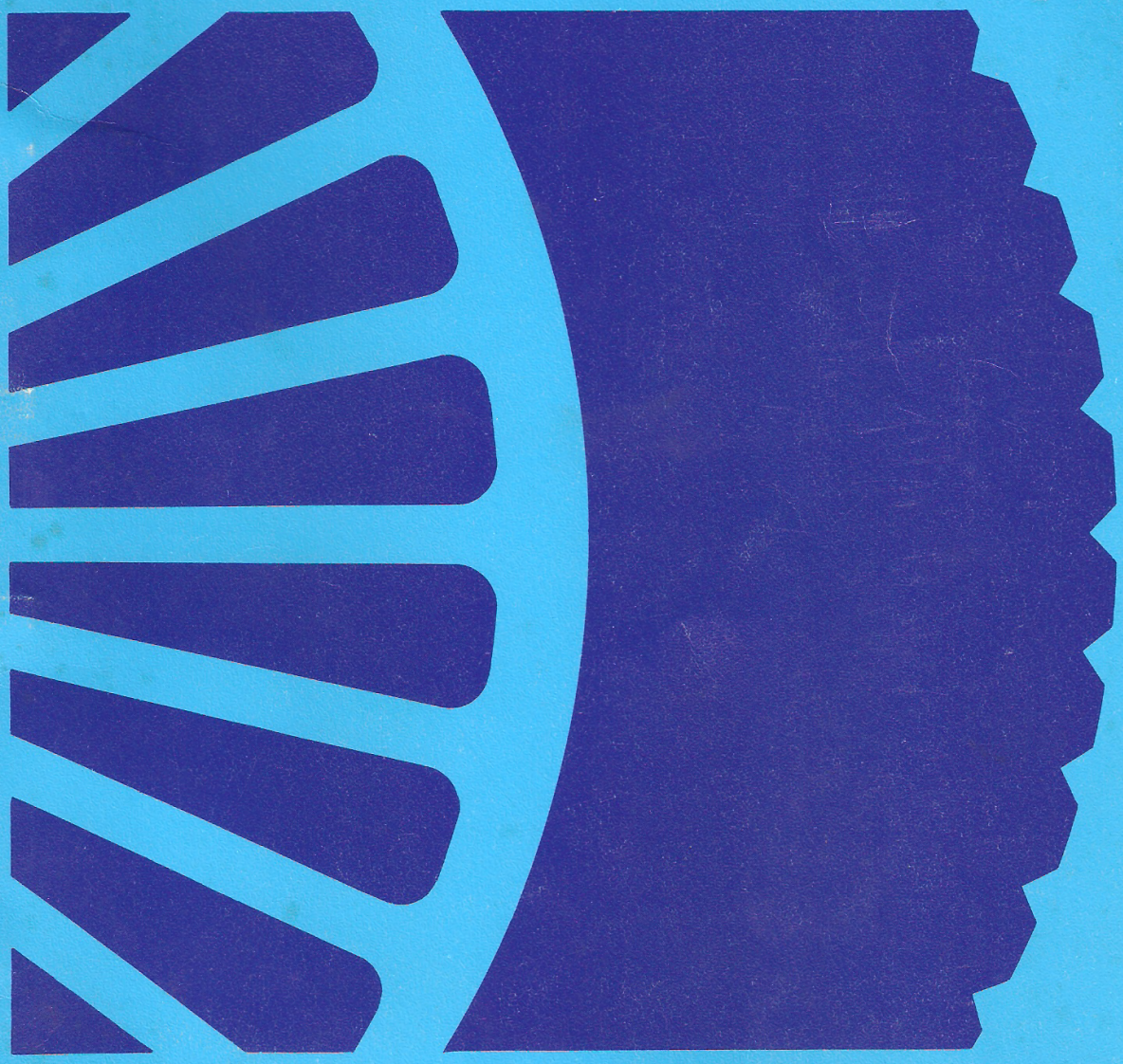
BATAVUS

WORKSHOP MANUAL

for

MOPED WITH LAURA ENGINE M56



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Index

Tools

For spec. tools see spare parts list!

Metrical tools needed:
Tube spanner 10 mm.
Tube spanner 13 mm.
Open ended spanner 8 x 9 Close ended spanner 8 x 9
Open ended spanner 10 x 11 Close ended spanner 10 x 11
Open ended spanner 12 x 13 Close ended spanner 12 x 13
Open ended spanner 14 x 15 Close ended spanner 14 x 15
Open ended spanner 16 x 17 Close ended spanner 16 x 17
Open ended spanner 18 x 19 Close ended spanner 18 x 19
Open ended spanner 32
Circlips plaiers

Technical data
ENGINE

Type of engine	Two stroke engine, reed valve controlled
Bore x stroke	40 x 38 mm.
Displacement	48 cc (2,9 cu. in)
Cylinder	Aluminum nikasil plated
Cylinderhead	Aluminum
Cylinderhead gasket	Aluminum
Cylinder base gasket	Spec. paper (Abil)
Crankcase gasket	Spec. paper (Guarnital)
Inlet gaskets	Klingerit
Piston	Special alloy and shape
Pistonrings	Cast iron, 2 rings
Wrist pin	Floating
Crankshaft	Build op type, ball bearing on each side
Bearings	Connectingrod: big-end: needle bearing little-end: bronze bushing Clutchhousing: needle bearing Driving shaft : ball bearing - needle bearing Lay-shaft : ball bearing - bronze bushing
Fuel	**Regular** gas and a good quality two stroke oil
Mixture	1 : 50 (2%)
Compression ratio	8 : 1 20-30 mph 9 : 1 30 mph
Carburettor	H 8 jet size 46 : 20 mph H 12 jet size 56 : 25-30 mph
Throttle valve nr.	H 8 - Nr. 22.135.2 H 12 - Nr. 22.135.3
Ignition	Bosch 6V 27/15 W
Sparkplug	Bosch W 175 T1 : Champion L85
Gear ratio	Engine 2.07 : 1 toothed belt 2.92 : 1 gear wheels Moped 13 : 39 chain wheels 20 mph 17 : 39 chain wheels 25-30 mph

