WORKSHOP MANUAL

DKW Hummel

AUTO UNION G·M·B·H

2nd. Edition

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Foreword

The information given in this new edition of the **DKW Hummel** workshop manual will help you to carry out repairs quickly and expertly.

It is intended to show you the jobs which necessitate the use of special tools and at the same time to give a brief outline of important technical data and (certain) measurements. In addition each particular servicing operation is described simply and clearly with the requisite illustrations to assist you.

We have not elaborated on work which is now generally familiar from repairs carried out on the bicycle.

It is also hoped that this repair manual will encourage the instruction and workshop training of our younger generation of technicians.

AUTO UNION G·M·B·H
Ersatzteile und Kundendienst
INGOLSTADT

An Important Point To Remember About The Moped

In Germany the maximum speed of a Moped is restricted by law to 40 km/h. In addition the capacity of the cylinder must not exceed 50 cc; if it does exceed this limit the vehicle must be licenced.

The DKW Hummel is specially constructed to meet these demands and, during the vehicle's initial testing, the maximum speed was not exceeded. The maximum speed of the vehicle is however subject to other considerations; the vehicle may be travelling downhill — with perhaps the assistance of a following wind — or it may be driven by an exceptionally light person in which case the speed is contingent upon certain physical controls (attenuation of wind resistance). Under conditions such as those just mentioned the speed of the vehicle can exceed the limit of 40 km/h.

Any attempt to increase the power output of the Hummel engine is under no circumstances necessary, or even admissable, if the DKW Hummel is to be exempt from tax and licence regulations. Furthermore, in its relation to present traffic regulations, the Moped, and consequently the DKW Hummel, finds itself in rather an ambiguous position. In so far as the equipment and use of the road conform to the Road Traffic and Users Regulations, all Moped vehicles are regarded as bicycles. On the other hand the Road Traffic Act (StVZO) commits all vehicles and road users to the same jurisdiction and lists Mopeds under the heading of motorised vehicles (motor bicycles).

Table of Contents

Index of illustrations

Construction of the DKW Hummel Moped

Fig. 1 DKW Hummel — view of left hand side (up to frame No. 01 518 923) VI/57/855

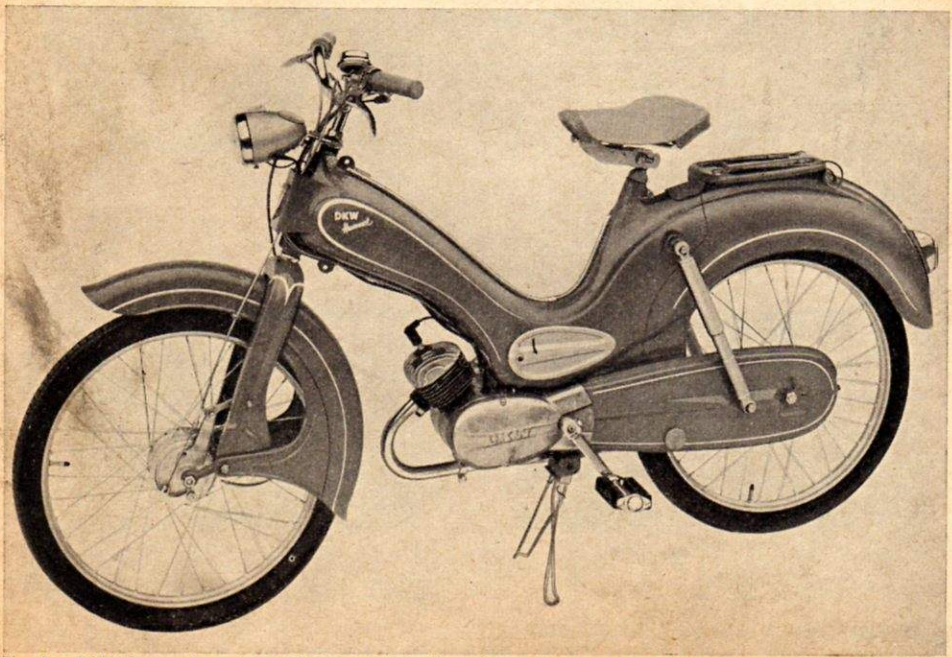

Fig. 1a DKW Hummel — view of left hand side (from frame No. 01 518 924 — 01 551 100) VI/57/306

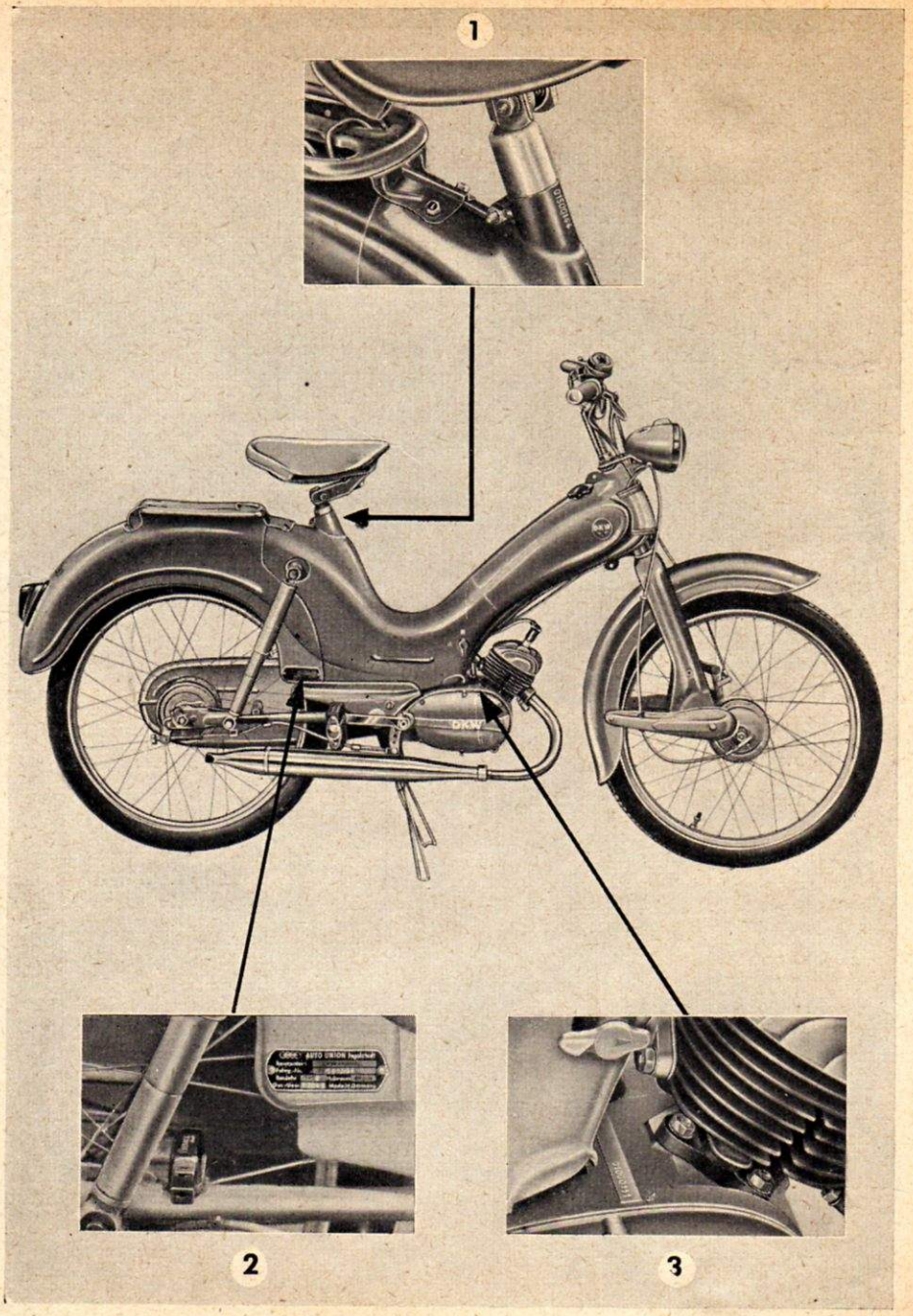

Fig. 2 DKW Hummel up to frame No. 01 518 923 VI / 56 / 2075

1 = Frame No., 2 = Rating plate, 3 = Engine No.

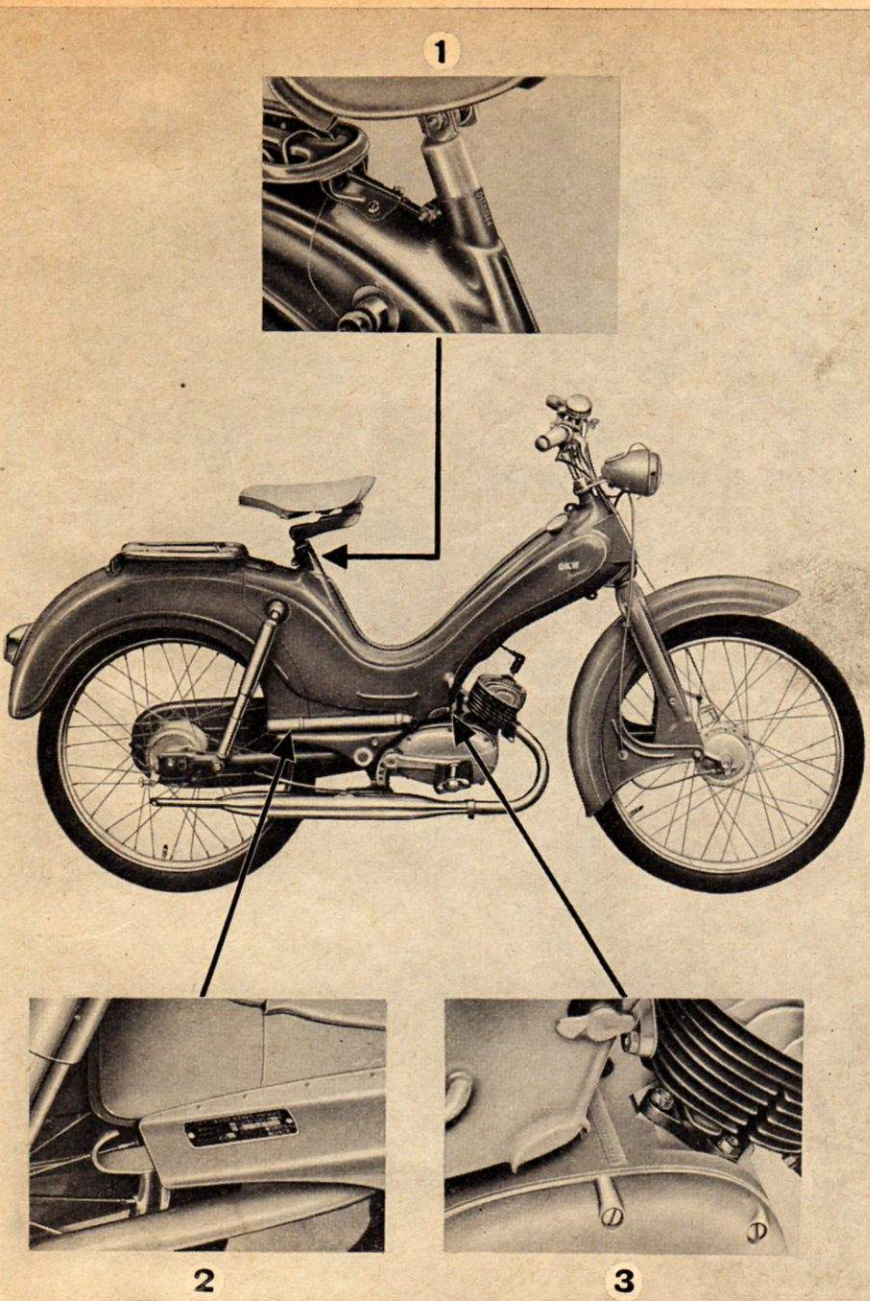

Fig. 3 DKW Hummel from frame No. 01 518 924 up to 01 551 100
1 = Frame No., 2 = Rating plate, 3 = Engine No.

VI / 57 / 787

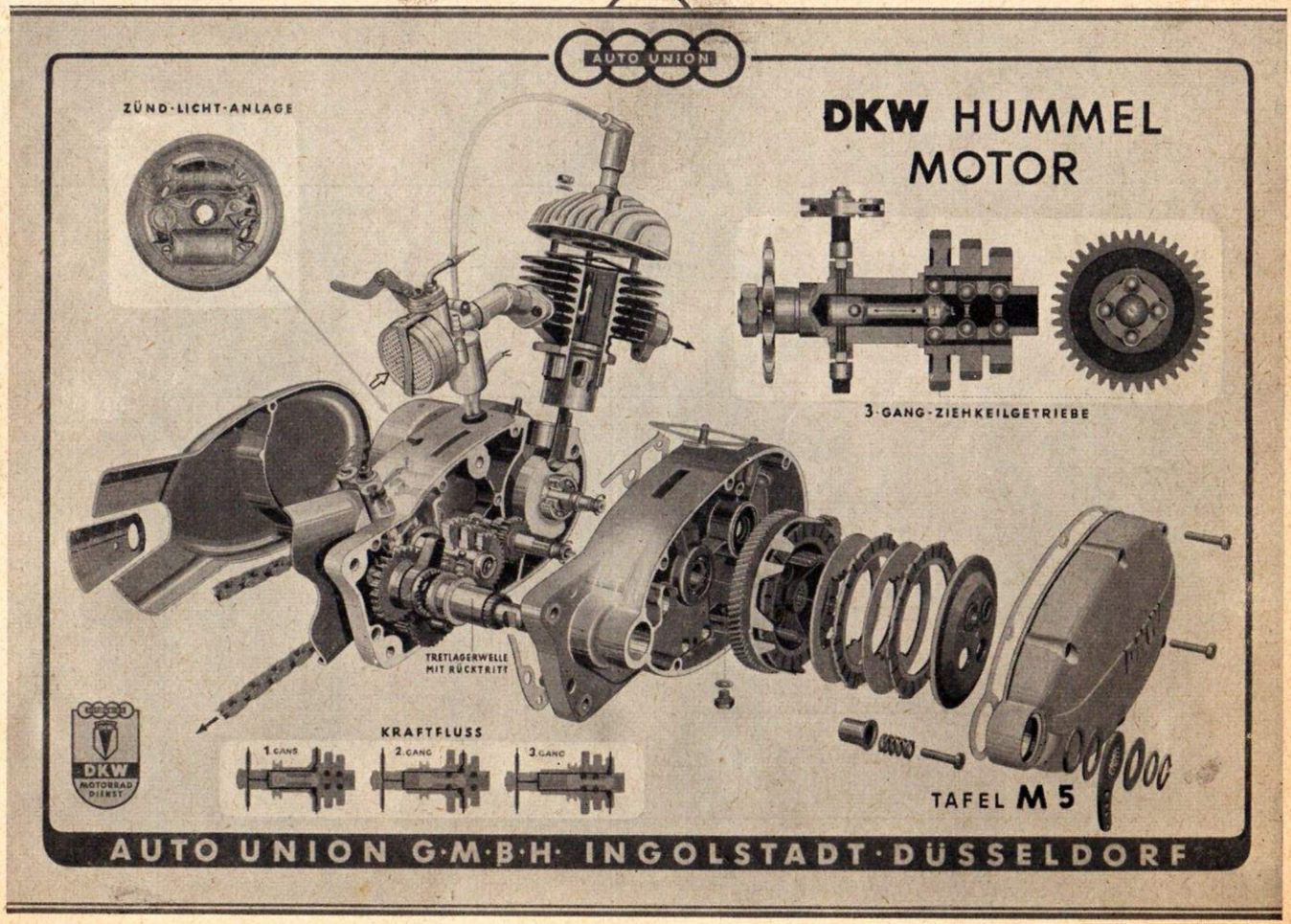

Fig. 4 DKW Hummel engine (Instruction chart)

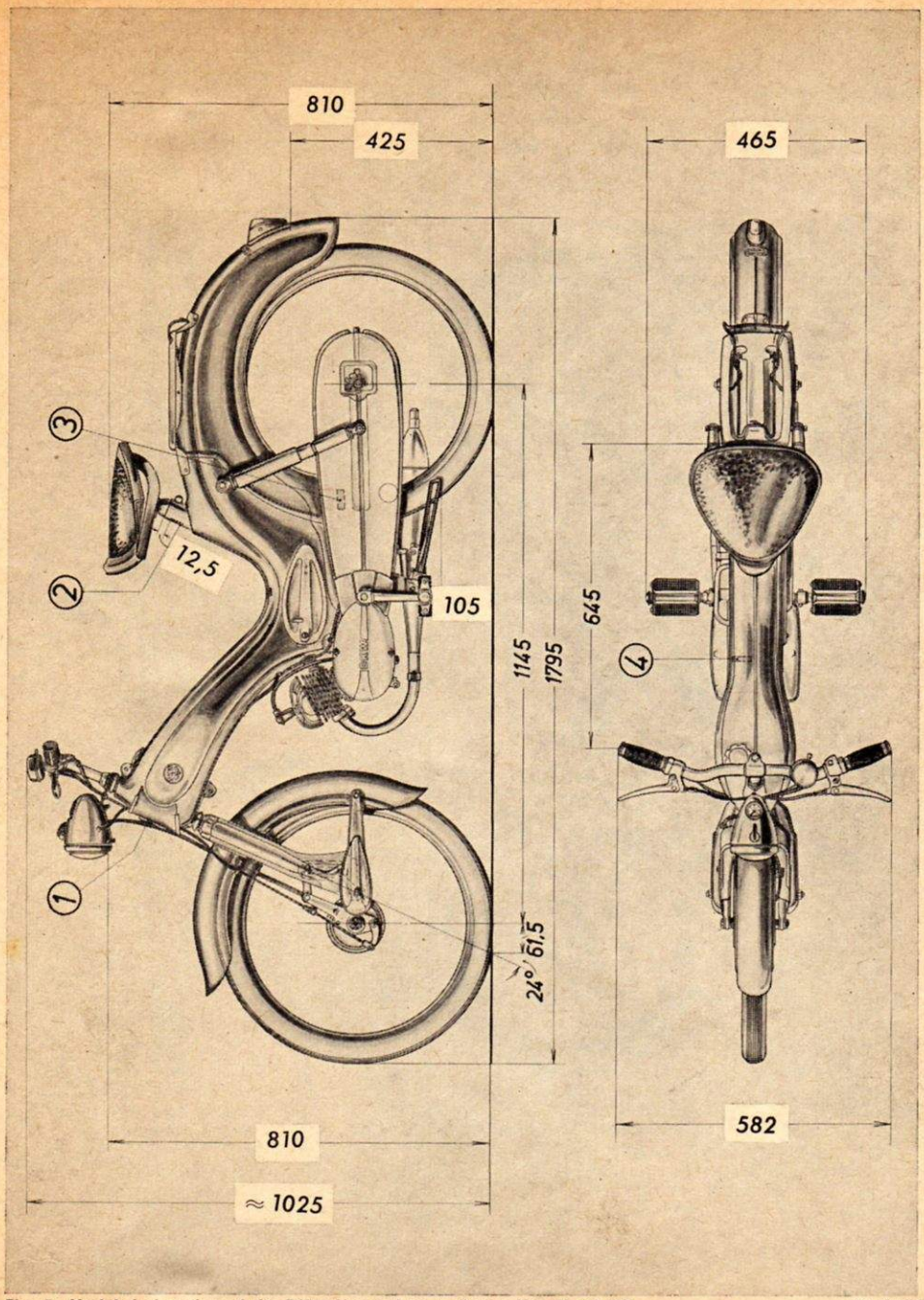

Fig. 5 Model designation of the DKW Hummel up to frame No. 01 518 923 VI/57/839

1 = Auto Union badge embossed
2 = Frame Number (visible fom right hand side)
3 = Rating plate fitted to right hand side
4 = Engine number

