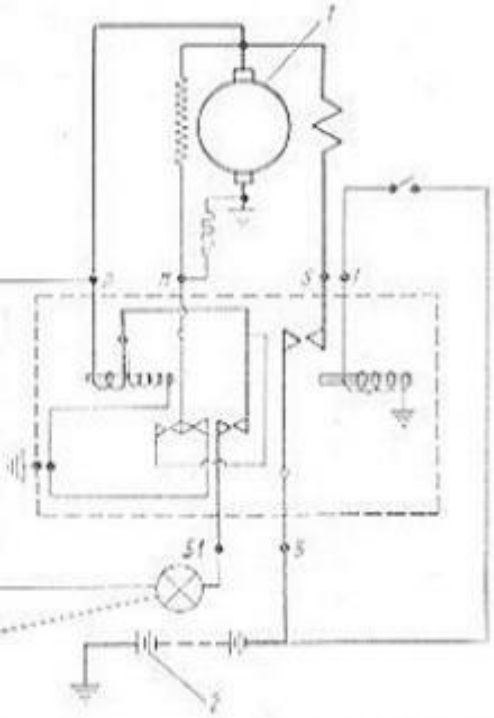
A) Distance of the armature from the coil core 0,18 to 0,25
B) Distance of the spring end of contact SK 1 from the armature min. 0,2
C) Gap between contacts RK 1 and RK 2 min. 0,4

If the fault is not in the winding of the volt and current coil the dynastart supplies current correct values, and there is no connection fault in the resistance (10 Ohms). It will as a rule

Fig. 27







Wiring diagram of the Cosa scooter fitted with electric starter: 1 - starter-generator, 2 - batteries, 3 - battery discharge warning light.

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 dynamo 6 V 45 W.

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

PAL 82-949-060 dynastart — technical data

a) **Dynamo**

Nominal voltage
12 V
Operational voltage
13,5 V
Nominal output
up to 100 W
Nominal current
up to 7,5 amps.
Operational voltage r. p. m.
1,700

b) **Starter**

Nominal voltage
12 V
Operational voltage at engagement torque
min. 9 V
Engagement torque at 20÷5° C (68 ÷ 9° F)
min. 7,2 lb. ft. (1 kgm)
Nominal r. p. m.
300
Current at engagement torque
min. 110 amps.
Starter switching max. time
10 secs.
Maximum number of starts without cooling the starter
5 at 10 secs. each, with intervals of 1/2 min. between starts

Dynastart — mechanical checking

a) Carbon brushes to move freely in holders and sit with at least 1/3 of their face on the rotor commutator.
b) Arms with springs have to press the carbon brushes to the commutator.
c) Rotor (commutator) may not be out of true by more than 0,05 mm.

Fig. 28

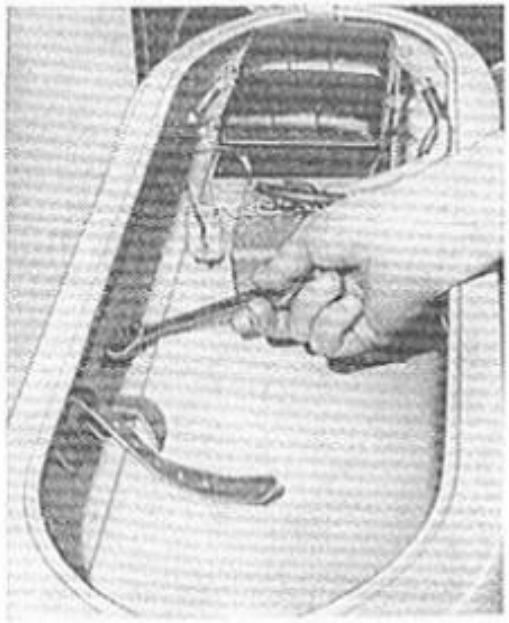


Fig. 29

d) The commutator has to be clean, free of carbon brush dust, the individual grooves between commutator plates have to be 0,5 mm deep and the plate edges at grooves lightly rounded.
e) All leads both from the carbon brushes and from the winding have to be properly fastened.

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

Lights. The headlamp is equipped with a two filament bulb, the bulb in the model with 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 5 W tail lamp bulb and a 15 W brake light bulb. The direction indicators are fitted with 10 W 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 R. H. side of the partition.

Leads. Motor car varnished leads of various sections corresponding to the current load serve to connect the accessories. The leads are disposed in a harness fastened inside the bodywork by metal clamps. The ends of the individual leads are marked with coloured or numbered tags. The tag numbers correspond with the numerical marking 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.