Technical data
FRAME

Frame	Single tube frame with seperate fuel tank
Type	Regency M56 VA Regency M56 HS
Position of frame nr.	right side of steering head
Frontfork	telescopic type 5 cc grease Retinax A per forkleg
Rearfork	resilient with 2 shockabsorbers
Lighting	Headlamp 6V-21W Brake light 6V-10W Taillight 6V-5W
Electric horn	6V-24 W.A.C.
Tyres	front and rear 2 ¼ x 16''
Tyre pressure	front 28 lbs rear 34.lbs
Rims	front and rear 1.20 x 16''
Dry weight	appr. 107 lbs (48,5 kg)
Max. G.V.W.	appr. 350 lbs (160 kg)
Chains	drive transmission ½'' x 3/16'' start/pedal transmission 3/8'' x 5/32''

ENGINE

Removal of the engine

- remove the shields
- remove the housing cover at clutch-side
- attend to the dimensions of the capnuts:
  front 2 × M6 back 1 × M5
- remove the pedaling chain
- demount the starter leaf spring by loosening the adjusting nut A fig. 2 on the bottom side. Pull the startingcable out of its holding on the crankcase (upperside).
  Don't lose the spring fitted on the stud below
- Loosen the bolt B (fig. 2) of the exhaust tube clamp and also demount the exhaust silencer clamp to the rear. Remove the exhaust tube from the cylinder by turning it to and fro and, at the same time pulling it off from the cylinder.
- demount the intake silencer
- Close the fuel cock and pull off the fuel line from the carburettor.
- Loosen the screw of the carburettor cover and pull the throttle valve and choke piston rectilinearly out of the carburettor housing.
- remove the housing cover at magneto side. fig. 1

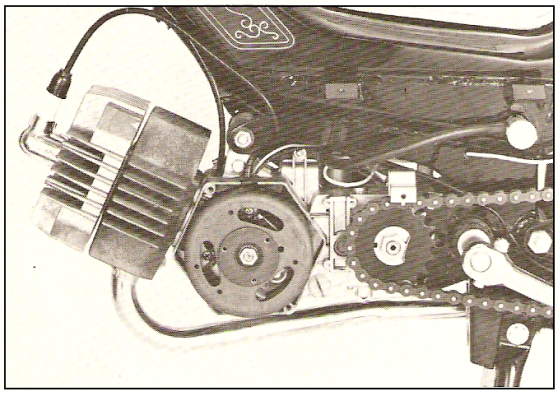

fig. 1

- attend to the dimensions of the fixing screws:
  front 2 × M4 rear 1 × M5
- Disconnect the elektrical wires
- Remove the driving chain
- Loosen and remove both engine fixing bolts at the back and also the bolt in the front
  Thereafter the engine can be removed out of the frame brackets.
- Watch over the intake silencer bracket fitted together with the engine fixing bolts.
  The engine only has to be removed in case of replacement of one of the shafts or bearings. All further proceedings can take place whilst the engine is attached to the frame.

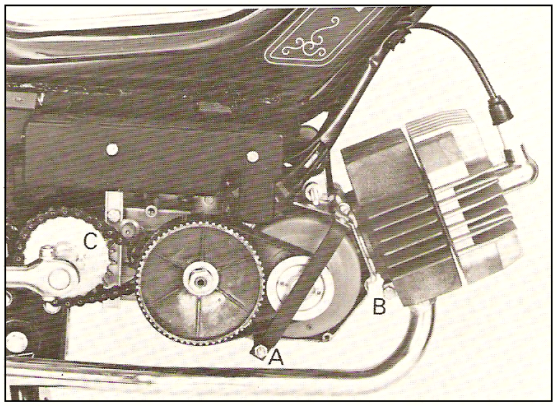

fig. 2

Dismantling of cylinderhead and cylinder

Pull off the sparkplug cover and remove the sparkplug. Remove the 4 nuts of the cylinderstuds by means of a 10 mm. tube spanner. Take care that the plain washers and the spring washers do not get lost when taking off the cylinderhead.
Remove the cylinderhead gasket and carefully take off the cylinder and cylinder base gasket.
Put a not fluffy rag around the connecting rod to prevent dirt from getting into the housing.

Cylinder and cylinderhead assembling

Before assembling the cylinder and cylinderhead the joint surfaces have to be cleaned well and carefully. (don't scratch!)
Decarbonize cilinderhead, piston and cylinder exhaust-port. Always use a new cylinder base gasket and, if damaged, also a new cylinderhead gasket.
Do never use any seal!

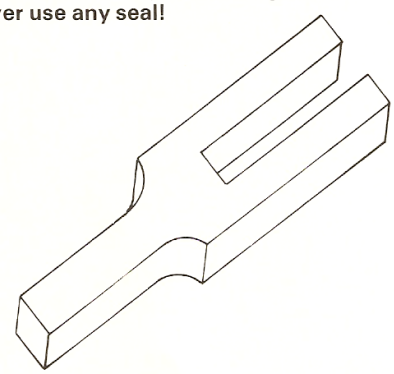

fig. 3

To facilitate the assembling of the cylinder a self-made wooden fork tool can be put below the piston. See fig. 3.
Provide the cylinderbore with some oil. Look to it, that the piston rings are located precisely in the ring grooves and the ring gap around the locating pin.
Pinch the rings together by hand and move the cylinder along the piston on the crankcase. Remove the fork tool in time.
Press the cylinder by hand on the crankcase and turn the magneto flywheel to and fro to determine wether the piston moves easily or not.
Replace cylinderhead gasket and assemble cylinderhead together with plain washers and spring washers. Tighten the nuts crosswise with 0,9 mkg.
Fit the sparkplug and sparkplugcover.

Dismantling of the piston

Remove the pistonrings and take care, when reassembling, that the rings are put into the previous grooves.
By means of a pair of pliers with flat bits both circlips can be removed out of the piston wrist pin bore. Thereafter the wrist pin can be pressed out of his location. Sometimes one needs a special wrist-pin press.

Piston assembling

Before assembling first check the gap of the piston rings by placing the rings into the cylinder-bore. The gap may be 0,7 mm. max. The gap can be measured by means of a feeler gauge. When the gap is too large repeat the same procedure with new piston rings. If the gap is still too large, the cylinder bore has been worn out too much, which means that the cylinder has to be replaced.
Before assembling the rings the piston ring-grooves have to be cleanded well and carefully.