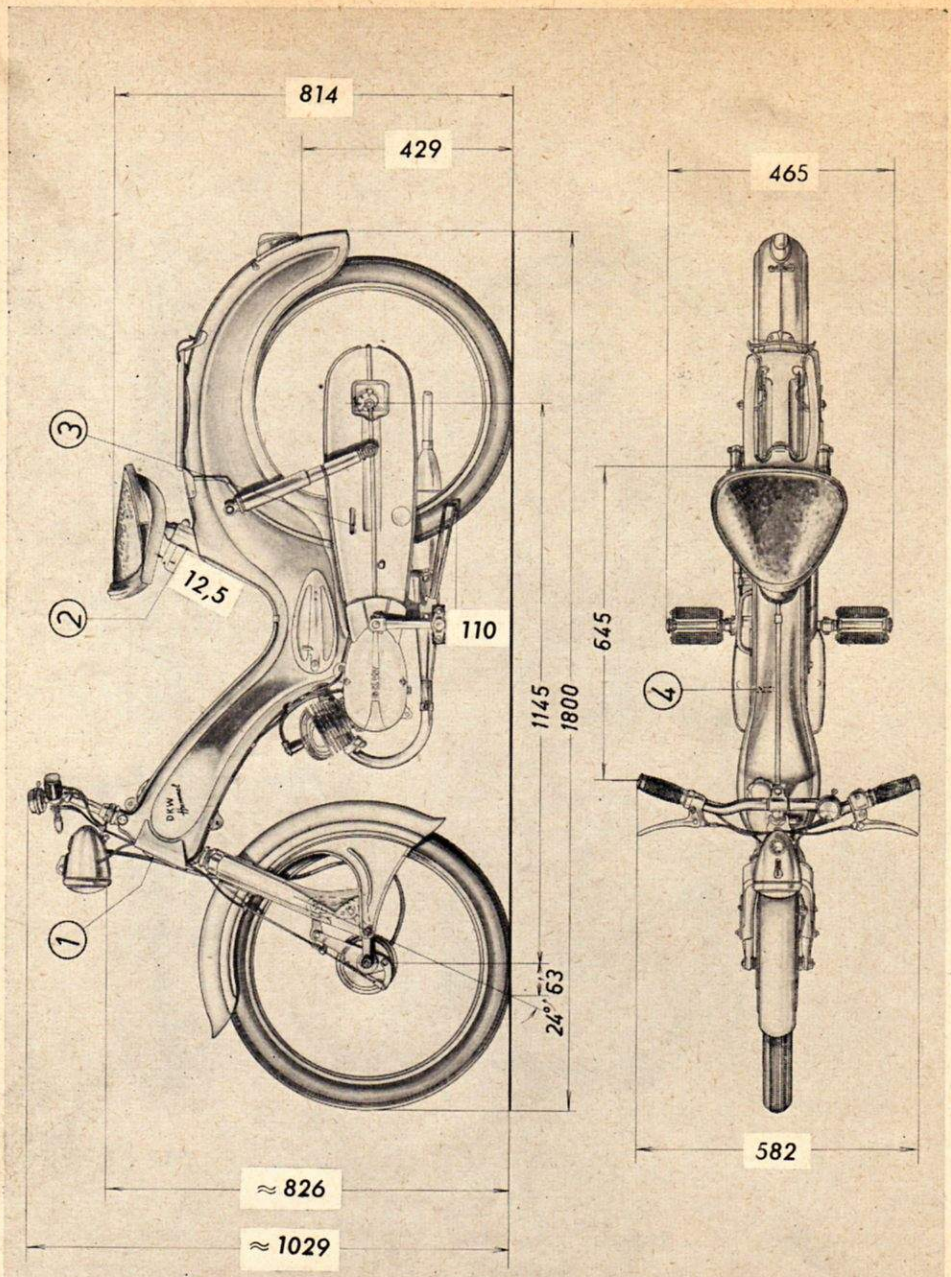

Fig. 6 Model designation of the DKW Hummel from frame No. 01 518 924 — 01 551 100 VI/57/840

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2 = Frame Number (visible from right hand side)
3 = Rating plate fitted to right hand side
4 = Engine number

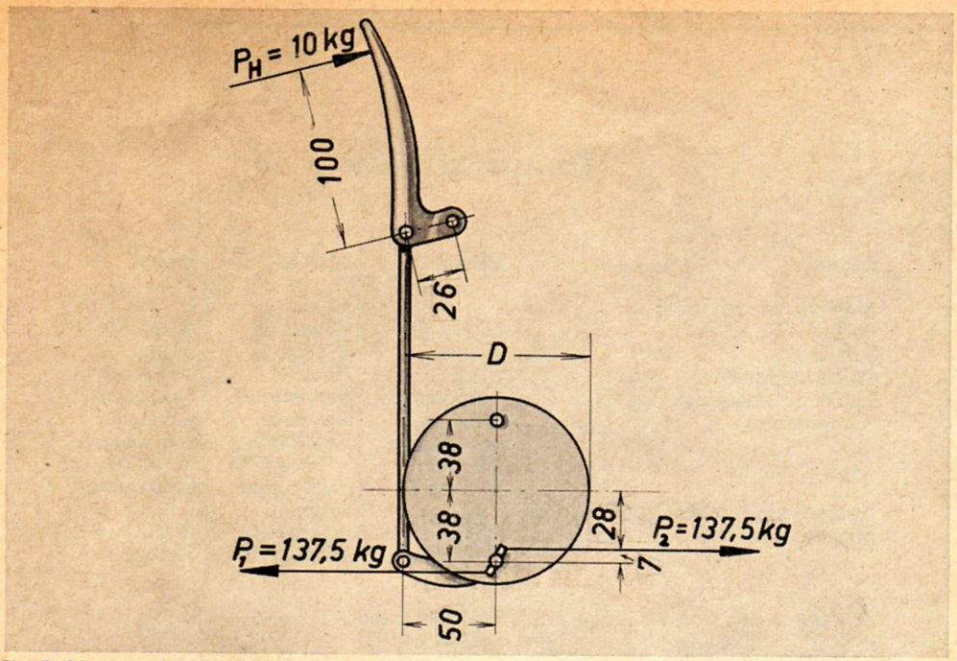


Fig. 7 Diagram of front wheel brake

VI / 57 / 841

Brake shoes ϕ D = 100 mm
Width of brake shoes b = 15 mm

Reduction ratio: i = brake cam $= \frac{100}{26} \cdot \frac{50}{7} = \approx 27{,}5$

i = brake lining $= 27{,}5 \cdot \frac{76}{38} = \approx 55$

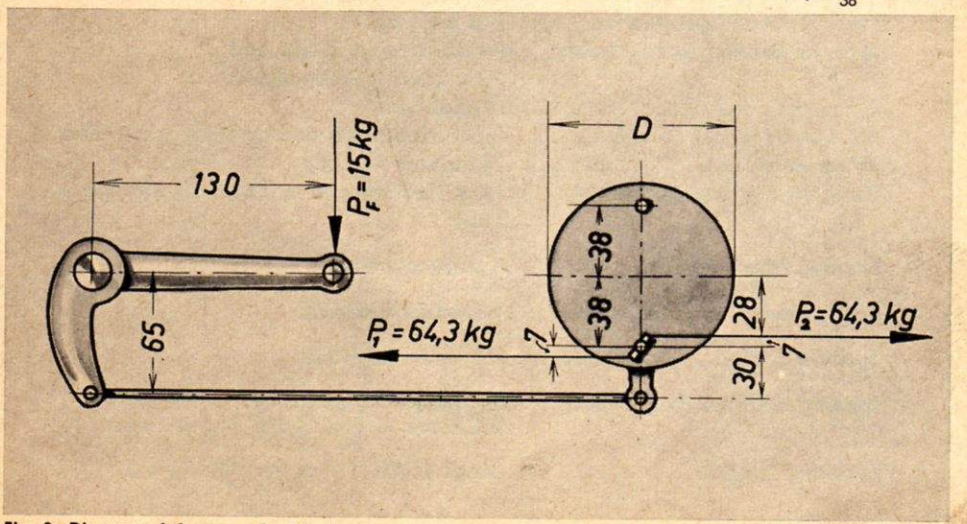


Fig. 8 Diagram of the rear wheel brake

VI / 57 / 842

Brake shoes ϕ D = 100 mm
Width of brake shoes b = 15 mm

Reduction ratio: i = up to brake cam $= \frac{130}{65} \cdot \frac{30}{7} = 17{,}14$

Reduction ratio: i = up to brake lining $= 8{,}57 \cdot \frac{76}{38} = 8{,}57$

Technical data

Engine:	0.8 hp	1.35 hp	1.8 hp
Number of cylinders	1	1	1
Bore	40 mm ⌀	40 mm ⌀	40 mm ⌀
Stroke	39 mm	39 mm	39 mm
Cubic capacity	49 cc	49 cc	49 cc
Cycle of operation	Two-stroke	Two-stroke	Two-stroke
Scavenging	Reverse-scavenging	Reverse-scavenging	Reverse-scavenging
Output	0.8 hp at 4000 r.p.m.	1.35 hp at 4400 r.p.m.	2.0 hp at 5500 r.p.m.
Compression ratio	1:6.5	1:6.5	1:7.0
Maximum speed	30 km/h = 20 mph	40 km/h = 25 mph	60 km/h = 38 mph

Cooling	Air filtration
Cylinder arrangement	Oblique
Cylinder material	Cast iron
Cylinder head	Aluminium — detachable
Control of gas flow	Through ports in the piston and cylinder
Crankshaft	Built up assembly with twin bearings
Type of crankshaft bearing	Ball bearing
Type of bearing in connecting rod	Roller bearing in big end Plain bearing in small end
Connecting rod	Forged steel
Mass of fly wheel	Inner (cam plate) and outer fly wheel disc
Piston material	Aluminium — alloy
Gudgeon pin-arrangement	Fully floating and secured by wire snap rings
Eingine mounting	3-point-mounting
Lubrication	Petroil mixture 1:25
Ignition	Fly wheel magneto

Ignition before t. d. c.	2.6 mm up to 2.8 mm	2.6 mm up to 2.8 mm	2.6 mm up to 2.8 mm

Sparking plug ..... Bosch W 225 T 1 or Beru 225/14 u 2

Carburetter:	Midget BING carburetter with choke air slide and air filter		
	for 0.8 hp engine	for 1.35 hp engine	for 1.8 hp engine
Type	1/9/17/18	1/9/15	1/12/68
Main jet	50	52	60
Needle jet	2.17	2.15	2.15
Needle setting (groove from top)	2	3	3
Slow running set screw	3 to 4 half turns to open		
Carburetter bore ϕ	9 mm = 0.354 in.	9 mm = 0.354 in.	12 mm = 0.472 in.
Fuel consumption *	1.2 litres/ 100 km = 235 mpg	1.1 litres/ 100 km = 257 mpg	1.35 litres/ 100 km = 210 mpg

Clutch and gearbox:

Clutch	Multi disc clutch running in oil		
Clutch control	Hand operated lever with gear ratchet		
Gearbox	Helical toothed gears (Draw key)		
Arrangement of gearbox	Engine and gearbox housing one casting		
Gear shift mechanism	Twist-grip gear change		
Transmission ratio from engine to gearbox	Helical toothed gearwheels		
Reduction ratio from engine to gearbox	78:23—3.39:1	78:23—3.39:1	78:23—3.39:1
Oil in gearbox	approx. 600 cc Gearbox oil SAE 80		
Number of gears	3	3	3
Transmission ratio from gearbox to rear wheel	Single roller chain		
Reduction ratio from gearbox to rear wheel	11:33—1:3	12:33—1:2.75	13:33—1:2.53
Total reduction through the gears I	1:35	1:32.22	1:24.93
II	1:21	1:19.23	1:17.75
III	1:14.75	1:13.4	1:12.48
Reduction ratio of kickstarter	1:17.05	1:17.05	1:17.05
Type of kickstarter	Pedal crank	Pedal crank	Pedal crank
Reduction ratio of pedal crank to gearbox	1:1.495	1:1.495	1:1.495

Frame:

Type of frame	Pressed steel frame
Type of frame jointing	Welded joints
Type of front suspension	Swinging arm with rubber band suspension
Type of rear suspension	Swinging arm with suspension units

* Consumption is estimated at ⅔ of the maximum speed plus 10% measured on a level dry surface with no wind resistance.

	for 0.8 hp version	for 1.35 hp version	for 1.8 hp version
Front shock absorber	None		
Rear shock absorber	Progressive rubber absorber		
Type of rims front and rear	23 x 2.00 strengthened (as DIN 7815)		
Type of tyre front and rear	23 x 2.00 Moped DIN 7801		23 x 2.25
Tyre pressure front wheel	1.6 atm.	1.6 atm.	1.6 atm.
Tyre pressure rear wheel	2.2 atm.	2.2 atm.	2.2 atm.
Front wheel brake	International brake shoe 100 mm ⌀ x 15 mm		
Rear wheel brake	International brake shoe 100 mm ⌀ x 15 mm		
Capacity of fuel tank	approx. 5.5 litres (1.3 gals) with approx. 1 ltr. (0.3 gals) in reserve		

Dimensions and weights:

Wheelbase	1145 mm = 3 ft. 9.07 in.	1145 mm = 3 ft. 9.07 in.	1145 mm = 3 ft. 9.07 in.
Overall length	1795 mm = 5 ft. 10.67 in.	1795 mm = 5 ft. 10.67 in.	1800 mm = 5 ft. 10.86 in.
Overall width	582 mm 1 ft. 10.91 in.	582 mm 1 ft. 10.91 in.	582 mm 1 ft. 10.91 in.
Overall height	1029 mm = 3 ft. 4 in.	1029 mm = 3 ft. 4 in.	1029 mm = 3 ft. 4 in.
Saddle height (lowest setting)	810 mm = 2 ft. 7 in.	810 mm = 2 ft. 7 in.	814 mm = 2 ft. 7.15 in.
Centre ground clearance (with load)	106 mm = 4 in.	106 mm = 4 in.	110 mm = 4 in.
Empty weight	44 kg = 97 lbs.	44 kg = 97 lbs.	44 kg = 97 lbs.
Admissible total weight	130 kg = 288 lbs.	130 kg = 288 lbs.	140 kg = 310 lbs.
Efficient working load	86 kg = 190 lbs.	86 kg = 190 lbs.	96 kg = 211 lbs.

Electrical system:

Output	6 Volt 17 Watts
Ignition	Magneto ignition
Ignition	2.6 up to 2.8 mm before t.d.c.
Gap between contact breaker points	0.35 up to 0.40 mm
Lighting (Headlamp)*	6 Volt 15 Watts
Tail lamp	6 Volt 2 Watts
Sparking plug	Bosch W 225 T 1 or Beru 225/14 u 2
Sparking plug gap	0.4 up to 0.5 mm
Type of audible signal **	Bicycle bell

* Dipper fittings for export 15/15 W

** Horn for export
In the wiring diagrams on pages 69—71 the wiring system is given for both dipper and horn.

Subject to technical modifications!

Modification Index

Ser. No.	Engine	From engine No.
1	**Oil escape on the clutch thrust rod:** The radial gasket and wire clip are replaced with a radial gasket, part number 06503-935-90. The lip of the gasket is fixed by a coiled spring.	01 001 742 *
2	**Galvanized screws on the clutch:** To facilitate a better fit the four oval head screws (part number 00084-053-31) fitted in the clutch centre are galvanized and have the part number 0084-053-37.	01 004 585 *
3	**Oil return inlet:** The crankcase provides the clutch thrust rod with an oil return inlet on the Radial-gasket.	01 006 224 *
4	**Securing of chain sprocket on the gear shaft:** In place of the 10 x 1 metre hexagonal screw, part number 00936-002-11, and the spring ring 10 AU, part number 90032-009-31, two 10 x 1 metre nuts are used.	01 006 120 *
5	**New spacing washers for the pedal shaft:** To reduce the amount of axial play on the pedal shaft spacing washers, part number 0101-13508-00/-10/-20 are used 1.5, 1.75 and 2 mm thick, according to the requirement. These washers are assembled between the circlip and the drive sleeve.	01 006 780
6	**Modified clutch thrust rod:** The clutch thrust rod is modified from 4.75 mm to 4.9 mm ϕ. The amount of play between the clutch thrust rod and the clutch shaft is thereby reduced, the tumbler movement in the radial gasket is mitigated and a better joint is maintained against the seepage of oil. The old part number 0101-12531-00 is kept.	01 007 676 *
7	**Modified gear shift lever shaft:** On the modified gear shift lever shaft, part No. 0101-15216-10, the threaded piece securing the chain sprocket is lengthened to 5 mm. From this engine number, the chain sprocket is secured with a washer, part No. 4895-15261-10, and two hexagonal nuts.	01 017 133 *

The modified parts marked with an asterisk * are exchangeable with the earlier design.

Modification Index

Ser. No.	Engine	From engine No.
8	**Marking of gear shift lever:** The bottom lugs holding the cable nipples are closed. In addition the gear shift lever is marked with "top". This marking eliminates any confusion when reassembling the lever.	01 020 008 *
9	**Reduction in the size of the slot on the gear shift lever:** The width of the slot is reduced to 7 + 0.022 mm, thereby producing a really tight fit on the gear shift lever shaft. The modified and strengthened gear shift lever carries the part No. 0101-15226-01.	01 025 053 *
10	**Pedal shaft:** To prevent the securing ring spreading, the pedal shaft, part No. 0101-13505-00, is ground to 16 mm ϕ f 7.	01 027 695 *
11	**Clutch:** The clutch springs, part No. 0101-12517-00, are strengthened and carry the part No. 0101-12517-01. These parts must not be confused.	01 030 496 *
12	**Primary drive:** To reduce wear on the teeth of the crankshaft sprocket and clutch gear wheel, more durable sprockets are fitted. The part No. 0101-10335-00 is retained.	01 032 589 *
13	**Modified pedal shaft:** The recessed slot retaining the securing ring on the pedal shaft ist offset 1 mm and a check plate 2 mm thick is fitted to support the gear wheel on the pedal shaft. The modified pedal shaft carries the part No. 0101-13505-01.	01 034 836 *
14	**Modified clutch centre:** 4 threaded pins are riveted into the clutch centre. The complete assembly carries the part No. 0101-12547-00. 4 slotted nuts are supplied with this design.	01 041 200 *

The modified parts marked with an asterisk * are exchangeable with the earlier design.