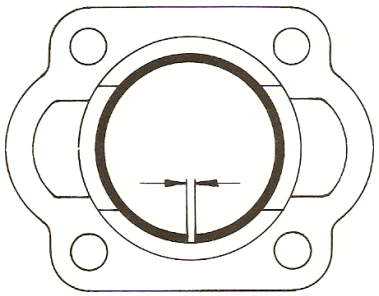

fig. 4

Before fitting the piston, provide the wristpin bore of the connecting rod with some oil and place one of both circlips into the wristpin bore of the piston.
Push the wristpin into the opposite bore in such a way that the pin protrudes of the inside of the piston for about 3 mm.
Fit the piston on the connecting rod now, the protruding part of the pin into the little end bush. Be sure that the arrow on the piston bottom points to the exhaust port.
Thereafter press the pin into its right location and fit the second circlip and the piston rings. (remember the grooves)

Dismantling clutch and toothbelt wheel

Remove the starter leaf spring as described on page 2 and the thrust saucer from the clutch housing by means of a cross head screw driver.
Do not damage the rim of the saucer!
Remove the circlip from the crankshaft.
Loosen and remove the nut on the driving shaft with a 17 mm. closed ended spanner while blocking the shaft with a 13 mm. open ended spanner.
See flat sides on shaft. fig. 5.

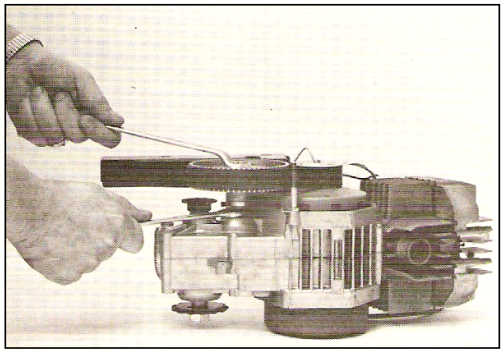

fig. 5

To make certain the tooth belt will not get damaged, the clutch drum, the wheel and the tooth belt have to be pulled off from their shafts together.
Never slide the tooth belt along the (sharp) sides of both wheels.
Thereafter block the clutch with spec. tool nr. 565005 and loosen only 3 bolts, under 120°, with a 8 mm. spanner, see fig. 6.

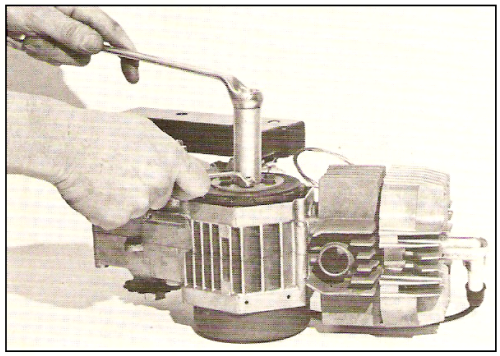

fig. 6

Now block the clutch with spec. tool nr. 565001 and loosen the disk nut from the crankshaft see fig. 7.

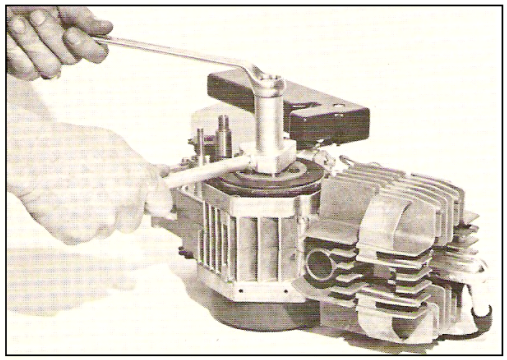

fig. 7

Fit spec. tool nr. 565002 with the 3 bolts on the clutch. Thereafter the clutch can be pulled off from the crankshaft as shown in fig. 8.
If any of the cluthc parts has to be replaced the left 3 bolts have to be loosened.

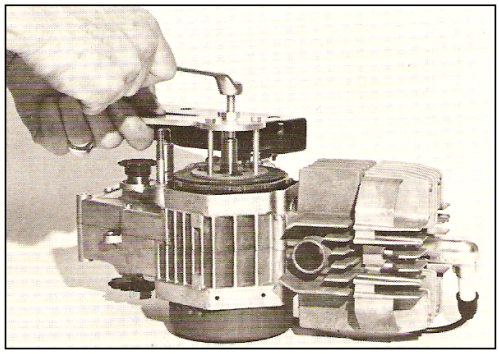

fig. 8

Clutch and toothbelt wheel assembling

Check the clutchplate on crack, flatness and excessive wear.
Check the pressure plate and end plate on flatness.
If necessary replace these parts and for that purpose only use original parts.
The clutch has to be assembled as follows:
- steel hub - clutch saucer with spring - aluminium hub - pressure plate - star spring - clutch plate - end plate - locking plate - leafspring.

Fit and fasten 3 of the 6 fastening bolts under 120°.
Check the total clearance of the clutch by means of a feeler gauge as shown in fig. 9. This clearance has to be between 0,5 and 0,9 mm.

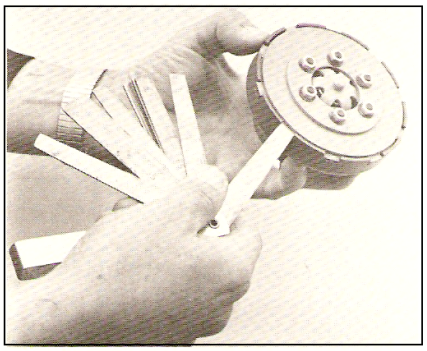

fig. 9

Fit the clutch to the crankshaft. Be sure of the right location and position of the key in the crankshaft and of the key way in the steel hub.
Fit the undulated washer to the crankshaft. For safety reasons do not forget this washer above all.
Fit the disk nut to the crankshaft and fasten it with 5 mkg. Use spec. tool nr. 565001 and nr. 565005, see fig. 7. Fit and fasten the left 3 bolts of the clutch.
If the carburettor is still seperate and not yet fitted to the crankcase this now has to be done first!
Thereafter fit simultaneously: clucth drum, toothbelt wheel and toothbelt. Be sure again of the right location and position of the key in the driving shaft and of the key way in the wheel. See fig. 10.

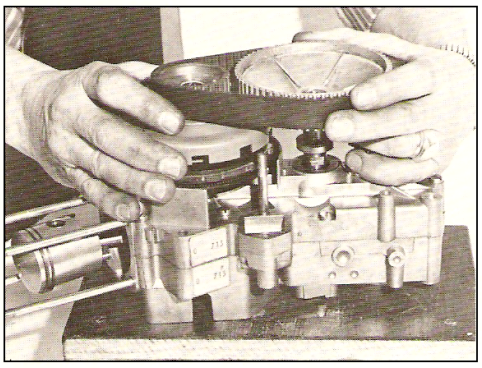

fig. 10

Press as far as possible the clutch drum against the crankshaft and measure the distance between the end of the crankshaft and the bottom of the chamber of the clutch housing. See fig. 11.

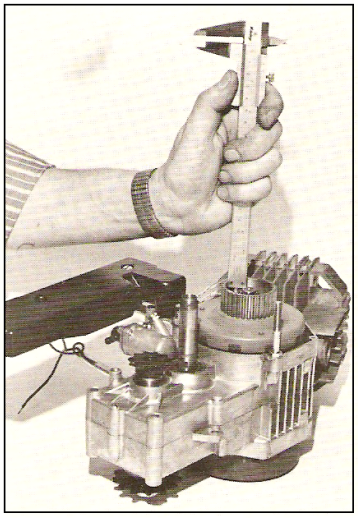

fig. 11

Fit the circlip to the crankshaft and now pull the clutch housing against the circlip and measure again the above mentioned distance.
The difference between both measures is the axial clearance of the clutchdrum.
This clearance has to be regulated between 0,2 and 0,5 mm. with available shims of 0,8 mm. and 0,5 mm.
If the clutch has been fitted in this way, the clutchdrum has to be pulled against the circlip again to measure in this position the distance between clutchdrum and toothbelt wheel. See fig. 12 distance D.
This clearance has to be between 0,5 and 2 mm. A clearance larger than 2 mm. efforts a replacement of the plain washer from the back to the front of the aluminium wheel. This however may occur very seldom.
Thereafter fit the centring ring, (be sure of its location on the shaft), the plain washer and the toothed washer to the driving shaft and fasten the nut blocking the shaft with a 13 mm. open ended spanner. See fig. 5.

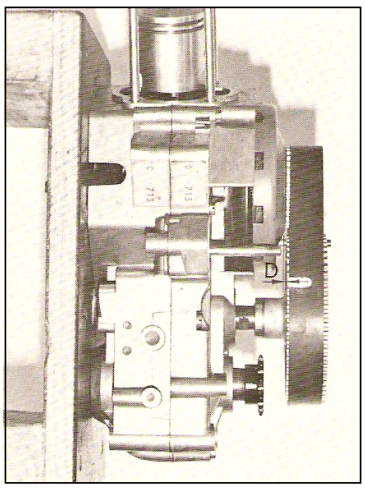

fig. 12

Starter leaf spring adjusting

It is very important that the starter leaf spring is adjusted correctly!
The adjustment is correct if:
— the distance between outside starterleaf spring (on top) and the crankcase housing is 48 mm. See fig. 13.
— The distance between starter leaf spring and the bronze thrust piece is 0,5-1,0 mm. See fig. 13.

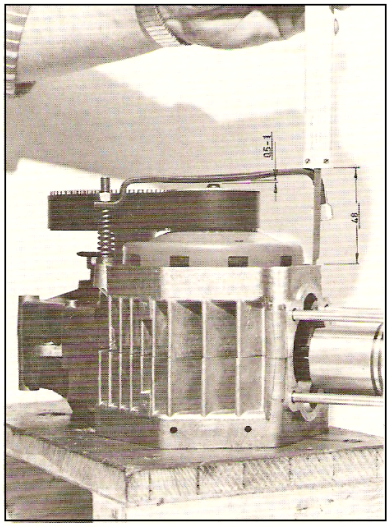

fig. 13

The distance of 48 mm. can be adjusted by turning the adjusting screw on the handlebar. The distance of 0,5-1,0 mm. can be adjusted by turning the nut on the stud. By the spring on this stud the starter leaf spring will be continually pressed against the nut.
Always provide the bronze thrust piece with a little bit of grease!

Carburettor and reed valve dismantling

Loosen the cover screw and pull the throttle valve and the choke piston rectilinearly out of the carburettor housing.
Remove the intake silencer by loosing the two screws, by which the silencer is fixed to the brackets.
Before being able to dismantle the carburettor and the reed valve further, first the clutch housing and the toothbelt wheel with the toothbelt have to be pulled off from their shafts in the way which already has been described above. Thereafter the carburettor can be removed by loosening the two nuts. Be sure of the right position of the silencer bracket, the insulating washer and of the right direction of the upper fixing bolt.
The carburettor, gaskets, insulating flange and reed valve can be removed now.

Carburettor and reed valve assembling

The reed valve has to be checked on damaging, possible presence of dirt and on its right function before fitting it. Clean a dirty reed valve only with a soft brush while dipping the reed valve in kerosine.
Always use new gaskets and be sure of fitting a gasket with a round hole between the insulating flange and the carburettor housing. Fitting a gasket with a square hole on that place will cause a bad working carburettor!

Fit carburettor and reed valve as follows:
- gasket (square hole) - reed valve - gasket (square or round hole) - insulating flange - gasket (round hole) - carburettor.
Be sure of the direction of the upper bolt: head to carburettor side. If not fitting that bolt in the right way the intake silencer can not be fitted afterwards.
Be sure also of the right place of the insulating washers: top side between bracket and bolt head, bottom side between carburettor and undulated washer.

Throttle valve and starterpiston assembling

Check the throttle valve on possible damages. In case the throttle valve only has been slightly damaged it can be put right by polishing.
In any other case the valve has to be replaced!
Also check carefully both O-rings (seals) of the choke piston.
A damaged O-ring at top side causes a too poor mixture due to the fact of false air.
A damaged O-ring at bottom side causes a too rich mixture.
To prevent swelling of the O-rings, these seals have been made of special material. To guarantee a good working carburettor only use orginal parts at any replacement!
To assemble the carburettor further on connect the throttle valve with its spring to the gascable.
Be sure not to damage the throttle valve and starter piston (O-rings) while fitting them into their bores. This has to be done carefully and rectilinearly. Locate the cover on the housing, tighten the screw and fit the rubber protecting cover to it.