Modification Index

Ser. No.	Frame	From frame No.
1	**Adjustment of carburetter cable:** The adjusting screw is transfered from the elbow on the carburetter to the twist grip, making adjustment easier and quicker.	01 507 550
2	**Transfer of the steering lock:** The spoke lock on the rear wheel swinging arm is replaced with a safety locking device, part No. 0101-28160-10, fitted in the steering head. It is not possible to fit this modified lock on earlier models. The table below indicates the parts affected by this modification.	01 511 942
3	**Modified chain guard to simplify reassembly:** To simplify the removal and reassembly of the chain guard, the two plates gripping the swinging arm at the rear have been removed.	01 512 157 *
4	**Modified exhaust system:** The end cap is lengthened to 100 mm. It is not possible to exchange this modified end cap with the previous design. The complete silencer and modified end cap assembly is exchangeable with the old design.	01 516 604
5	**DKW Hummel De-Luxe series:** In addition to the standard production model De-Luxe Mopeds are built.	01 518 924
6	**Front fork assembly fitted with strengthened steering column:** The front forks, part No. 0101-20301-00, are fitted with a strengthened steering column and carry the same part No.	01 527 040 *

Part designation	Prev. Part No.	Mod. Part No.
Frame compl.	0101-20100-00	0101-20100-10
Front fork with steering column compl.	0101-20301-00	0101-20301-10
Swinging link compl.	0101-20300-00	0101-20300-10
Steering yoke with stem.	0101-20401-00	0101-20401-10
Handlebar with stem compl.	0101-20400-00	0101-20400-10
Swinging arm compl.	0101-24201-00	0101-24201-10
Spoke lock with key vompl.	0101-28160-00	—
Safety lock with key		0101-28160-10

The modified parts marked with an asterisk * are exchangeable with the earlier design.

Modification Index

Ser. No.	Frame	From frame No.
7	**Check plate on the drive housing:** To secure the drive housing in the correct position when reassembling, a check plate, part No. 0101-22292-00, ist fitted.	01 527 040 *
8	**Slack in the spokes:** To prevent the spokes slackening off, the rear and front wheel hubs are fitted with small spoke sockets (2.75 mm ⌀).	01 530 236 *
9	**Water tight speedometer hub drive:** Speedometer hub drive manufactured by ISGUS and VDO, is an optional fitting. Both products are water tight.	01 537 743 *

The modified parts marked with an asterisk * are exchangeable with the earlier design.

Special tools for the DKW Hummel

Ser. No. Fig. 9	Designation	Part No.
1	Replacing assembly for work on the crankshaft. The following parts are used:	0101-73500-00.1
	a) pressure plate NM 35/17, 6mm thick	4601-73505-00.1
	b) collar bushing NM 35/25, length 86mm	4601-73509-00.1
	c) nut M 16 x 1.5 SW 24	00934-019-11
	d) spindle, outer thread M 16 x 1.5, inside thread M 14 x 1.5 SW 10	4601-73502-00.1
	e) pressure ring NM 45/35/17, 15mm thick	4601-73517-00.1
	f) threaded insert, outer thread M 14 x 1.5 inside thread M 10 x 1	4601-73513-00.1
	g) sliding sleeve for gear shaft NM 17, length 26mm	4601-73518-00.1
	h) sliding sleeve NM 15, length 23mm	4601-73516-00.1
2	Extracting assembly for pressing out crankshaft. The following parts are used:	0101-73400-00.1
	a) flange	4601-73301-10.1
	b) distance sleeves (two pieces required)	0301-73301-00.1
	c) Puller	4699-71500-00.1
	d) pressure cap M 10 x 1	0301-71901-00.1
3	Ignition setting gauge, slide and dial system	6003-72000-00.3
4	Extractor and replacer for the connecting rod bushing	0101-70800-00.1
5	Pressure pin for removing gudgeon pin from piston NM 10	0101-70401-00.1
6	Supporting lever cranshaft sprocket	0101-71401-00.1
7	Forked wedge for crankshaft, 22 across forks, length 90	0101-73201-00.1
8	Arresting piece for clutch drum and clutch centre	0101-71301-00.1
9	Fork for supporting piston	4601-71001-00.1
10	Box spanner for cylinder head nut	4601-73101-00.1
11	a) drift, inside thread 38 x 1.5	4896-71102-00.0
	b) insert for drift 18/34 M 38 x 1.5	4896-71104-00.0
12	Connecting rod straightening levers	0301-70700-00.1
13	Extractor for removing fly wheel disc	0301-71700-00.3
14	Reaming assembly for small end bush, basic size 10	0101-70900-00.1
15	Sliding sleeve for clutch cover plate	0199-73501-00.1
16	Extractor for bearings fork bearing race	4995-71700-10.2
17	Device for supporting fly wheel magdyno	0101-71300-00.3

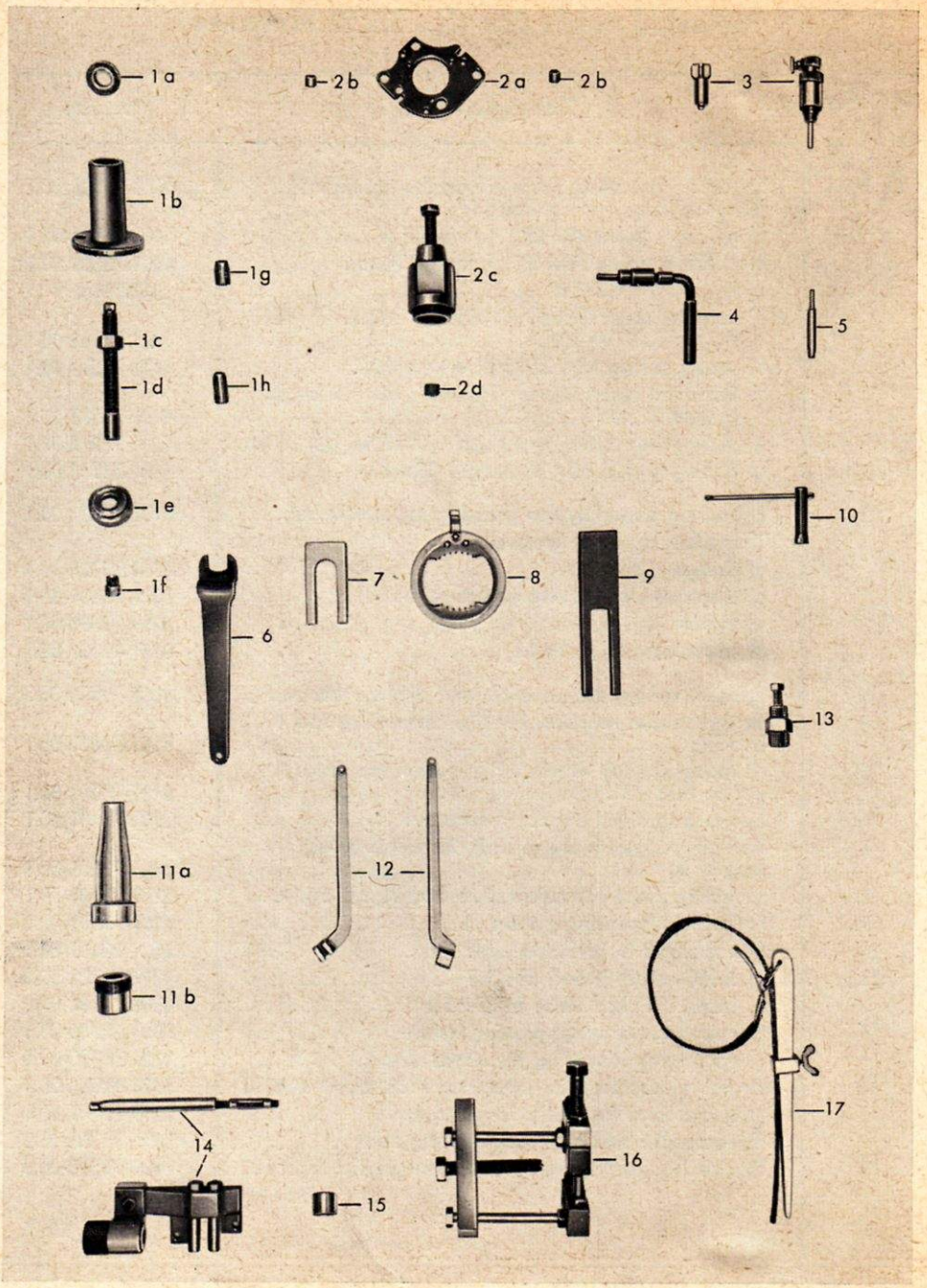


Fig. 9 Special DKW tools for the DKW Hummel

VI / 57 / 836

Ser. No. Fig. 12	Designation	Part No.
	B. We recommend the use of the tool assemblies listed below.	
	DKW-Universal-assembly-Jig for motorcycle workshops.	
	I. Main unit see fig. 10	
	a) tubular stand	2017-75200-00.0
	b) adapting mount I	6318-75200-00.0
	c) adapting flange Ia	6003-75200-00.0
	d) adapting flange Ib	6718-75200-00.0
	e) multi purpose angle	6603-75200-00.0
	f) adapting mount II	4605-75200-00.0
	II. Accessory unit see fig. 11	
	a) clamp for frame	0101-75200-00.2
	b) supporting arm for engine assembly	0101-75200-10.1
	III. Special accessories (these tools are illustrated on fig. 12)	
1	Buzz box	0101-72000-00.3
2	Ring gauge (setting ring) NM 40	0101-72501-00.0
3	Inside micrometer NM 35 to 60	0301-72600-00.0
4	Dial gauge, 10 mm	4601-72701-00.0
5	Alignment gauge for wheels	4601-74400-00.2
6	Drift spreader for bearing races on frame (steering head)	4505-71101-00.2
7	Seal for sparking plug seat	1817-76701-00.1
8	Tap for sparking plug seat	4601-76501-00.3
9	DKW-Messknirps, ammeter.	0301-76301-00.3
10	Thickness gauge 0.05 / 0.35 / 0.4 / 0.5 / 0.6	6203-74400-10.3
11	Ignition spark gauge	4701-76200-00.3
12	Extractor and replacer for condenser	0301-73400-00.3
	A tool that can be made in the workshop as required	
	Assembly for tracking the wheels (not illustrated)	4701-73300-00.2

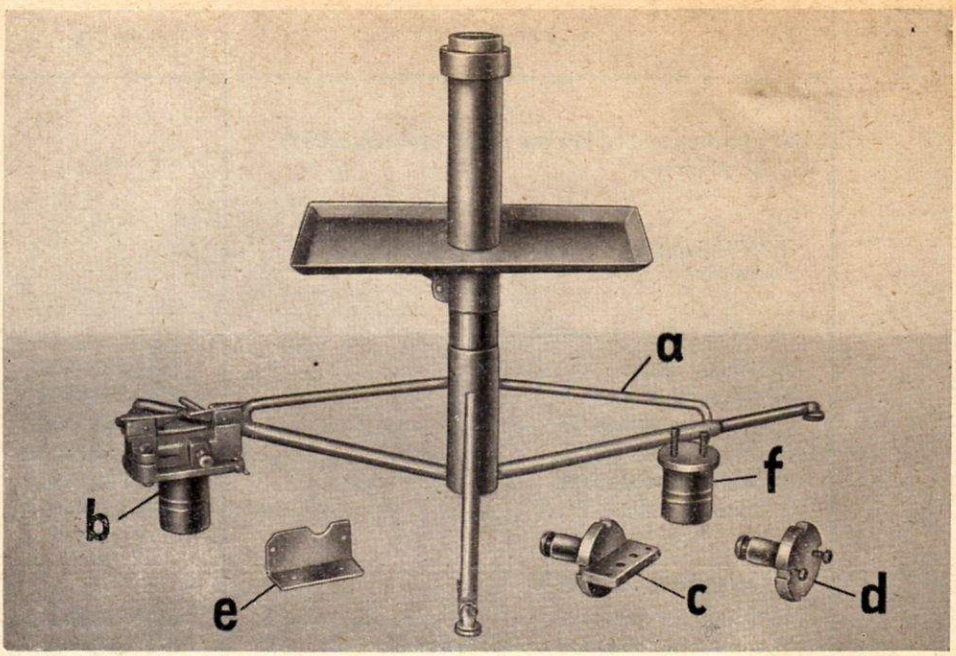


Fig. 10 DKW-Universal-Assenmbly-Jig (main unit) VI / 56 / 2127

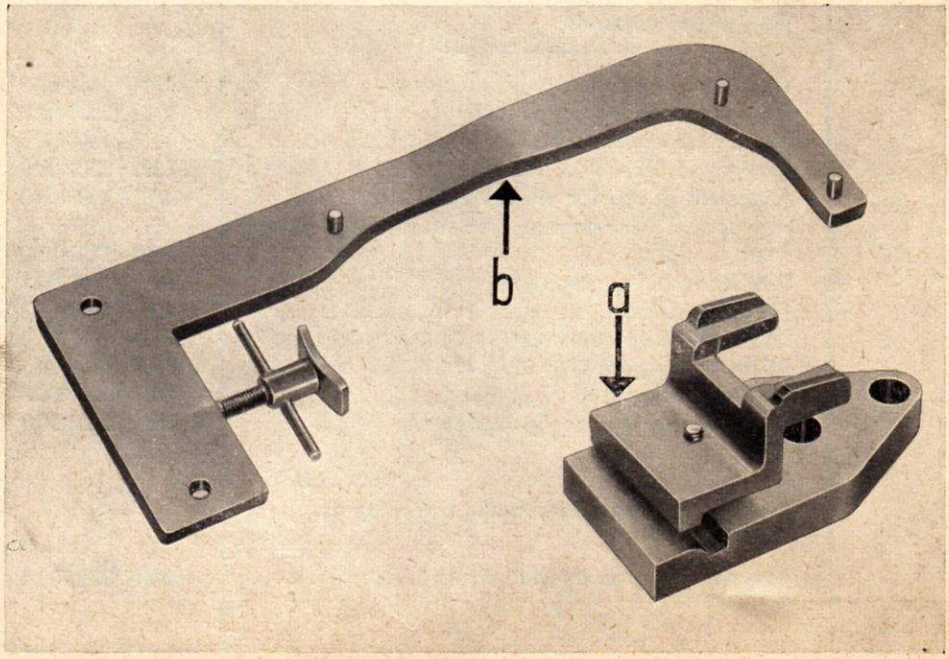
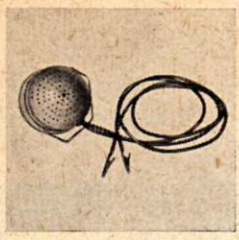
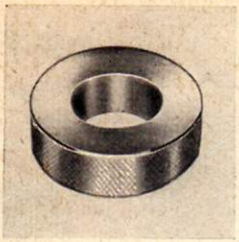


Fig. 11 DKW-Universal-Assembly-Jig (Accessory unit for DKW-Hummel) VI / 57 / 626

Special tools for the DKW Hummel



12 / 1 VI / 57 / 604



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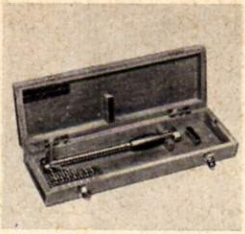
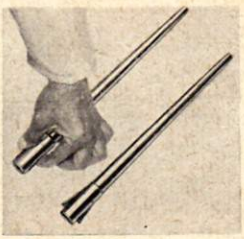


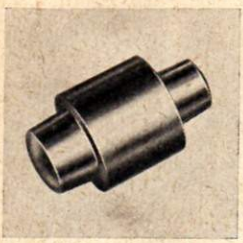
12 / 3 VI / 56 / 2137

12 / 4 VI / 56 / 2130

12 / 5 VI / 56 / 2191



12 / 6 VI / 56 / 2132



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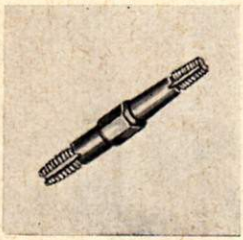

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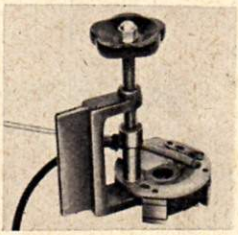
12 / 11 VI / 57 / 2137



12 / 12 VI / 56 / 2138

The figure numbers against the illustrations above correspond to the sequence of serial numbers on page 25.

Fig. 12 Special tools recommended for purchase

Fig. 13 DKW Hummel in position on the Universal-assembly-jig VI / 56 / 2168

I. Engine removing and replacing

A. Removing engine

1. Open headlamp, disconnect short circuit cutout cable (green) and electric light cable (red), draw both cables from

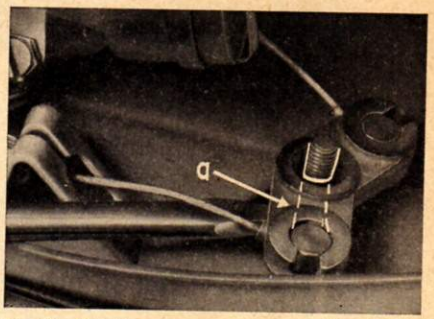


Fig. 15 Pressing gear shift lever out
a = from eng. No. 01 020 008 the gear shift lever is scribed with "top" VI / 56 / 1759

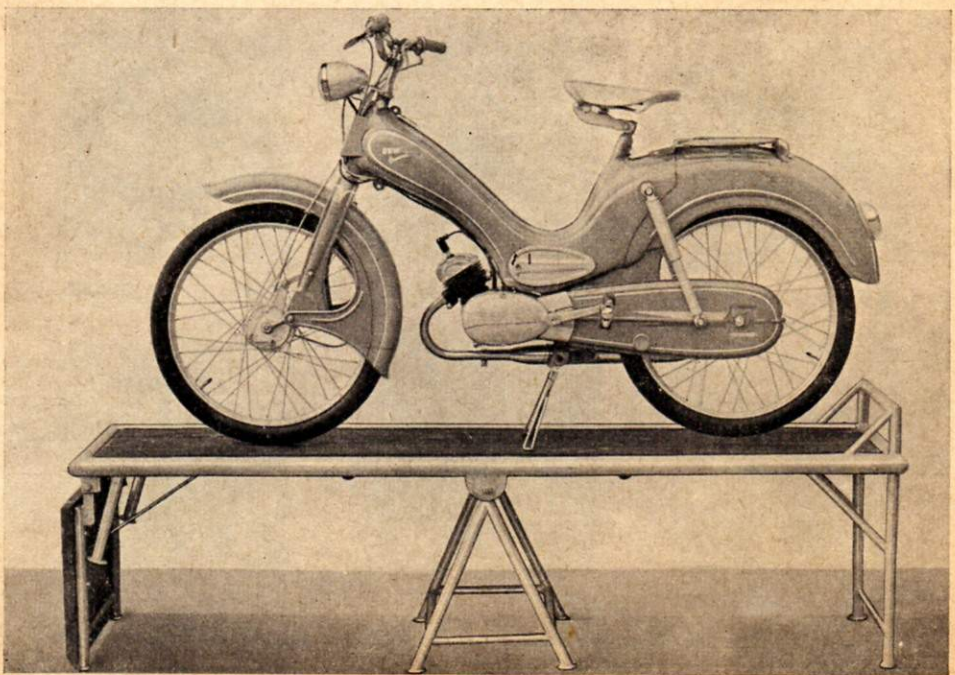


Fig. 14 DKW Hummel in position on the assembly stand VI / 57 / 588

the headlamp housing and detach from the frame by unclipping the three securing straps.

2. Undo cover plate from chamber housing carburetter and remove. Unscrew the 6 metre hexagonal nut (width across flats 10; it will be subsequently designated with SW) from the gear fork shaft. Lift off gear shift lever and spring washer or press out with a screw driver. (see fig. 15)

Note!

From engine No. 01 020 008 the gear shift lever (see arrow on fig. 15) is cribed with "top". In addition the bottom eyes for the cable nipples are closed. From engine No. 01 025 053 the slot in the gear shift lever is reduced in width from 7 + 0.022 mm and eliminates play in the fitting. This gear shift lever can be exchanged with the previous design and carries the part No. 0101-15226-01.

3. Close the fuel tap and remove fuel pipe from the carburetter. Unscrew the two hexagonal nuts, remove spring washers and take the induction pipe and carburetter from the cylinder.

Note!

If the carburetter is to be removed for repair (described on page 54) the clamping screw on the induction pipe must be loosened.

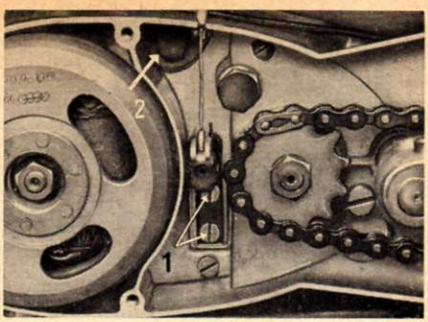
4. Remove the two M 6 x 30 cheesehead screws holding the cover plate (left hand side of engine) from the crankcase and remove the plate.

5. Unscrew the bracket supporting the clutch lever from the crankcase (2 M 5 x 12 counter-sunk screws) and disconnect the clutch cable from the side. (see fig. 16)

Note!

The nipple on the clutch lever cable can only be removed from the side.

6. Unscrew hexagonal nut (SW 11) from the cotter pin on the left hand pedal crank, take the washer off and, by supporting



VI / 56 / 2076

Fig. 16 1 = Securing screws of bracket
2 = Front engine securing screws

the pedal crank, tap cotter pin out of the crank with an aluminium hammer. Withdraw pedal crank from pedal crank shaft.

7. Unscrew the M 6 x 25 cheesehead screw from the end plate and remove the plate from the pedal crankshaft.

8. Remove the two hexagonal nuts from the gear shaft. Take off securing washer, chain and sprocket and remove the sprocket from the chain.

Note!

Up to engine No. 01 006 120 the sprocket is secured with a nut and an ATECO-spring ring.

From engine No. 01 006 212 the sprocket is secured with two flat nuts.
From engine No. 01 017 133 the gear shaft was modified and from this engine No. the sprocket is secured with a washer and two nuts.

9. Remove the right hand pedal crank repeating the instructions given for operation 6.

10. Dismantle brake cable on the brake control lever. Remove split pin, take bolt out of the forked piece.

11. Loosen clip on the exhaust silencer and screw the exhaust pipe from the cylinder. Pull the exhaust tube out of the silencer a little an withdraw from the cylinder.

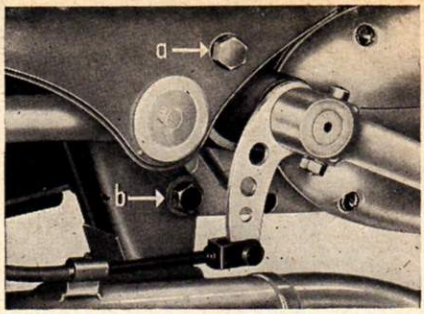
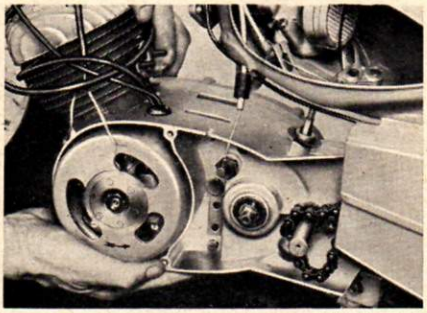


Fig. 17 Engine rear mounting VI / 57 / 607

12. Witw a box spanner (SW 14) unscrew the rear engine securing screws (see arrow **"a"** and **"b"** on fig. 17), the M 8 x 105 and M 8 x 50 hexagonal screw and spring ring from the right hand side.



VI / 56 / 2080

Fig. 18 Lifting engine from the chassis

13. With a similar spanner (SW 14) remove the M 8 x 50 hexagonal screw and spring ring securing the engine at the front from the left hand side. With one hand supporting the engine, draw it down out of the chassis as illustrated in fig. 18.

B. Refitting engine

14. Guide the engine into position on the frame from the front. Place the chain over the pedal crank shaft.

15. First screw in the front securing screw, then the two rear screws and finally tighten thoroughly with a box spanner.

16. Replace gasket between induction pipe and cylinder and screw the pipe firmly onto the cylinder.

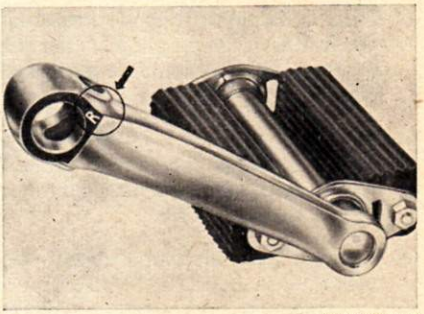
17. If necessary insert some asbestos cord round the exhaust stud and press it in with the exhaust pipe. Attach the exhaust pipe to the cylinder and fit the other end of the tube to the silencer.

18. Connect brake cable to brake control lever, replace bolt and renew split pin.

19. Fit right hand pedal crank on to shaft. Press in cotter pin. Tighten thorougly with washer and nut.

Important!

From the illustration fig. 19 it can be seen that the pedal cranks are marked with the letters "R" (right) and "L" (left) respectively; they are not inter-changeable. The symbol may be found on the other end of the crank.



VI / 56 / 2089

Fig. 19 Identification marking on the pedal cranks. (May occur on the other end of the crank)

20. Loosen the rear wheel, push it to the front a little, replace sprocket in the chain, insert on the gear shaft and tighten firmly.

Note!

Up to engine No. 01 006 120 replace spring ring and tighten chain sprocket with a nut.

From engine No. 01 006 121 the chain sprocket is secured with two flat nuts.

From engine No. 01 017 133 the gear shift shaft was modified. The chain sprocket from this engine number is secured with a washer, two nuts.

21. Connect clutch cable to clutch lever and screw the support bracket to the housing.

22. Adjust amount of play in clutch by loosening lock nut and screwing the set screw in or out until the clutch control lever on the handlebars has some play in it.

23. Screw crankcase cover (timing side) firmly to the crankcase (M 26 x 30 cheesehead screws).

24. Secure end cap on the crankcase. Replace left hand pedal on the pedal crank shaft and tighten with cotter pin, washer and nut.

25. Reassemble gear shift lever (marked "top" from engine No. 01 020 008) and tighten thoroughly. The direction of the drive must be transverse to the lug retaining the gear fork shaft (see fig. 15).

26. Replace cover on chamber housing the carburetter.

27. Secure leads to the frame with the 3 straps and insert into headlamp. Connect green lead to terminal 2 and red to terminal 51. Reassemble headlamp unit.

28. Fit the rear wheel squarly in the forks, correct tension of the chain and readjust rear wheel brake.

29. Adjust gear change; method described on pages 64 and 65.

II. Stripping down the engine

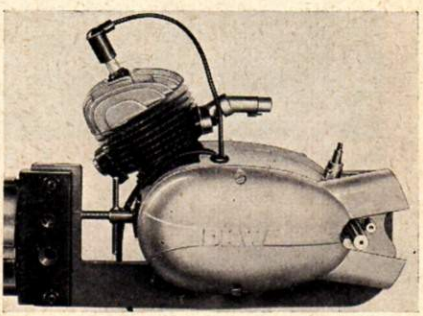
Once the engine has been removed from the frame it must be thoroughly cleaned. The tools illustrated on page 24 are essential for a methodical stripping and overhaul of the engine.

A. Removing flywheel magdyno

Note!

Repairs on the flywheel magdyno can be done quite easily without stripping the engine. It is necessary however to remove the housing cover (timing side of engine) which can be done by unscrewing the two M 6x30 cheesehead screws.

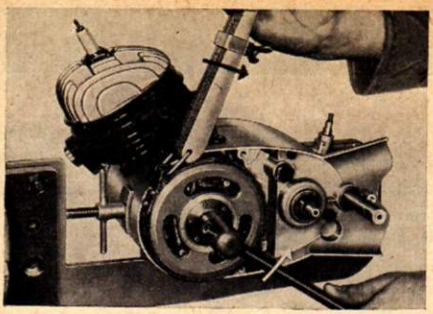
1. Clamp engine in supporting arm, part No. 0101-75200-10.1, on the assembly jig (see fig. 20) and drain off gearbox oil.



VI / 57 / 634

Fig. 20 Complete engine fitted on the Universal-assembly-jig supporting arm.

2. Hold the flywheel disc firmly with supporting strap, part No. 0101-71300-00.3, and unscrew M 10x1 hexagonal nut with box spanner (SW 15) (see fig. 21).



VI / 57 / 633

Fig. 21 Unscrewing nut securing flywheel disc

3. Screw in extractor, part No. 0301-71700-00.3, use a 27 mm spanner on the extractor, turn set screw (illustrated in fig. 22) and remove flywheel disc and spring ring B 10.

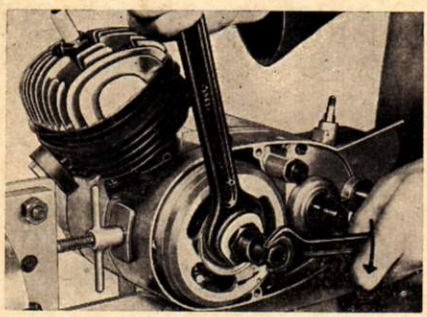


Fig. 22 Removing fly wheel disc VI / 57 / 632

4. To simplify the adjustment of the ignition the position of the stator plate is scribed on the crankcase.

5. Unscrew the two M 4 x 18 crossheaded fillister screws, spring rings and washers which secure the stator plate. Remove sparking plug contact and press rubber grommet through to the inside. Take off the stator plate and draw lead from the crankcase.

6. Lay stator plate in the flywheel disc.

Note!

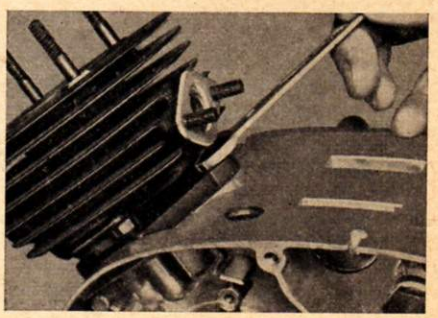
If the flywheel has been removed for any length of time short circuit the magnets with a strip of metal.

B. Removing cylinder head, cylinder and piston

Note!

Jobs carried out on the cylinder head, cylinder and piston can be done quite easily without stripping the engine. Stripping the cylinder, however, necessitates the removal of the exhaust system, carburetter and induction pipe.

1. Remove the four M 6 hexagonal nuts securing the cylinder head with a box spanner (SW 10) as shown in fig. 23, lift off cylinder head with the four spring washers and remove cylinder head gasket.



VI / 56 / 1806

Fig. 23 Loosening cylinder base nuts

2. Unscrew the four M 6 hexagonal nuts from the threaded pins on the cylinder base (illustrated on fig. 23). Remove spring washers or spring rings and draw out cylinder (see fig. 24).

3. Remove cylinder base gasket.

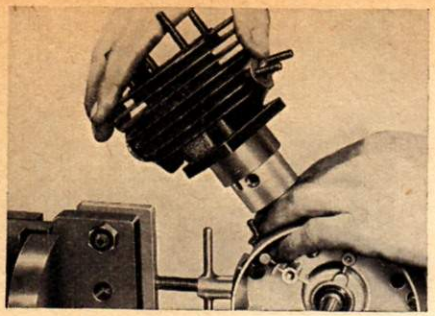
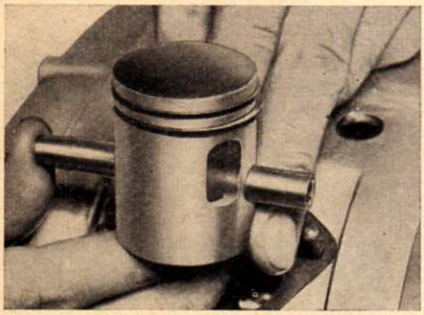


Fig. 24 Removing cylinder VI / 57 / 629

Note!
If work is limited to the cylinder, piston, or the fitting of a new smallend bush on the connecting rod, the crankcase chamber must be covered with a clean piece of cloth.

4. Remove both gudgeon pin circlips from the piston with a pair of pliers and press the gudgeon pin out of the piston with drift, part No. 0101-70401-00.1.



VI / 56 / 1867
Fig. 25 Pressing gudgeon pin out of the piston

Note!
The gudgeon pin floats in the piston and it is not recessary to warm the piston when stripping down. When dismantling this part of the engine it is important to remove the piston as quickly as possible because it can be very easly damaged.

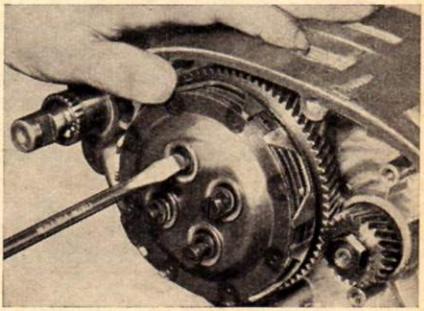
C. Removing clutch

Note!
All work on the clutch can be carried out without stripping the engine.

1. Remove securing ring from the pedal crank shaft with a pair of Seegerring pliers, and take off check and spacer washers, brake lever and rubber ring.

2. Remove the six M 6 x 35 cheesehead screws and lift off the clutch cover. Remove seal on the clutch cover and drain off what oil is left in the gearbox.

3. Unscrew the 4 oval head screws from the clutch centre (fig. 26), and remove spring cups and clutch springs from the clutch plates.



VI / 56 / 1808
Fig. 26 Removing oval head screws from the clutch centre

Note!
From engine No. 01 004 585 the oval head screws are galvanized to fit more tightly in the clutch centre. These screws carry the part No. 00084-053-37. If the screws in the clutch centre appear to be slack or a loose fit, they must be replaced with the galvanized screws which have a slightly deeper thread.

To prevent the clutch slipping the clutch springs are strengthened from engine No. 01 030 496, and must not be confused with the previous assembly.

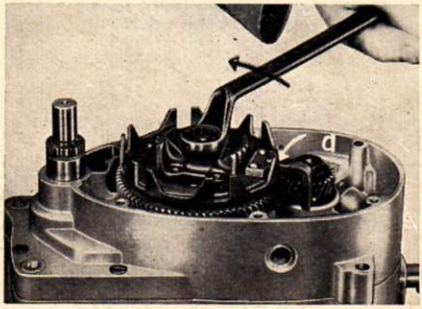
From engine No. 01 041 200 the four oval head screws are not used. The clutch centre is fitted with 4 rivet threaded pins. Four slotted screws are required with this design to tighten the clutch springs. The complete assembly carries the part No. 0101-12547-00, and can be exchanged with the previous design, part No. 0101-12509-01.

4. Remove clutch plate and discs from the clutch. Remove the built up clutch thrust rod assembly and the steel balls (5 mm ⌀) separating the two thrust rods from the clutch shaft.

Note!

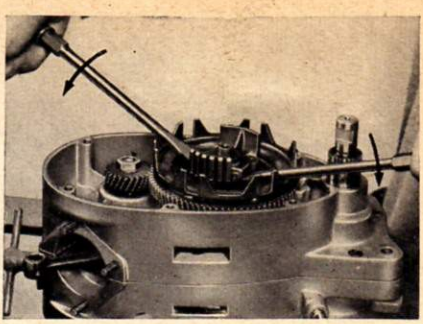
From engine No. 01 007 676 the thrust rod is modified from 4.75 to 4.9 mm ⌀. The play between thrust rod and clutch shaft is thereby reduced and the tumbler movement on the radial ring is mitigated. The fitting of the 4.9 mm ⌀ thrust rod increases the surface pressure on the edges of the radial seal affording a better protection against oil seepage.

5. Insert arresting piece **"a"**, part No. 0101-71301-00.1, between clutch core and clutch centre. Unscrew hexagonal nut with box spanner (SW 19).



VI / 57 / 599

Fig. 27 Unscrewing hexagonal nut from the clutch shaft



VI / 57 / 598

Fig. 28 Releasing clutch centre

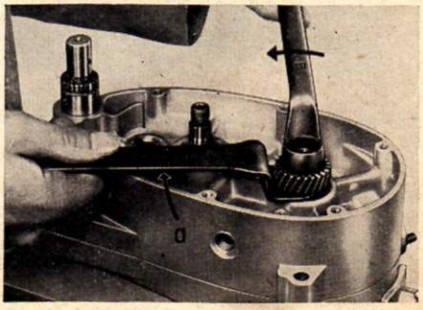
Note!

The nut on the clutch shaft has a right hand thread.

6. Withdraw clutch centre, or lever off if necessary with a pair of large screwdrivers (see fig. 28).
7. Remove gear wheel, bush, abutting ring and spacer shims from the clutch shaft.
8. Insert arresting piece **"a"**, part No. 0101-71401-00.1, under the crankshaft sprocket and remove the nut (SW 17) and spring ring with a wrench or box spanner.

Note!

From engine No. 01 032 589, the sprockets are manufactured with a more durable material.
This type of sprocket attenuates wear and contributes greatly to the quieter and smoother running of the engine.



VI / 57 / 600

Fig. 29 Unscrewing hexagonal nut from the crankshaft

9. Remove sprocket from the crankshaft (no cone).

N o t e !

If removing the clutch and nothing else, ignore the instructions given in operations 8 and 9.