Dismantling of the magneto ignition

Block the flywheel by means of spec. tool nr. 485010 and loosen the flywheel nut with a 13 mm. spanner. The flywheel can be pulled off from the crankshaft with spec. tool nr. 485002.
Loosen and remove the fitting screws of the magneto baseplate and take the baseplate out of its centring cams.
Keep the rubber grommet on the wires while sliding the grommet out of its locating position of the housing.

Reassembling of the magneto ignition

When refitting the baseplate be sure that it joints the centring cams correctly and that no wires are pinched between base plate and housing. Fit the screws but do not yet tighten them.
As it is very difficult to adjust the breaker gap with a fitted flywheel, a special tool nr. 565004 is available. With this tool the breaker gap adjusting can be done without mounted flywheel.
Fit this spec. tool to the crankshaft cone. See fig. 14, and adjust the breaker gap to 0,3 mm. in the usual way. (loosening the screw of the breakerpoint set and moving the fixed contact into the desired direction).

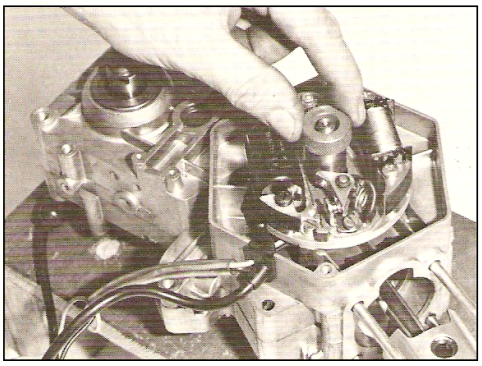

fig. 14

The rupture distance, determining the electric power of the spark, can only be changed by changing the breaker gap. Therefore it is very important to make a correct point-adjustment to get a spark with a maximum on electric power. The rupture distance must be between 6-10 mm. Fit the flywheel, plain washer and toothed washer and tighten the flywheel nut while blocking the wheel with tool nr. 485010.
Adjusting the advance should be done as follows:
Fit a dial gauge into the sparkplug hole of the cylinder-head and connect an ignition adjusting lamp, one wire to the ground f.i. cylinderhead and the other one to the cut-off wire of the ignition (blue wire).
Turn the flywheel clockwise until the piston comes into T.D.C. Now turn the flywheel counter-clockwise.
The moment the breakerpoints close the lamp will burn. That is the exact ignition point. The piston position is indicated by the dialgauge. The advance must be between 1,4-1,6 mm. (25 mph) (1,8-2,0 mm. 20 mph. and 30 mph.).
If the engine is advanced turn the baseplate clockwise. If the engine is retarded turn the baseplate counter clockwise.
Instead of a dialgauge a vernier calipers also can be used. An other possibility is using the line scratched on the outside of the flywheel.. The moment the breaker points close, turning the flywheel counter clockwise, this line must coincide the posterior rim (viewed from the cylinder) of the grommet sleeve in the housing. If not, correction can be made by turning the baseplate.
Because of the accuracy the dialgauge method however is preferred.
After having adjusted the advance the screws of the baseplate have to be tightened.

Dismantling of the crankcase

First remove cylinderhead - cylinder - clutch - toothbelt-wheel with toothbelt - intake silencer - carburettor - mag-neto ignition and chain-wheel as already described above. Drain of the oil by removing the drain-plug.
After that remove the locking springring from the driving shaft by means of a screwdriver.
Loosen and remove the crankcase screws. To prevent irreparable damage of the crankcase bores it is necessary to heat the housing parts up to about 100°C.
Seize the housing at two cylinder studs of the same crankcase half, using a rag or gloves, and seperate both parts by tapping all around the outside of the housing,. using a plastic hammer. The ratchet wheel (with the starter chain wheel) can remain in its housing bore.
Remove the shafts out of the crankcase.

Dismantling of the ratchet wheel

Block the wheel by means of the spec. tool nr. 565003 (see fig. 15) and gripp this tool into a vice.
Remove the chain-wheel by means of a self made chain-spanner. The ratchet wheel can be seperated now.
If the ratchet wheel bore has been worn out too much the racket wheel has to be replaced.
Never replace the bushes only!

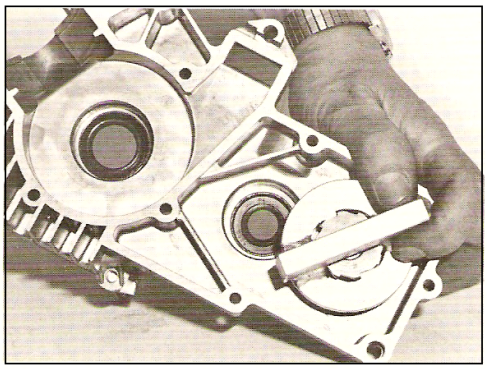

fig. 15

Dismantling of the ball bearings

The dismantling of the ball bearings has always to be done by means of extractors nr. 565018.
When pulling off the ball bearing at the magneto side always protect the crankshaft-end with the adapter M8, spec. tool nr. 565012.

Ball bearings assembling

— **crankshaft:**
Put suport-plate nr. 485008 between the webbs of the crankshaft and put the plate on the bits of a vice, see fig. 16. When fitting the ball bearing with a dolly, tool nr. 565016, no external forces then will act upon the crankshaft.

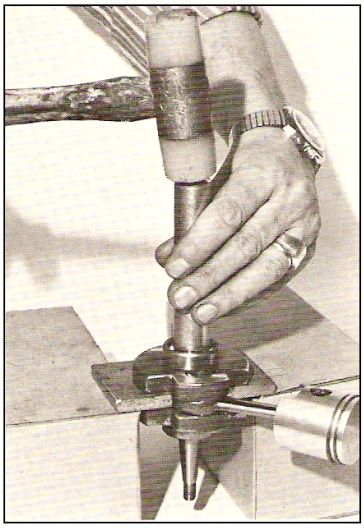

fig. 16

— **lay-shaft:**
Grip the dolly, tool nr. 565016, in a vice and use it as a bracket when fitting the ball bearing with another dolly, tool nr. 565011. See fig. 17.

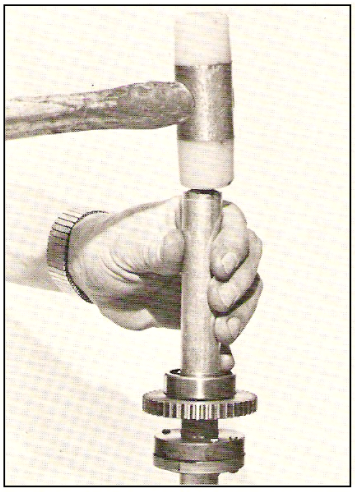

fig. 17

— **driving-shaft:**
Again use tool nr. 565016 as a bracket gripped in a vice and fit the ball bearing with the dolly, tool nr. 565010. See fig. 18.

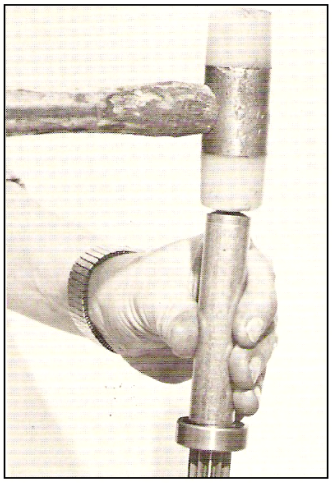

fig. 18

Needle bearing assembling

Heat the housing part magneto side up to about 100°C. Fit the needle bearing from the outside into the bore with a mandril (diam. 15 mm.) in such a way that the front-side of the bearing remains 0,3-0,7 mm. back to the crankcase-surface.

Crankcase housing assembling

Heat the crankcase part magneto side up to about 100°C and put it on a assembly block.
Oil all bearings and fit the shafts into the housing part. Don't forget to fit the two shims on the driving shaft, see fig. 19.

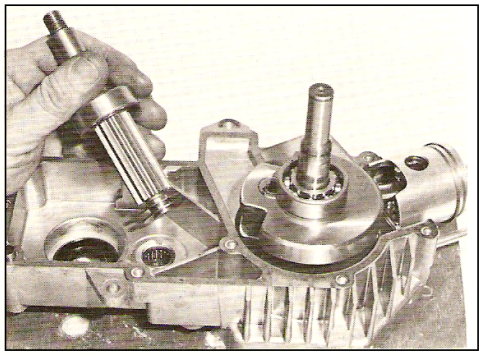

fig. 19

Fit the racket wheel on the lay shaft and be sure the two shims A and B being on the right location, see fig. 20.

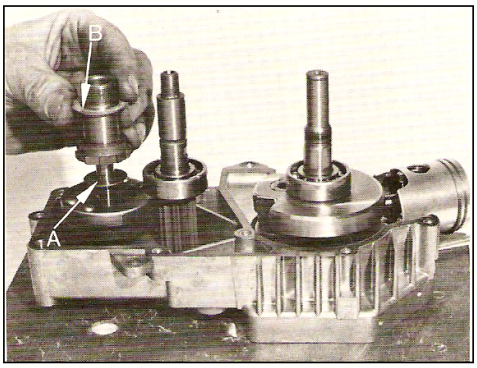

fig. 20

Always use a new crankcase-gasket and oil the joint surface before fitting the gasket.
Heat the crankcase part clutch-side up to about 100°C, fit it along the shafts to the other part and screw both parts together.
Check if all shafts turn easily in their bearings. If they do not, then tap with a plastic hammer on the housing around the bores and on the sahft-ends to release the shafts.
Oil and fit the oil seals. Use the spec. sleeves 565013, 565014 and 565015 tot prevent damaging of the lips.
To be sure that the oil seals get on their right positions use ring-tools nos. 565006, 565007, 565008 and 565009 with the dollies nr. 565010 and 565011.

Put the closing-plate (pos. 70 spare-partslist) on the racket wheel and screw the chain wheel on the racket wheel by hand.
Fit the locking spring-ring into the groove of the driving shaft using tool nr. 565017, see fig. 21.

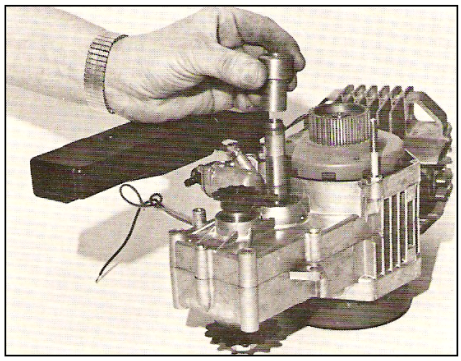

fig. 21

Fit the safety-ring (pos. 154 spare part list), tapered side tot the springring, to the shaft.
Assemble further as described above:
magneto - ignition - chain-wheel - carburettor - clutch - toothbelt-wheel with belt and intake silencer.
Provide the crankcase with 80 cc. motor-oil SAE 50 or a gear-box-oil SAE 80 of a well known brand. Therefore hold the engine to the back under approx 45°.
When the oil-level reaches the lower side of the fill and drain-hole the charging will be approx 80° cc. Fit the drainplug.
Now the engine can be attached into the frame. Remember the bracket for the intake silencer. Only after the first 500 km. the oil has to be drained off and refilled.
Rechange jet 56 of the carburettor by jet no. 54 (30 mph only).
For refitting the starter leaf spring and its adjustment see pag. 6.
Remember capnuts and screws when refitting the covers
clutch-side front 2 x M6, rear 1 x M5
magneto-side front 2 x M4, rear 1 x M5.

Little end bush replacement

Press the bush out of the connecting rod bore with tool nr. 48.50.03 as shown in fig. 22.

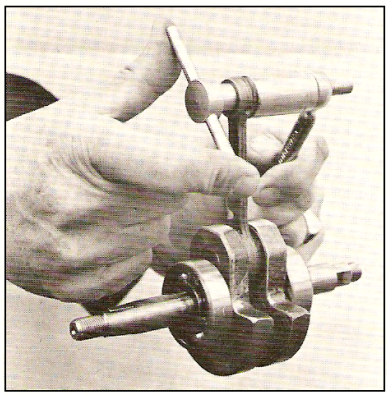

fig. 22

With the same tool a new bush can be pressed into the bore as shown in fig. 23.