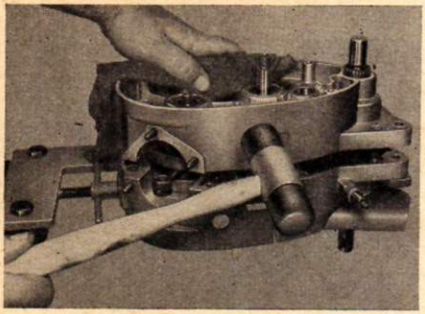
D. Seperating crankcase half-members. Removing gearbox and crankshaft

N o t e !

The crankcase can be taken apart in one of two ways. .

First method:

Carefully heat both halves of the crankcase to a temperature of between 80 and 100° C and seperate the half-members. No special tools are necessary.



VI / 57 / 880

Fig. 30 Taking off the heated right hand half-member from the crankcase

Second method:

It is not necessary to heat the crankcase; simply seperate the two halves with the special tools, part No's 4699-71500-00.1 and 4601-73301-10.1, described on page 24.

Stripping down the crankcase using the first method

1. Remove all cheesehead screws from the crankcase (see diagram on fig. 45 showing position of screws).
2. Heat right hand crankcase half-member to approx. 80—100° C with a gas flame. Remove the radial sealing ring.
3. Draw the two halves of the crankcase apart. A light tap with a rubber tipped hammer will be sufficient to separate the half-members (see fig. 30). The pedal shaft must be left in position in the left hand half-member of the crankcase.

N o t e !

It is immaterial whether the clutch shaft and centre bush are left in the left hand half of the crankcase or not. Take care not to lose the spacer shims on the crankshaft bearing.

4. Remove seal from crankcase.
5. Remove the gearbox as follows:
   a) Remove clutch shaft (if it has not already been taken out with the right hand half-member) and gear wheel shaft.

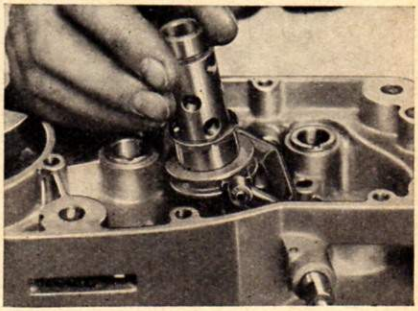


Fig. 31 Removing gear shaft VI / 57 / 602

   b) Take the three gear wheels off the shaft, remove 12 steel balls from the gear shaft and pull off the check washer. The securing ring is left on the gear shaft.

N o t e !

The gear shaft was modified from engine No. 01 007 133 and the collar was replaced with a securing ring and a check washer.

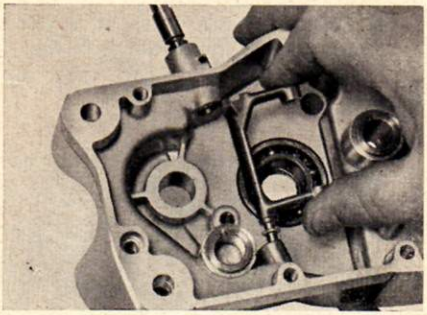
   c) Remove the complete pedal shaft assembly from the left hand half of the crankcase.

6. Knock the gear shaft out of the bearing 6004 with a few light hammer taps. Tilt

gear shaft to one side, as illustrated on fig. 31, and withdraw sleeve from the gear selector shoes.

7. Remove the shoes from the gear selector fork.

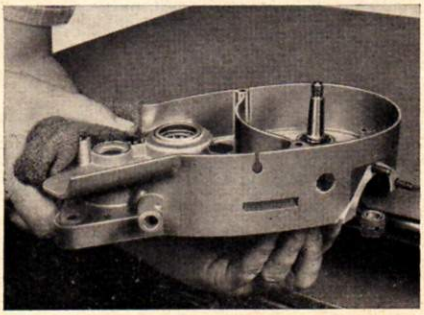
8. Remove gear selector fork by
   a) tapping out the 3 mm cylindrical pin from the gear fork shaft bearing on the crankcase,
   b) withdrawing gear fork shaft,
   c) and lifting the selector fork and washer out of its bottom bearing as illustrated in fig. 32.



VI / 57 / 859

Fig. 32 Removing gear selector fork

9. Heat left hand half member to between 80—90° C, take off the radial sealing ring and remove the crankshaft and ball bearing. If necessary support the crankcase with a layer of wood, as illustrated in fig. 33.



VI / 57 / 881

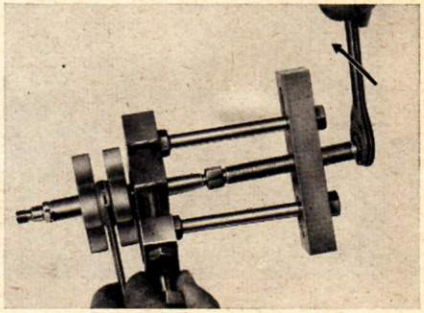
Fig. 33 Removing crankshaft from the heated left hand crankcase half-member

N o t e !
If necessary the bearing 6004 "C 3" in the gearbox can be pressed out gently providing the crankcase is still warm. This applies also to the Bearing 6202 "C 3" in the right hand half-member of the crankcase.

10. Remove all the radial rings and lip sealing the crankcase.

11. Remove securing ring on the crankshaft bearing from the right hand half-member with a pair of Seegerring pliers.

N o t e !
When the crankcase is heated to strip down the engine, the bearings are left on the two crankshaft pins. The bearings are removed with the extractor, part No. 4995-71700-10.2 (fig. 34).



VI / 57 / 835

Fig. 34 Stripping bearing from the crankshaft

12. Fit the extractor and remove bearing 6202 "C 3" from the crankshaft pin by screwing in the pressure screw.

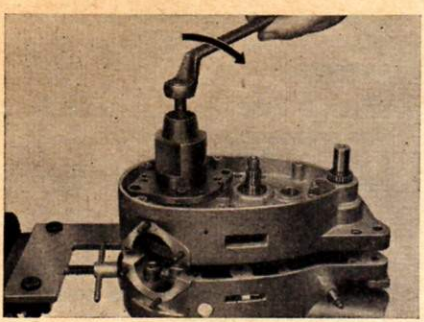
13. The bearing on the other crankshaft pin is removed in the same way.

Stripping down the crankcase employing the second method

1. Remove all the screws on the crankcase.

2. Screw pressure cap, part No. 0101-71901-00.1, on the right hand crankshaft pin.

3. Screw puller, part No. 4699-71500-00.1, and flange, part No. 4601-73301-00.1, firmly on to the right hand crankcase half-member over the two distance sleeves, part No. 0301-73301-00.1.



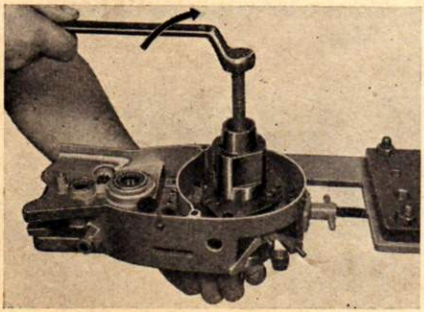
VI / 57 / 882

Fig. 35 Removing right hand half-member from crankcase

4. By screwing in the pressure bolt the right hand half-member and the bearing are withdrawn from the crankshaft pin as fig. 35 shows. The pedal shaft must remain in the left hand half-member of the crankcase.

5. The removal of the gearbox follows the instructions given for operations 4 to 8 in section D first method.

6. Screw pressure cap on left hand crankshaft pin. Secure puller and flange to the left hand crankcase half-member and press out crankshaft.



VI / 57 / 883

Fig. 36 Withdrawing crankshaft from left hand crankcase half-member

N o t e !
If the bearings are left on the crankshaft pin after removal of the crankshaft they must be stripped with the extractor as described under operations 12 and 13 of section D, first method (see fig. 34).

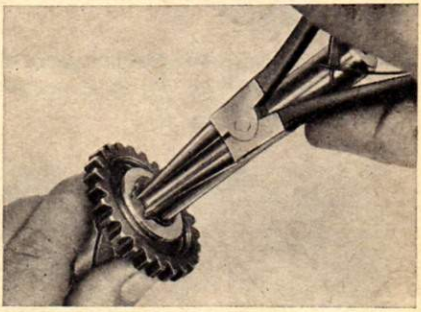
7. Heat the two halves of the crankcase to between 80 and 100° C and remove the bearing. Watch out for any spacer shims lying between the crankshaft bearing and the securing ring in the right hand half of the crankcase.

8. Press out all the radial sealing rings and lip rings.

9. Remove securing ring for the crankshaft bearing from the right hand crankcase half-member using a Seegerring plier.

E. Stripping down and refitting pedal shaft

1. Remove securing ring from the pedal shaft with a pair of pliers (see fig. 37).



VI / 57 / 636

Fig. 37 Removing securing ring from the pedal shaft

N o t e !
To prevent the securing ring spreading after assembling a number of times, the pedal shaft is ground to 16 mm ϕ f 7 from engine No. 01 027 695.
From engine No. 01 034 836 the recessed slot retaining the securing ring is offset 1 mm and a check plate 2 mm thick is fitted to support the gear wheel.

2. Remove check washer and gear wheel.

3. Reverse the procedure when reassembling.

Important!

When removing and refitting the securing ring open the jaws only as far as is necessary to push it precisely over the shaft.

If the securing ring does not fit firmly in the groove on the shaft it must be replaced with a new ring.

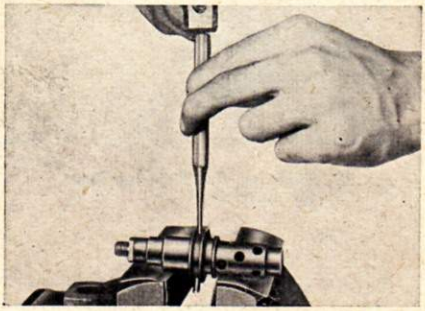
F. Stripping down and refitting gear shaft

Note!

From engine No. 01 000 015 the collar on the gear shift shaft was replaced with a securing ring, part No. 00471-010-30, and a check washer, part No. 00988-989-33.

From engine No. 01 017 133 the thread securing the chain sprocket was lengthened to 5 mm. The gear shaft carries the part No. 0101-15216-10.

1. Tap the dowel pin out of the gear sleeve and the draw key with a 4 mm punch, as illustrated in fig. 38.



VI / 56 / 2167

Fig. 38 Tapping out dowel pin from the draw key and the gearshift sleeve

2. Remove gear sleeve, grip the gear shaft with one hand and insert a small screwdriver into the slot of the draw key with the other. Turn the screwdriver through 90° and the small arresting ball will drop into the palm of the hand.

Important!

If the arresting ball has dropped out the draw key must not be turned any further otherwise the arresting spring will be damaged.

3. Remove arresting spring from the bottom hole of the draw key.

4. Remove draw key from the gear shaft.

Note!

The securing ring number 7 on fig. 40 must always be left on the gear shaft.
Refitting gear shaft.

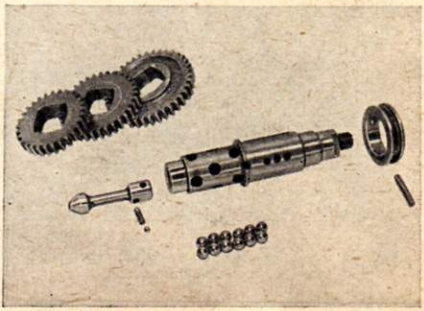
5. Slide draw key on to the gear shaft and adjust until the bottom hole for the arresting spring is directly underneath one or other of the longitudinal slots.

6. Replace the arresting spring and the steel ball (3.969 mm or 7/32").

7. Press in arresting ball with a screwdriver and turn the draw key with a small screwdriver until the ball engages in one of the three arresting depressions.

Note!

The arresting depressions lie on the inside of the gear shaft opposite the holes over which the selector sleeve slides.



VI / 56 / 2155

Fig. 39 Gear shaft, gear wheels, sleeve and draw key stripped from the gearbox (up to engine No. 01 000 014)

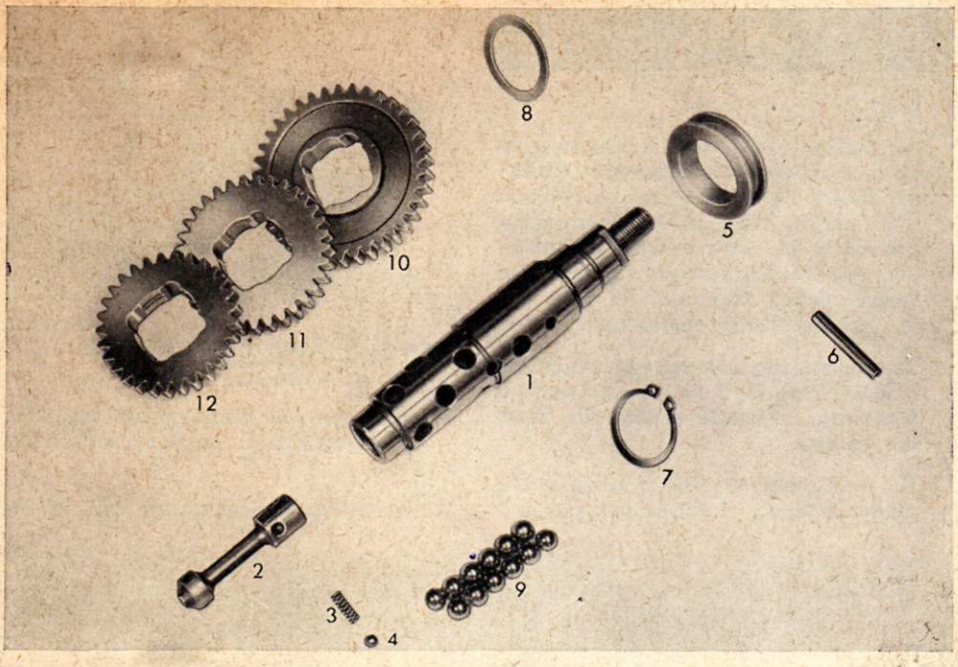


Fig. 40 Gear shaft stripped down (from engine No. 01 002 909) VI / 57 / 593

1 = Gear shaft	0101-15216-10	7 = Securing ring	00471-010-30
2 = Draw key	0101-15234-01	8 = Check washer	00988-989-30
3 = Arresting spring	0101-15214-01	9 = Steel balls 7 mm	05401-024-40
4 = Steel ball 3.969 mm	05401-037-40	10 = Gear wheel 1st gear	0101-13107-00
5 = Selector sleeve	0101-15219-00	11 = Gear wheel 2nd. gear	0101-13108-00
6 = Dowel pin 4 x 29 x 0.5	01481-998-30	12 = Gear wheel 3rd. gear	0101-13109-00

8. Slide gear selector sleeve over the gear shaft until the hole in the draw key is opposite the holes in the selector sleeve.

9. Tap the dowel pin into the hole on the selector sleeve and knock it through the draw key.

Important!
The dowel pin must fit tightly in the draw key. There should be slight play in the two holes on the selector sleeve.

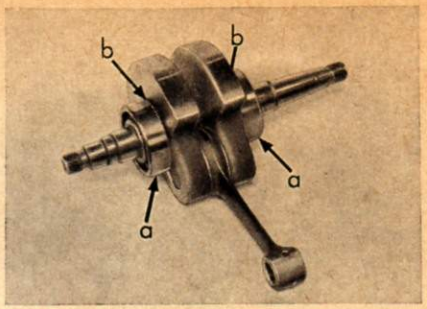
III. Reassembling the engine

Note!

All engine parts must be thoroughly cleaned, checked and if necessary renewed before the engine can be refitted. If the engine has been completely stripped down and the crankcase half-members are already screwed together, the radial sealing rings and lip rings are the first items to be reassembled.

The sealing edges of the two crankcase half-members must be checked and, if necessary, reground before the seals are refitted.

The reassembly of the crankshaft can again be carried out in two ways.



VI / 57 / 622

Fig. 41 Crankshaft prior to reassembly
a = ball bearing 6202 "C 3"
b = membrane

1. When the ball bearings are still fixed to the crankshaft, as illustrated on fig. 41.
2. When the ball bearings are in the

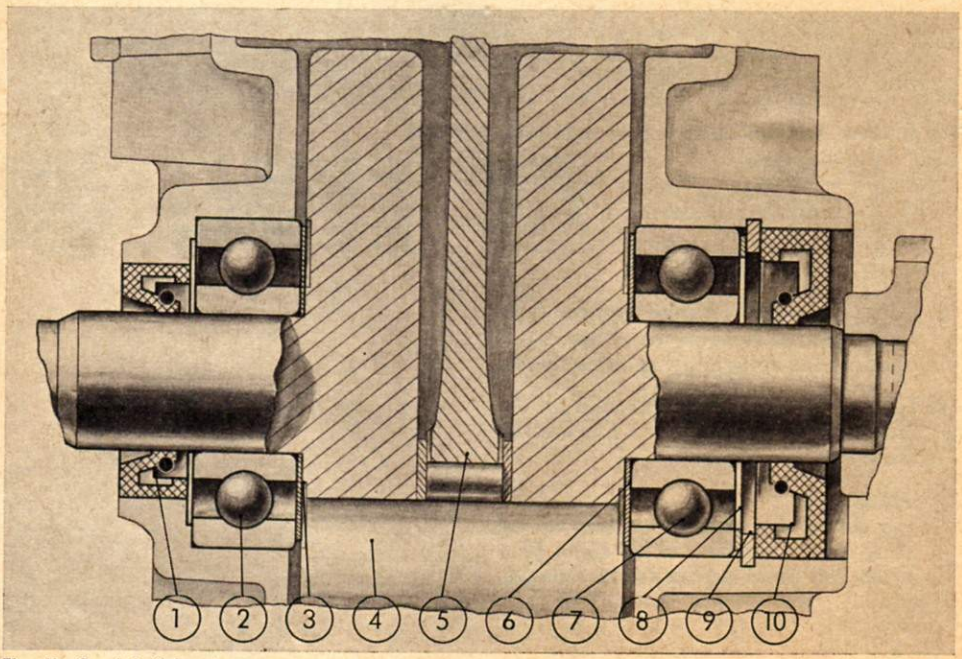


Fig. 42 Crankshaft bearing

No.	Part designation	Part No.	No.	Part designation	Part No.
1	Radial sealing ring (timing side)	06504-018-90	6	Membrane shim	0101-10344-00
2	Ball bearing 6202 "C 3"	00625-982-40	7	Ball bearing 6202 "C 3"	00625-982-40
3	Membrane shim	0101-10344-00	8	Check washer	0101-10327-00
4	Crank pin	—	9	Securing ring	00472-003-30
5	Roller bearing on connecting rod	—	10	Radial sealing ring drive side	06504-991-90

crankcase half-members.

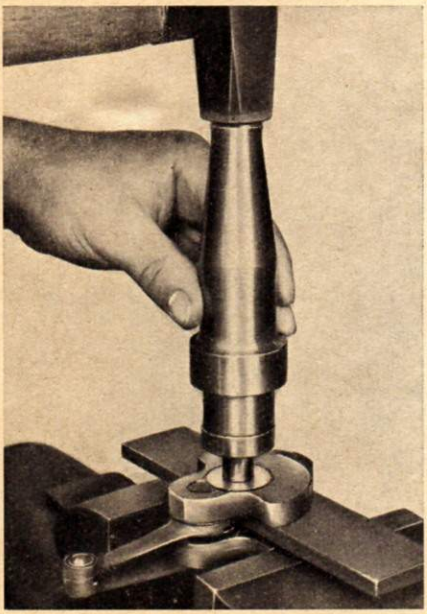
Ball bearing 6202 "C 3" is the only type used on the crankshaft assembly.

The designation "C 3" is stamped on the outside of the packing and also scribed on the outer ring of the bearing. Three dots "• • •" are also used to indicate the designation "C 3".

A. Reassembling crankshaft and gearbox

Refitting engine when the ball bearings are assembled on the crankshaft

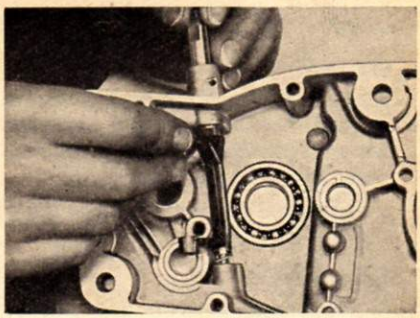
1. Slide a piece of flat steel or an assembly plate between the "bob-weights" and rest them on the open face of the vice.
2. Push washer **"b"** over the crank pin on the "bob-weight" and refit the ball bearing **"a"** with tapered sleeve (see fig. 43).



VI / 57 / 813

Fig. 43 Refitting ball bearing on crankshaft pin

3. Repeat the procedure on the other crankshaft pin.
4. Heat left hand crankcase half-member to between 80—100° C.
5. Replace crankshaft and the bearing in the left hand half-member.
6. If the half-member is still warm replace the ball bearing 6004 "C 3" on the gear shaft.



VI / 57 / 603

Fig. 44 Reassembling gear selector fork

7. Replacing gear selector fork:

   a) Replace gear selector fork and washer as illustrated in fig. 44, and fit the gear fork shaft in to its socket on the crankcase.

   b) Tap the 3 mm cylindrical pin into its socket on the crankcase.

   Important!

   When the cylindrical pin has been fitted the gear fork shaft should move easily in its sockets.

8. Reassembling gearbox:

   a) Replace both gear shoes on gear selector fork.

   b) Guide shoes into the selector sleeve and tap gear shaft with a rubber tipped hammer or press with the hand into the ball bearing 6004 "C 3".

   Note!

   If the radial sealing ring for the gear shaft is already in the crankcase the sliding sleeve, part No. 4601-73518-00.1, must be fitted on the outside and the gear shaft pressed in or tapped in.

   c) Slide pedal shaft into the crankcase.

   d) Push check washer 22 x 30 x 0.8 up against the securing ring on the gear shaft.

N o t e !

The check washer must always be replaced before the steel balls and gear wheels are fitted.

e) Replace the 12 steel balls (7 mm ⌀) and some grease into the gear shaft sockets.

N o t e !

When replacing the balls it is necessary to push the draw key into neutral allowing all the balls to be pressed complety into the gear shaft.

f) Slide the 3 gear wheels on to the gear shaft.

Important!

The largest gear wheel must always be fitted first. Pay particular attention that the narrow collar on the inside running surface points to the selector sleeve. The other two gear wheels are fitted in the same way with the collar bearing the oil groove pointing to the selector sleeve. The arrow on the gear wheels indicates the direction of rotation.

g) Replace the clutch and gear wheel shaft in the crankcase. Replace the driving element, brake spring, driving sleeve and check washer on the pedal crank shaft.

N o t e !

All working parts must be lightly oiled.

h) Stick crankcase seal and a jointing grease on to the left hand half-member of the crankcase.

9. Assemble the right hand half-member.

a) Heat right hand half-member to between 80 and 100° C and replace ball bearing 6002 "C 3" on the clutch shaft.

b) While the half-member is still warm place it on the previously assembled left hand half-member of the crankcase.

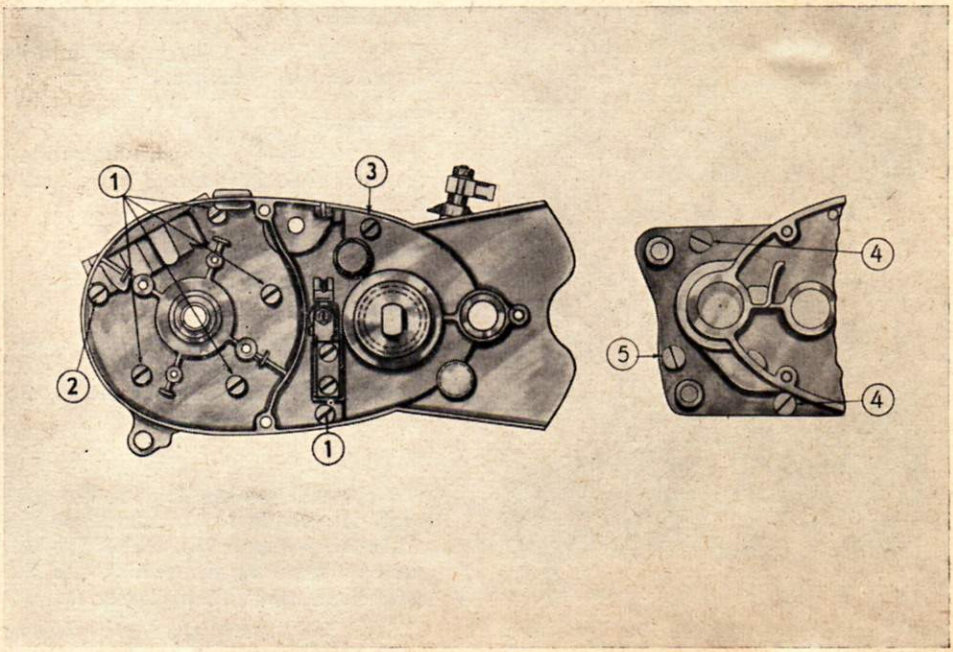


Fig. 45 Diagram showing position of screws

1 = Cheesehead screw M 6 x 30
2 = Cheesehead screw M 6 x 40
3 = Cheesehead screw M 6 x 50
4 = Cheesehead screw M 6 x 30
5 = Cheesehead screw M 6 x 25

VI / 57 / 200

If it is necessary to knock the half-members with a rubber tipped hammer the forked wedge, part No. 0101-73201-00.1, must be inserted between the "bob-weights".

Important!

When replacing the two halves of the crankcase make sure that the brake spring grips the nibbed projection on the right hand half-member. If necessary push the brake spring into the correct position with a small screwdriver.

d) Insert all screws securing crankcase into the positions illustrated in fig. 45 and tighten thoroughly.

f) After tightening the screws the crankshaft bearings are released as follows:

Insert forked wedge between the "bob-weights" and tap each crank pin lightly with a rubber-tipped hammer. Remove the forked wedge and check whether the crankshaft revolves easily.

g) Check gear change mechanism and gearbox for smooth running.

h) Remove the spacer sleeve from between the right hand crankshaft bearing and the recessed slot and replace securing ring.

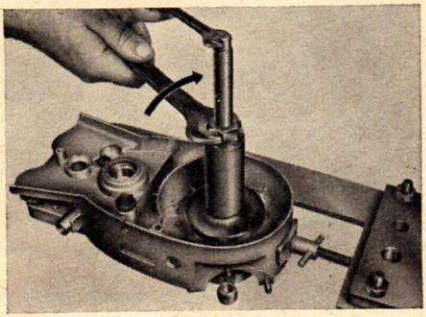
i) Replace the radial sealing ring for the crankshaft, gear shaft and clutch thrust rod and also the lip ring for the pedal crank shaft in the left hand crankcase half-member.

Note!

From engine No. 01 001 742 the radial seal and wire clip preventing oil escape on the clutch thrust rod are replaced with a radial sealing ring, part No. 06503-935-90, which has a coiled spring tightening the edges of the ring. Oil escape on the clutch thrust rod can be corrected with a new sealing ring.

Refitting engine when the ball bearings are in the crankcase

1. Heat both halves of the crankcase to between 80 and 100° C and replace the ball bearings.
2. Clamp left hand half-member into the adapting arm of the assembly jig.
3. Slide washer over the left hand crank pin.
4. Replace crankshaft with the replacing assembly, part. No. 0101-73500-00.1, in the left hand crankcase half-member. (See fig. 46)



VI / 57 / 884

Fig. 46 Replacing crankshaft in the left hand crankcase half-member

5. The reassembly of the gearbox follows the same sequence as that described in section A — operations 7 and 8.

Note!

If reassembling the crankcase half members without having previously heated them the job will be done more easily if the clutch shaft is fitted to the ball bearing in the right hand half of the crankcase.

6. Press clutch shaft into the ball bearing, or tap in with a rubber-tipped hammer.

Note!

If the right hand half-member is fitted with a radial sealing ring for the

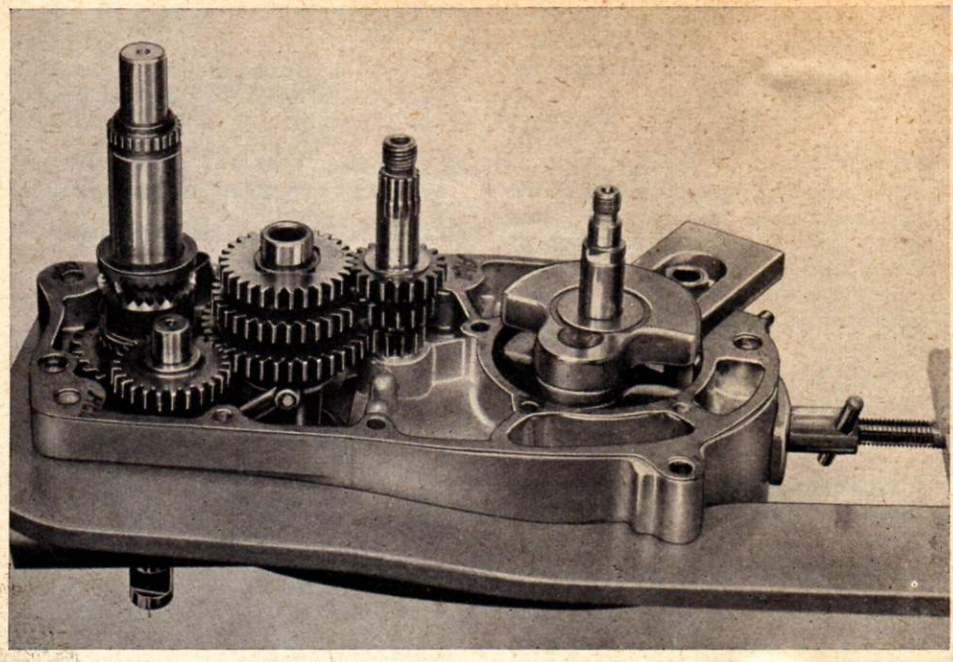
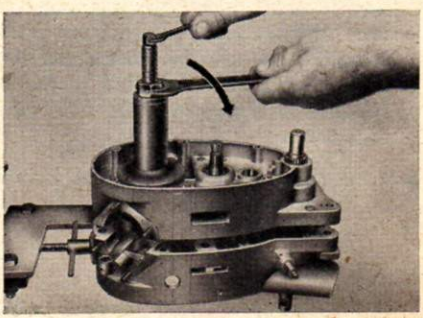


Fig. 47 Complete gearbox reassembled in the left hand crankcase half-member VI / 57 / 595

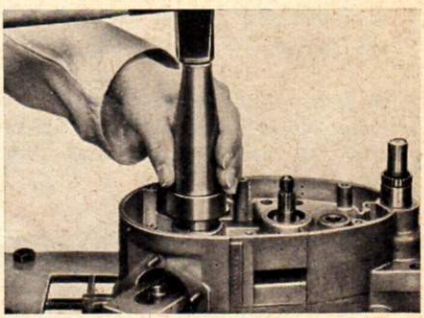
crankshaft the sliding sleeve, part No. 4601-73516-00.1, must be inserted into the seal ring from the ouside before the crankcase is assembled.

7. Slide washer over the right hand crank pin, replace right hand half-member with fitted ball bearing and tighten with replacing assembly as illustrated in fig. 48.



VI / 57 / 385

Fig. 48 Drawing crankcase together



VI / 57 / 618

Fig. 49 Replacing ball bearing up to the bob-weight

8. Insert screws securing crankcase into the positions shown on fig. 45 and tighten thoroughly.

Note!

When replacing the bearing a forked wedge, part No. 0101-73201-00.1, must be inserted between the bob-weights.

9. Replace ball bearing as far as the bob-weight with a sleeve or a drift, part No. 4896-71102-00.0 and insert, 4896-71104-00.4, fitting bearing into the right hand half of the crankcase.

10. Remove spacer sleeve from between ball bearing and the slotted recess for the securing ring and replace securing ring.

11. Release bearing with a light tap on the right and left hand crankshaft pins using a rubber-tipped hammer and check crankshaft for free running.

12. Replace radial sealing ring on the crankshaft, gear shaft and clutch thrust rod and also the lip ring on the pedal crank shaft.

Note!

From engine No. 01 001 742 the radial sealing ring and wire clip for the clutch thrust rod was replaced with a radial sealing ring, part No. 06503-935-90, which is gripped by a coiled spring fitted over the lips of the seal.

B. Reassembling complete clutch assembly

Note!

The fitting of the crankshaft sprocket always precedes that of the clutch gear wheel.

1. Replace sprocket on the crankshaft pin, attach spring ring and screw on nut. Hold the sprocket firmly with the supporting lever, part No. 0101-71401-00.1, and tighten nut.

Note!

From engine No. 01 032 589 the sprockets are hardened to reduce wear and contribute to the smooth running of the engine.

2. Replace clutch shaft spacer washers, abutting ring (1mm thick) and bush in that order. Slide the clutch gear wheel over the bush and check the setting.

Note!

The faces of the crankshaft sprocket teeth are 12mm wide. The clutch gear wheel teeth are only 10mm wide.

The gear teeth on the clutch must fit correctly into those on the sprocket. Each sprocket tooth must project 1mm on both sides. Any error can be corrected by either refitting or removing the spacer washers. The spacer washers must be fitted at the back of the 1mm thick abutting ring.

3. Replace clutch centre on clutch shaft, attach arresting piece, part No. 0101-71301-00.1, refit spring ring, crew on hexagonal nut and tighten.

4. Replace steel balls in the clutch thrust rod and slide the built up assembly on to the clutch shaft.

Note!

From engine No. 01 117 676 the clutch thrust rod is modified from 4.75 to 4.9mm ⌀. The amount of play between the clutch thrust rod and the clutch shaft is thereby reduced and the tumbler movement in the redial gasket is mitigated. The fitting of a thrust rod 4.9 mm in diameter increases the surface pressure on the lips of the radial seal, and a better joint is maintained against oil seepage.

5. Replace the clutch discs. (First a clutch and then a steel plate.) A total of 3 clutch and 2 steel discs.

6. Attach clutch plate, insert the four clutch cups and their springs. Screw in the oval head screws or slotted nuts until the clutch slips.

Note!

To adjust the clutch the clutch plate must be lifted off. To check the clutch control screw the support bracket on to the left hand half of the crankcase. Any adjustment necessary can be made by screwing the oval head screws or slotted nuts either clockwise or anti-clockwise.

The oval head screws must not be screwed in too far and screws longer than 6 x 25 metres must not be used. Longer screws would press against the clutch gear wheel and jam the clutch.

Note!

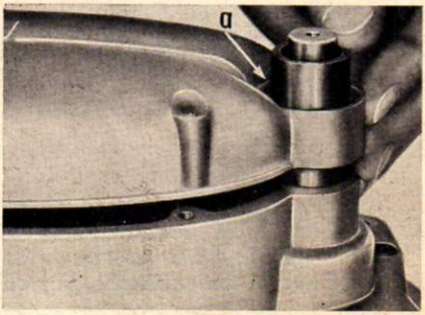
From engine No. 01 004 585 the oval head screws are galvanized to produce a tighter fit in the clutch centre. These screws have the part. No. 00084-053-37. If the screws fitted in the clutch centre are slack or a poor fit they must be replaced with the galvanized screws which have a deeper thread.

From engine No. 01 030 496 the springs are strengthened to prevent the clutch slipping. They must not be confused with the previous assembly.

Oval head screws are not fitted from engine No. 01 041 200 and four riveted thread screws replace the four oval head screws in the clutch centre. Four slotted screws are required with this design to tighten the clutch springs. The complete assembly has the part No. 0101-12547-00 and can be exchanged with the previous design, part No. 0101-12509-01.

7. Grease clutch cover seal and attach to crankcase. Pour in 600cc of gearbox oil SAE 80.

8. Fit the driving sleeve lip ring to the clutch cover. Push the sliding sleeve "a", part No. 0199-73501-00.1, in from the outside and place clutch cover in position (illustrated in fig. 50). If the sliding sleeve does not sit over the joint the rubber lip must be lifted carefully over the socket of the toothed portion and then over the shoulder of the driving sleeve using a scewdriver or something similar.



VI / 57 / 631

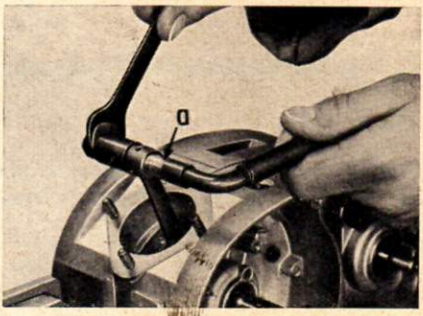
Fig. 50 Placing in position of clutch cover with fitted lip ring

9. Replace check washers 25 x 35 as required and fit brake lever to the sleeve on the pedal shaft. The lever should project about 0.2 mm.

10. Fit rubber ring and washers to the pedal shaft as required. Replace securing ring in the groove. Do not expand the jaws further than is really necessary.

C. Renewing connection rod bush and refitting piston gudgeon pin

1. Force out the old bush with the extracting and replacing tool illust. in fig. 51. Fit the new bush into this tool so that it can be pressed in simultaneously.



VI / 57 / 630

Fig. 51 Extracting and inserting connecting rod bushes

2. Cover the cylinder opening in the crankcase with a piece of clean cloth or a piece of rubber. Drill out the three lubrication holes on the bush and countersink lightly with a spherical cutter (dia. approx. 5mm).