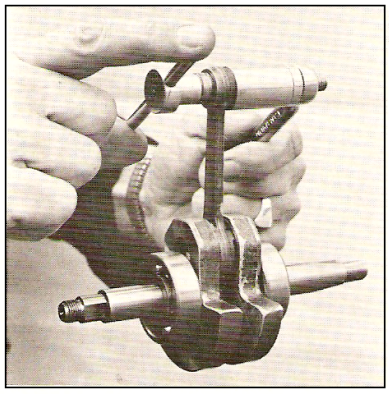

fig. 23

The bore of the bush has to be reamed to a diameter of $12\ ^{+\ 0,020}_{+\ 0,016}$ mm.

If the measuring tools to check this diameter are not available, the reaming operation has to be done in such a way that the wrist pin fits in the bore freely (floating). The clearance has to be 0,020 mm.

It is very important that the bush is reamed squarely to the connecting rod and that the oil-holes of the bush match the holes of the little end.

FRAME

Rear-fork

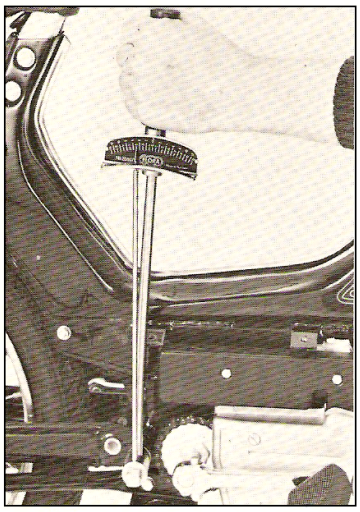

fig. 24

The resilient rearfork is applied with two shockabsorbers, and joints at the front in two silentblocs which are pressed into the framebracket. To prevent damaging of the silentblocs the bolt has to be retightened after the first 500 km.
Release counter nut and tighten the swingbolt with 8 mkg., see fig. 24.
Secure again with the counter nut.

Centerstand

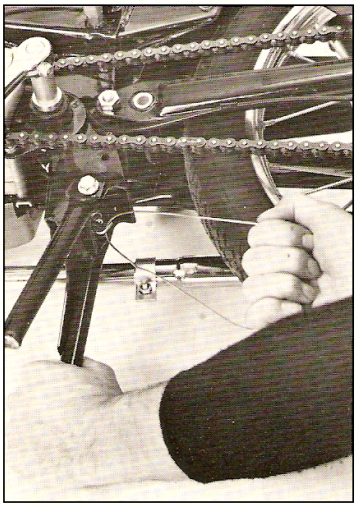

fig. 25

The centerstand is attached to the frame bracket by 2 special M8-bolts.
For assembling the stand spring, a piece of bowden cable in a tube can be a handy tool, see fig. 25.

Frontfork

Assembly of the frontfork can be done according to the exploded view, fig. 29.
When replacing the plastic bushings be sure that the internal cams of the bushings fit into the holes of the forklegs.
Fill the forklegs up with 5 cc grease, Retinax A, per leg.

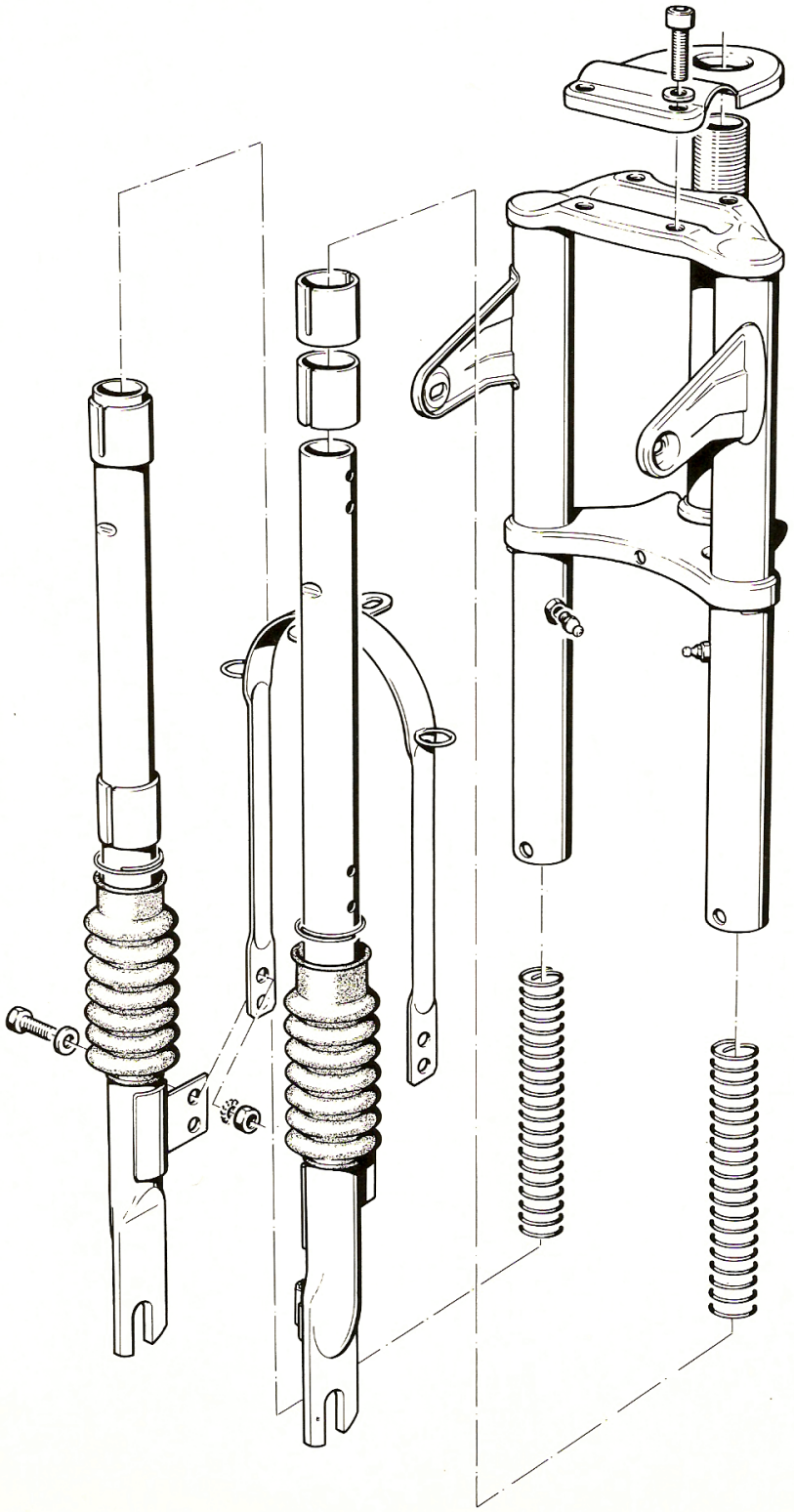

fig. 29

Front- and rearwheel-hub

The construction of both hubs, is shown in the exploded views.
front-wheel-hub fig. 30.
rear wheel-hub fig. 31.

Spokes

frontwheel: thickness nr. 12.
rearwheel : thickness nr. 11.
The number of spokes for both wheels is: 28.

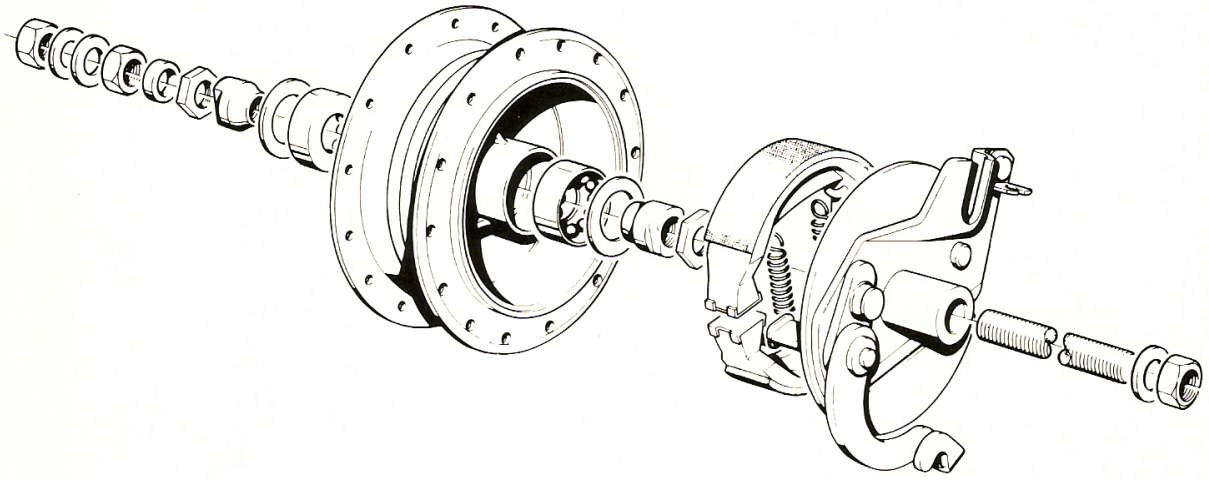

fig. 30

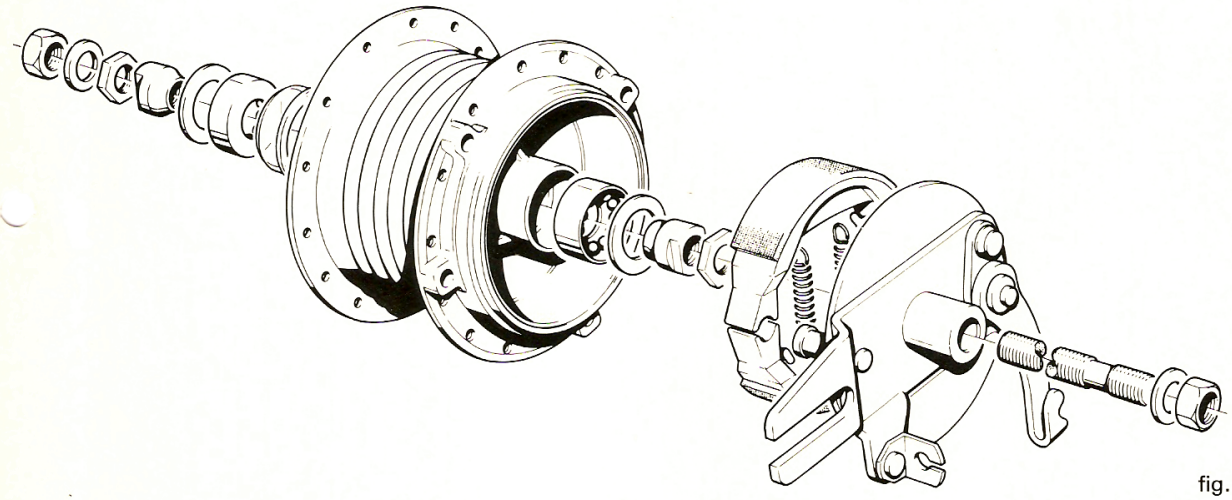

fig. 31

Exhaust-silencer

The construction of the silencer and the exhaust gas-flow as well are shown in fig. 32.
When loosening the nut and removing the back part the silencer can be cleaned internally. The gasket between front- and back-part is made of a special rubber.

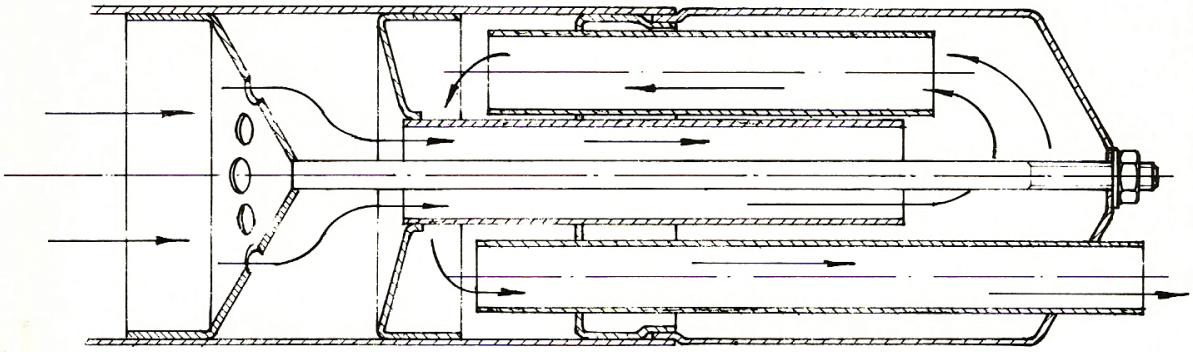

fig. 32