3. Secure the connecting rod reaming attachment, part No. 0101-70900-00.1, to

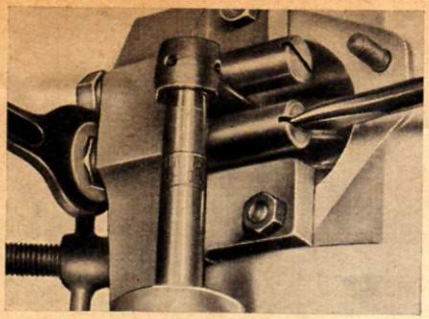
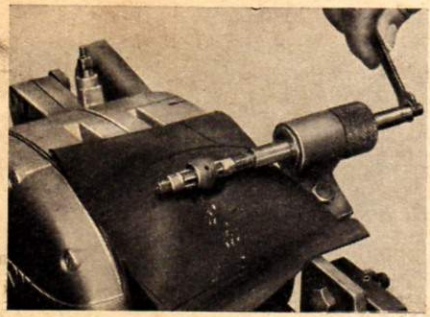


Fig. 52 Centering connecting rod VI / 57 / 590

the crankcase and align the connecting rod as illustrated in fig. 52.

4. Cover the cylinder opening in the crankcase with a piece of rubber hose and ream the small end bush as shown in fig. 53.



VI / 57 / 811

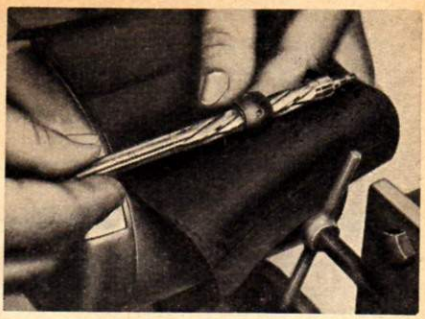
Fig. 53 Reaming connecting rod bushes

Note!

Replacement connecting rod bushes are available under the part No. 0101-10329-99. The inside bore is already turned to the correct size and need only be polished.

The polishing is facilitated with the slotted, spiral-fluted hand reamer DIN 859 illustrated in fig. 54. The diameter of this reamer is 10 mm.

The maximum amount of play between gudgeon pin and connecting rod bush is 0.027 mm. In all cases the gudgeon pin must be a free working fit in the small end bush.



VI / 57 / 812

Fig. 54 Polishing connecting rod bushes

Whenever a new bush is fitted the alignment of the connecting rod must be checked.

The alignment can be checked more easily if the piston — less its rings — is refitted to the connecting rod. Piston and cylinder bearing surfaces must be dry and free of oil and grease.

5. Remove cylinder and piston — now without its compression rings.

6. Replace fly wheel disc on the crankshaft pin and turn the crankshaft. When the connecting rod is correctly aligned the piston must be held with the thumb at top dead centre and must not be allowed to drop back into the cylinder. Move the piston from top to bottom dead centre by turning the crankshaft and check whether the piston is exerting any pressure on the walls of the cylinder.

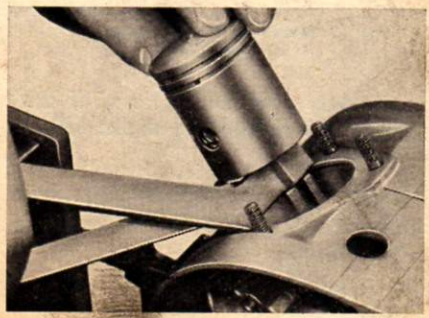


Fig. 55 Aligning connecting rod VI / 57 / 628

7. The connecting rod can be re-aligned with the straightening levers, part No. 0301-70700-00.1, as illustrated in fig. 55.

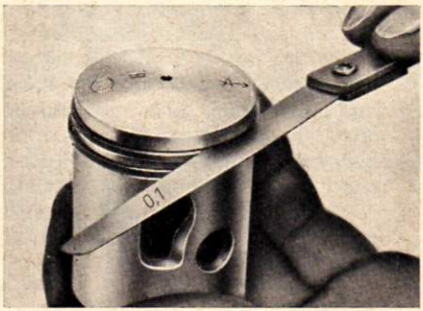
8. Straighten connecting rod and then dismantle the cylinder and piston.

D. Examining piston and cylinder for wear

First check the piston for damage to the outside walls and the ring slots. A heavy deposit of oil carbon over the piston stem indicates that there is too much play between the piston and cylinder. The piston and cylinder must be replaced if there is too much play.

Excessive wear in one side of the piston indicates that the connecting rod is incorrectly aligned. The re-alignment of the connecting rod is described under 7 in Section C.

If the piston is re-used, clean away any corroded spots and measure the vertical play in the piston compression rings, as illustrated in fig. 56. The play may be between 0.04 mm



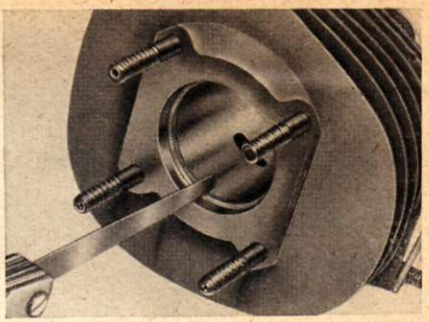
VI / 57 / 597

Fig. 56 Measuring vertical play in the piston rings

(size when new) and 0.1 mm. If the play exceeds this amount the engine will become very noisy.

The gap between the piston rings should be 0.40 mm and it can be measured as illustrated in fig. 57.

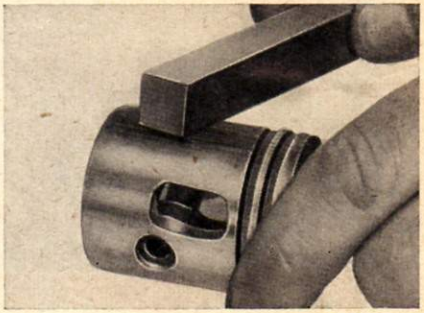
The compression rings are inserted into the cylinder one at a time about 10 mm from the top edge.



VI / 56 / 2091

Fig. 57 Measuring piston rings for gap

To prevent further damage to the piston rub off any lightly seizing marks with a clean dead-smooth file and polish with a fine grained carborundum stone as illustrated in fig. 58. Keep the carborundum moist by dipping it in a quantity of petroil.



VI / 56 / 2106

Fig. 58 Removing seizing marks on the piston

The piston must be thoroughly cleaned in a trough of petrol. Emery paper must not be used; it can remove far more of the soft surface material than the corrosion which is more resistant.

The piston may jam or seize for a number of reasons. Here are some examples:

a) incorrect amount of oil in fuel mixture,

b) incorrect carburetter fuel mixture caused by inadequate jet adjustment or a blockage in the jets,

c) overheating caused by a restricted exhaust outlet on the cylinder, a heavily corroded exhaust system or a defective ignition system,

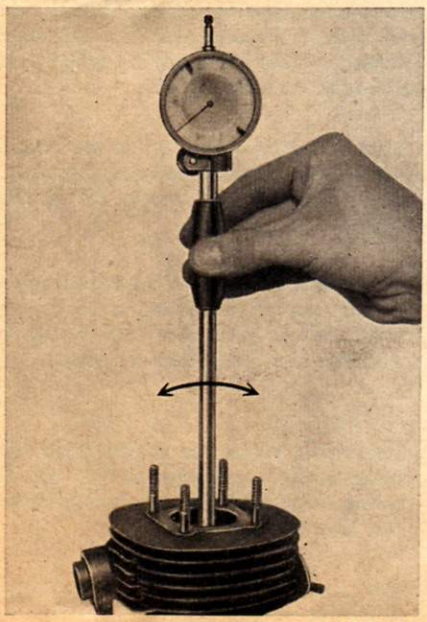
d) travelling downhill in gear with the fuel tap turned off,

e) persistent overloading of the engine with the excessive use of the throttle in the lower gears.

First of all check the cylinder for any visible faults. Any lightly corroded spots must be removed with a fine grained emery and polishing paper to prevent the piston seizing at that spot again.

Measure the cylinder with the inside micrometer as illustrated in fig. 59. The dial gauge should be set to the rated diameter of 40 mm using a ring gauge or a micrometer.

The greatest amount of wear is found about 10 mm from the top of the cylinder and at the point where the piston changes the direction of its stroke (t.d.c. or b.t.c.). If the wear exceeds 0.15 mm it is necessary to fit a new cylinder or rebore the old cylinder.



VI / 56 / 2095

Fig. 59 Measuring cylinder with an inside micrometer

If the old cylinder is refitted clean away deposits of oil carbon that may be lying on the cylinder ports and channels.

The cylinders are graded into 4 classes and A, B, C, and D. These letters are stamped on the neck of the cylinder and on the bottom of the piston, respectively. The amount of play is 0.04 mm.

Piston	Cylinder
A = 39.95 mm ⌀	A = 39.99 mm ⌀
B = 39.96 mm ⌀	B = 40.00 mm ⌀
C = 39.97 mm ⌀	C = 40.01 mm ⌀
D = 39.98 mm ⌀	D = 40.02 mm ⌀

Our DKW Exchange Servive offers all our DKW workshops immediate delivery from our general depot of replacement cylinders and matching pistons on receipt of the old assembly.

The DKW Exchange Service supplies cylinders and matching pistons in the following sizes:

Oversize	Part No.	Size
1	0101-11175-001	40.25 mm ⌀
2	0101-11175-002	40.50 mm ⌀

Pistons are also supplied separately in the following sizes:

Oversize	Part No.	Size
1	0101-10411-001	40.21 mm ⌀
2	0101-10411-002	40.46 mm ⌀

E. Removing piston, cylinder and cylinder head

1. Fit piston and pressure pin, part No. 0101-70401-00.1, to the connecting rod so that the arrow stamped on the bottom of the piston points to the exhaust outlet on the cylinder. Press the oiled gudgeon pin into the oiled connection-rod bush, as shown in fig. 60.

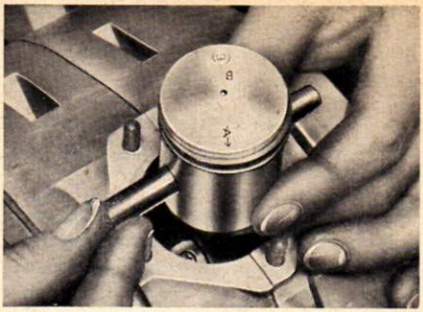


Fig. 60 Pressing in gudgeon pin VI / 57 / 592

Fit both gudgeon-pin locks and check them for tight fit in their slots.

2. Apply the cylinder-foot gasket and slightly oil all movable parts, such as connection-rod bearings, piston rings, piston shaft and cylinder barrel.

3. Insert the fork for piston support, part No. 4601-71001-00.1, between casing and piston.

4. Turn the piston rings until the locking slots correspond to the locking pins in the piston.

5. Press the piston rings together, with your fingers or a tensioning strap, and push the cylinder over the piston (see fig. 61).

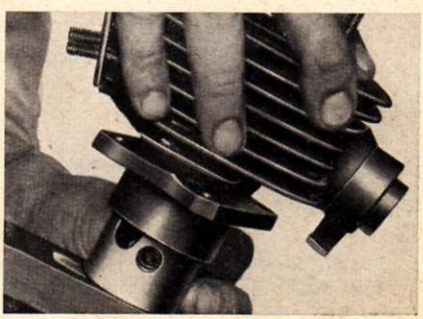


Fig. 61 Fitting the cylinder VI / 56 / 2096

6. Remove the fork for piston support, put the cylinder on the casing and screw on.

7. By means of the flywheel put the engine into motion. The crankshaft should turn easily in any position.

8. Check the sealing surface of the cylinder head for evenness; grind the surface, if necessary.

9. Put the cylinder-head gasket on the cylinder, fit the cylinder head, apply the spring washers and spring rings respectively, screw on the nut and tighten crosswise.

F. Fitting the flywheel magdyno

N o t e !

Before refitting, all parts should be checked for wear and proper functioning and replaced, if necessary.

Special attention should be paid that no metal remains, such as filings, drillings and so on, stick to the magnets of the flywheel or the stator plate itself, as they might cause trouble later on. (See fig. 62)

1. Insert the ignition cable into the bore of the casing, press in the rubber grommet and screw the plug on to the ignition cable.

2. Fit the stator plate into the centering rim of the casing (mind the marking you made when removing) and screw on with the two cross-slotted screws.

   N o t e !

   The stator plate has to be fitted correctly in the centering rim. First slip the spring rings on to the fastening screws and then the washers.

3. Push the flywheel on to the crankpin, apply the spring ring, screw on the nut, hold the flywheel with the support tool and tighten the nut.

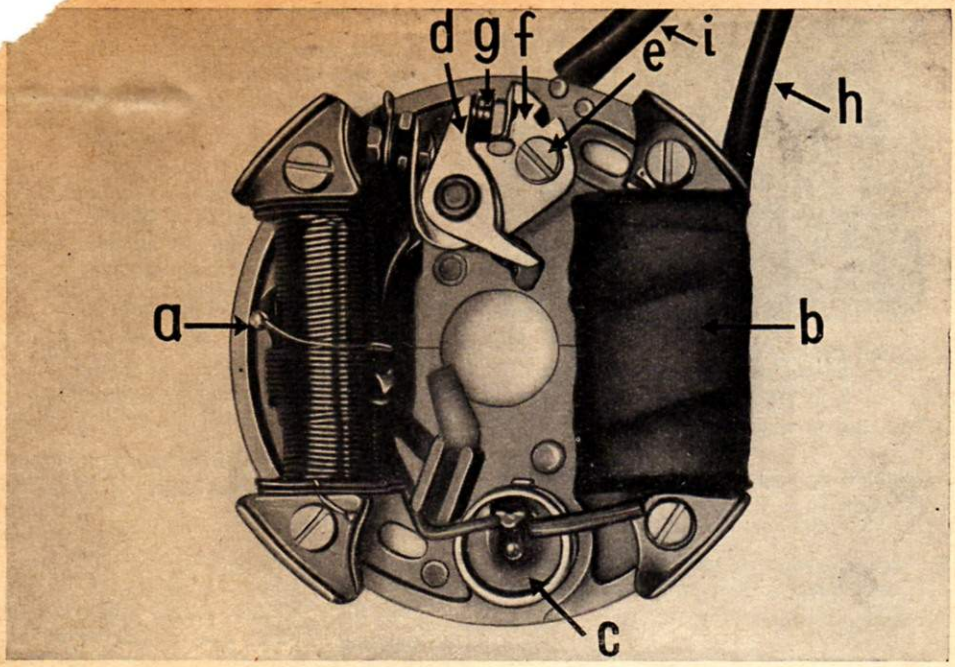


Fig. 62 Layout of the flywheel magdyno stator plate

VI / 57 / 606

a = lighting coil 0301-38000-10
b = ignition coil 0301-39000-10
c = condenser 0301-38506-00
d = contact breaker arm 0301-38605-10
e = Cheesehead screw securing contact carrier
f = contact carrier 0301-38639-10
g = contact breaker points
h = ignition cable
i = lighting and cutout cable

N o t e !

If possible tighten the hexagonal nut securing the fly wheel disc using 2.5 metres/kg. (18 ft. lb.) (torque spanner).

G. Adjusting ignition

N o t e !

Ignition adjustment can be done in one of two ways.

1. **With a buzz-box, part No. 0101-72000-00.3.**
2. **With a feeler gauge from a thickness of 0.05 mm.**

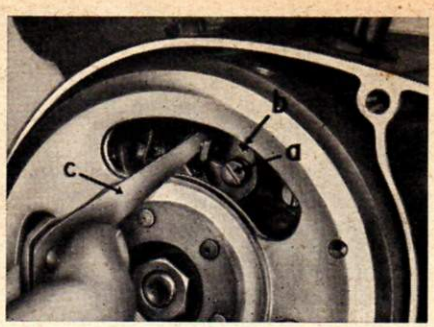
A buzz-box however enables you to work more accurately.

Ignition advanced is at 2.6 — 2.8 mm before t.d.c.

1. Adjustment of ignition timing with a buzz-box.

1. Remove sparking plug and screw in the ignition setting gauge, part No. 6003-72000-00.3. This gauge can be used with the slide or dial system.

2. Turn the fly wheel disc until the contacts on the contact breaker are fully open. Adjust the contact breaker gap to between 0.35 and 0.40 mm. The adjustment can be made by loosening the cheesehead screw **"e"** and turning the contact carrier **"f"** clockwise or anticlockwise with a screwdriver until a feeler gauge 0.35 — 0.40 mm thick can be pushed between the contact breaker points.

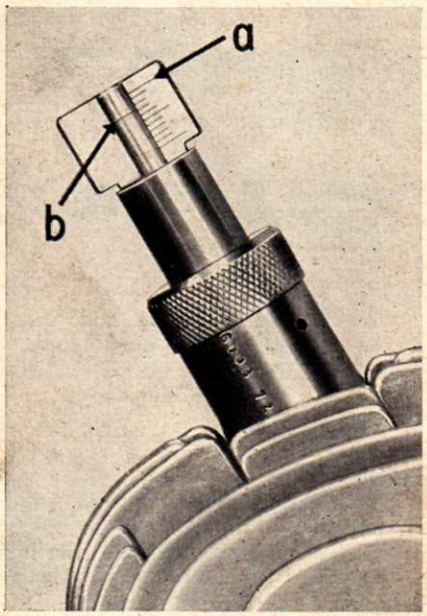


VI / 57 / 815

Fig. 63 Adjusting the gap between the contact breaker points
a = set screw
b = contact carrier
c = feeler gauge

Tighten up cheesehead screw **"e"** (see fig. 63).

3. Ascertain t.d.c. by turning the fly wheel. Check t.d.c. with a microme slide (fig. 64).



VI / 57 / 816

Fig. 64 Adjusting ignition with ignition timing gauge (micrometer slide)
a = t. d. c.
b = initial ignition setting

Note!

The rotation from the generator side of the engine is anti-clockwise. The direction is marked on the flywheel with an arrow.

4. Turn the fly wheel disc slowly to the left until the piston is 2.6 — 2.8 mm before t.d.c. The position of the piston is shown on the ignition timing gauge (micrometer slide fig. 64).

Important!

Leave flywheel in this position.

5. Connect one lead from the buzz-box to earth and the other to the short cricuit cable (green).

Note!

The pitch of the sound will vary in strength. When the contact breaker points are closed the pitch will be high and low when the points are open.

6. Loosen the two securing screws on the stator plate and turn the plate to the left or right until pitch alters.

Important!

Any alteration in the pitch indicates ignition and the initial setting can be made.

7. Tighten up the screws holding the stator plate in position and re-check the ignition setting.

8. Apply a little BOSCH FT 1 V 4 hot bearing grease to the contact breaker cam on the contact carrier.

9. Before the sparking plug can be replaced it must be thoroughly cleaned with the steel tool illustrated in fig. 66, or a sand blaster. Adjust the sparking plug gap to 0.4 mm.

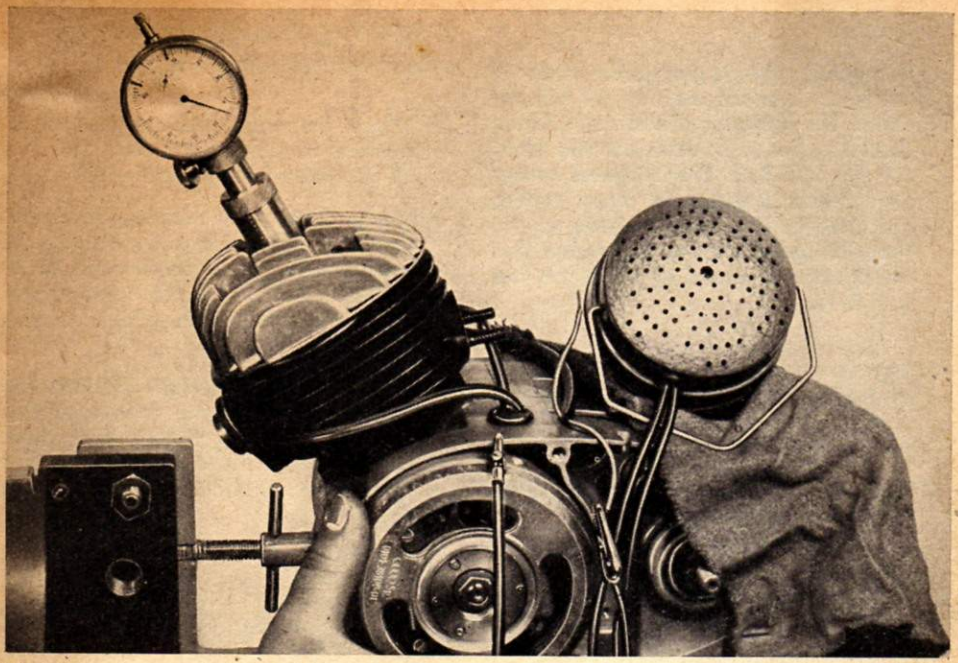
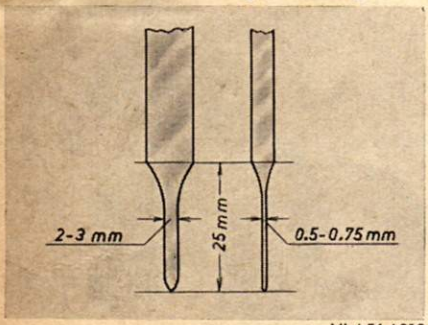


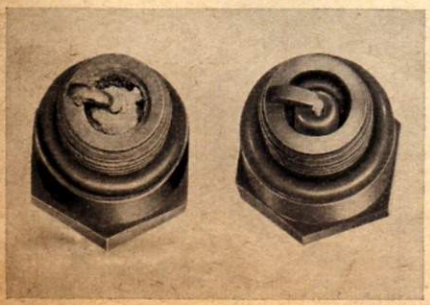
Fig. 65 Buzz-box attached for ignition timing

VI / 57 / 817



VI / 56 / 210

Fig. 66 Steel tool for cleaning sparking plug



VI/57/1297

Fig. 67 Unsuitable and usable sparking plugs

2. Adjusting ignition with a feeler gauge

1. Screw in ignition timing gauge; see **1,** operation 1.
2. adjust contact breaker points, see **1,** operation 2.
3. determine t.d.c., see **1,** operation 3.

Important!

The piston must now be set to 2.2 — 2.4 mm before t.d.c. and not to the previous setting of 2.6 — 2.8 mm. The thickness of the metal blade from 0.05 is equivalent to a movement of 0.4 mm of piston in cylinder.

4. Insert the metal blade of the feeler gauge at 0.05 mm between the contact breaker points.
5. Loosen the two stator plate securing screws a little and turn the stator plate slowly to the left or right until the metal blade can be easily withdrawn.

Note!

The ignition timing gauge must indicate 2.2 — 2.4 mm beforte t.d.c. in this position. The thickness of the metal blade (0.05 mm) has to be added to the 2.2 to 2.4 mm b. T. D. C. This thickness causes the contact breaker to open earlier, which results in a shorter piston way in the cylinder by 0.4 mm. This means that the ignition is timed to 2.6 to 2.8 mm b. T. D. C.

6. Tighten up screws holding stator plate in position and check initial ignition setting.

7. Grease cam and clean sparking plug; see **1**, operations 8 and 9.

H. Removing, cleaning and refitting carburetter. Adjusting idling speed

1. Close fuel cock, remove cover from chamber housing carburetter and draw off fuel hose from the carburetter.

2. Loosen carburetter clamping screw and draw the carburetter away from the induction pipe. The carburetter can not be twisted out of the induction pipe as both parts are held together with a cylindrical pin.

3. Hold carburetter upright and unscrew the two screws securing the lever support bracket. Withdraw throttle and choke air slide from the carburetter housing and detach air slide from the pressure pin.

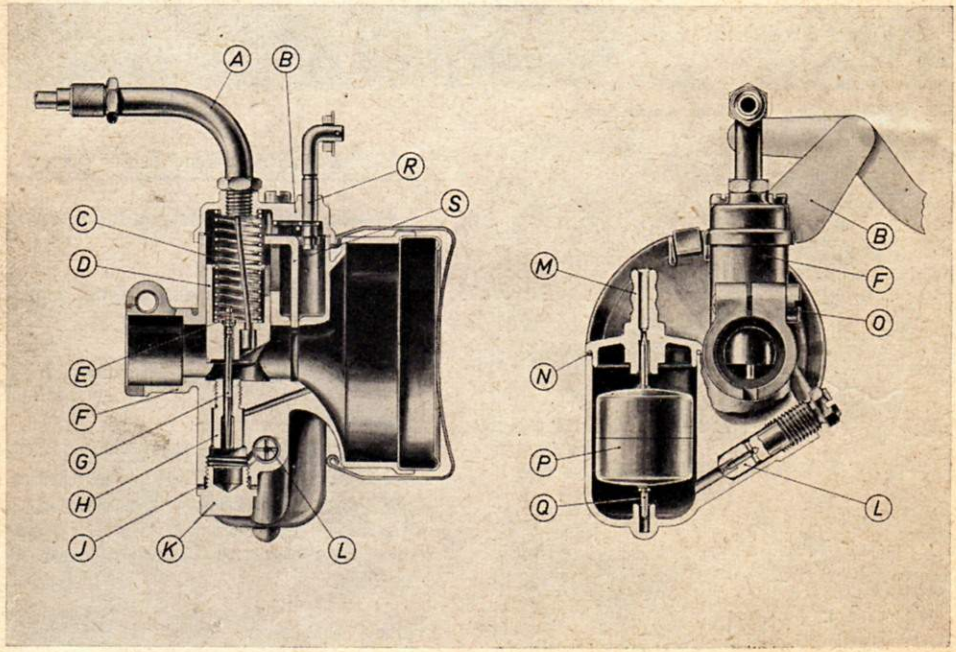


Fig. 68 Carburetter in section IV/57/860

A = Induction pipe elbow
B = Lever support bracket
C = Slide spring
D = Throttle slide
E = Small plate for spring
F = Carburetter housing
G = Jet needle
H = Needle jet
J = Seal washer
K = Plug
L = Main jet
M = Float chamber cover
N = Rubber seal ring for float chamber cover
O = Clamping screw
P = Float
Q = Float needle
R = Pressure pin
S = Choke air slide

4. Disconnect throttle cable from the throttle slide. Press the throttle slide against its return spring until the cable nipple is pushed from the socket. Push nipple through hole and remove the throttle slide, jet needle and slide spring from the cable.

5. Unscrew the lever support bracket from the induction elbow by loosening the lock nut.

6. Strip the carburetter, clean and reassemble.
The choke air slide must be a free working fit in the reassembled carburetter. When the throttle slide is drawn up as far as it will go the choke air slide must be fully open.

Note!
The component parts of the carburetter are illustrated in Fig. 68. From chassis No. 01 507 550 the throttle cable set screw is fitted to the "twrottle twist grip" in preference to the induction elbow "A" on the carburetter. This modification simplifies any adjustment that may be necessary to reduce play between the Outer Bowden cable hose and the inner cable.

Reassembly:

As might be expected the sequence for reassembling the carburetter is the reverse of that described above. The joint between the carburetter and the induction pipe must engage the cylindrical pin.

7. Adjust slow running speed **only** when the engine is **warm.**

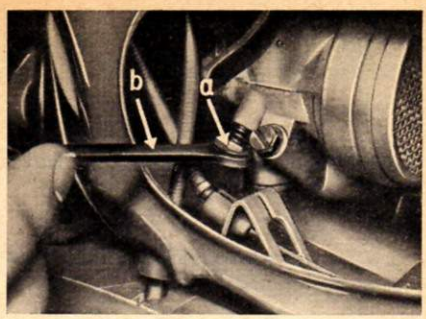
Note!
When adjusting the idling speed it is important (see fig. 69) that

a) the choke air slide functions properly;

b) the air filter is clean;

c) the inside of the carburetter is not dirty and the jets are correctly tuned;

d) the flange between the induction pipe and the cylinder is a good seal and the carburetter fits firmly onto the induction pipe;



VI / 57 / 814

Fig. 69 Adjusting idling speed
a = slow running - air regulating screw
b = spanner (SW 7)

e) the radial gaskets on the crankshaft, cylinder head and cylinder base are a good joint;

f) the ignition is adjusted correctly and the fly wheel magdyno is working properly;

g) the sparking plugs are clean and the gap (0.4 mm) is set correctly.

IV. Work on the frame

A. Removing and refitting front wheel

1. Unscrew speedometer drive shaft **"c"** from the axle drive.

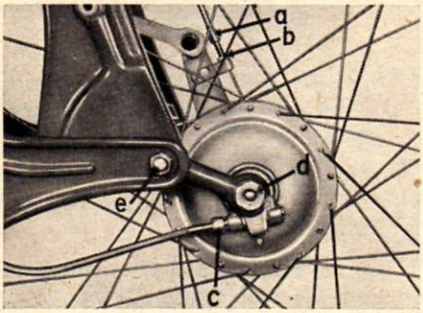


Fig. 70 Front wheel fitted VI / 57 / 810

a = Set screw
b = Lock nut
c = Speedometer drive shaft
d = Axle nut
e = Spring-stop-end nut securing the mudguard

2. Loosen lock nut **"b"** on the set screw, turn the set screw **"a"** and disconnect cable from the lever on the brake anchor plate. Unscrew set screw from the brake anchor plate.

3. Unscrew the hexagonal nut (SW 10), remove the spring ring from the counter support link and screw out hexagonal screw.

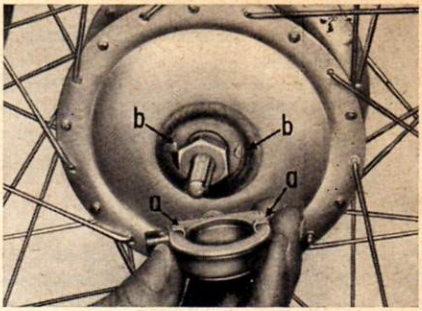
4. Unscrew the two axle nuts **"d"** (SW 19) and remove front wheel from the fork.

5. Reverse the procedure when reassembling. See that the drive illustrated in fig. 70 is fitted squarely on the axle and that the driving elements fit into the axle grooves.

Note!

From frame No. 01 527 040 an arresting plate is fitted to hold the axle drive in the correct position when it is being reassembled.

From frame No. 01 530 236 a water tight axle drive is fitted (see fig. 71).



VI / 57 / 610

Fig. 71 Reassembling the speedometer axle drive

6. Adjust front wheel brake. Ensure that the play in the hand brake lever on the handlebars does not exceed one third of the total movement in the control.

B. Removing and refitting front mudguard

(from frame No. 01 518 924)

1. Remove front wheel.

2. Withdraw speedometer drive shaft, rubber grommet and hand brake cable from the mudguard or from the mudguard bracket clip.

3. Unscrew the two M 8 spring-stop-end nuts (SW 14) from the bottom mudguard fixture and remove washers.

4. Unscrew the two M 6 x 10 hexagonal screws securing the mudguard to the fork from the inside and remove washers.

5. Withdraw both mudguard stays from the bottom securing screws and remove the mudguard from the fork by pulling it out from the rear.

Note!

On vehicles up to frame No. 01 518 923 the mudguard is removed in the following way:

1. Remove front wheel.
2. Withdraw drive shaft and cable from the mudguard.
3. Unscrew the spring-stop-end nuts and remove M 5 x 20 hexagonal screws from the rear ends of the decorative valances. Remove the spacer sleeve.
4. Unscrew the two M 6 x 10 hexagonal screws securing the mudguard to the front fork from the inside and remove the spring washers.
5. Pull the mudguard out of the fork from the rear.

In both cases reverse the procedure when reassembling.

C. Removing and reassembling swinging link fork

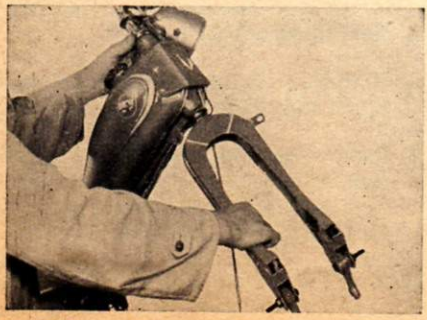


Fig. 72 Removing front fork VI / 56 / 2102

Note!

The removal and reassembly of the front fork is carried out just as it would be done on a bicycle. It is not necessary to disconnect the Bowden cables when stripping the handlebars from the stem.

D. Removing and reassembling front wheel hub fittings

1. Remove front wheel.
2. Remove cap from the brake anchor plate, unscrew lock nut (SW 19) on the spacer sleeve and under the counter support links.
3. Withdraw nibbed washer, unscrew spacer sleeve from the axle and remove brake anchor plate. Watch out for the nibbed washer between lock nut and brake anchor plate.
4. Unscrew lock nut on adjusting cone, remove nibbed washer, unscrew adjusting cone from the axle and remove it from the hub.
5. Remove dust caps from both sides of the hub and withdraw seal ring.
6. Remove steel balls (6.35 mm ⌀) from the two retaining washers. (10 balls to each bearing).
7. Clean all parts in clean petrol and check for wear.

Note!

Damaged parts must be renewed. Avoid damaging the retaining rings by pressing them out from the hub with the bearing cups or by tapping them out carefully with a punch.

Check the fixed and adjusting cones, the two bearing cups and the 20 steel balls most carefully.

8. To reassemble reverse the procedure accordingly. Smear the balls (10 balls to each bearing) with multi-purpose grease and replace in the bearing cups.

9. Correct the play in the bearing by screwing the adjusting cone either in or out and check the cone with the lock nut.

Note!

When the wheel has been loosened the hub is correctly adjusted if the wheel has some lateral play in the axle.

When the wheel is refitted and tightened up this lateral play must be taken up by the axle nuts. The rim however must always have some visible play in it. If this play disappears when the wheel is trued with the axle nuts it is necessary to check whether the forks are still straight and parallel.

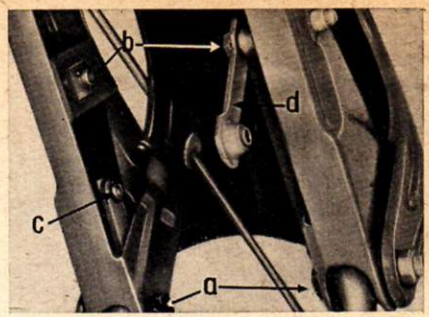
To alter the amount of play in the bearing the axle nut must be loosened and the securing nut underneath it slackened off until the adjusting cone can be turned. By turning the adjusting cone clockwise or anticlockwise which ever may be the case the play in the bearing can be reduced or increased. Remember that the play will be reduced immediately if the securing and axle nuts are tightened up.

E. Removing or refitting rubber bands on the swinging link

1. Remove front wheel.

2. Remove front mudguard.

3. Remove the M 8 x 60 hexagonal screw **"a"**, fig. 73, on the swinging link bearing from the fork or tap out with a punch.



VI / 57 / 609

Fig. 73 Fixture of the swinging link rubber bands and bearing

4. Withdraw the seal rings and cushioning washers from the bottom (each swinging link has two seal rings and two cushioning washers).

5. Unscrew the spring-stop-end nut and remove the M 6 x 45 hexagonal screw **"b"** on the counter support bearing **"d"** from the left hand side of the forks (see fig. 73). Withdraw spacer sleeve and the counter support link.

6. Remove split pin from the hollow bolt **"b"** on the right hand side of the fork and tap the bolt out of its socket with a punch.

7. Tap out bearing sleeve on the left hand side of the fork from the inside and withdraw with a pair of pliers on the outside.

Note!

There is no bearing sleeve fitted to the right hand side of the fork.

8. Withdraw swinging link and rubber bands out of the fork from the front.

9. Remove securing ring from the hollow bolt **"c"** on the swinging link. Press out bolt and withdraw rubber suspension bands and roller from the swinging link.

10. Press bushes out of swinging link bearing, clean and examine all parts for wear and if necessary renew.

Refitting:

11. Grease bushes and press back into the swinging link, replace rubber suspension bands and roller, insert hollow bolt and secure with securing ring.

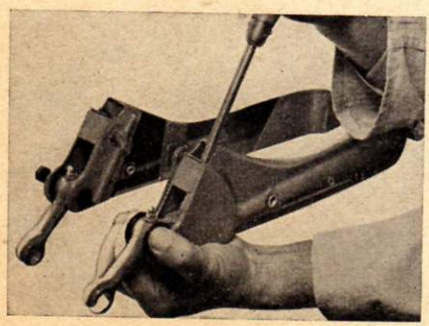
Note!

Each time the securing ring is removed a new one should replace it.

12. Move the swinging link up the fork until the hollow bolt or the bearing sleeve can engage the roller from the outside and be pushed in. Secure hollow bolt with a new split pin. Fit hexagonal screw, counter support link and spacer sleeve to the bearing sleeve from the inside of the left hand fork end and tighten with spring-stop-end nut.

13. Press a large screwdriver into the swinging link fork and push the link over the front lugs. (See fig. 74)

    Fit seal rings and cushioning washers to both sides of the swinging link, hold



VI / 56 / 2108

Fig. 74 Reassembling swinging link

firmly and push them back into the lugs together with the swinging link. Align washers and swinging link with a drift and press in the M 8 x 60 hexagonal screw from the inside of the fork.

14. Replace mudguard.

15. Reassemble front wheel.

F. Removing and refitting chain guard

1. Loosen cheesehead screw **"a"**, fig. 75 (up to frame No. **01 512 156**), remove hexagonal screw **"b"** and spring ring with a box spanner (SW 10) from the right hand side.

   From frame No. **01 512 157** the screw **"b"** is fitted to the left hand side to simplify assembly.

2. Loosen hexagonal screw **"c"** (SW 14) and hexagonal nut **"d"** (SW 21). Slacken chain adjuster **"e"**.

3. Unscrew cheesehead screw **"f"** and remove spring ring.

4. Withdraw the bottom run of the chain guard to the rear. Lift up the rear end of the top run and withdraw from the crankcase and end plate cover to the rear.

Note!

From frame No. 01 512 157 the plates gripping the swinging arm bearing have been removed.

Reassembly:

Reverse the procedure accordingly when reassembling. Make sure that the securing strip (right hand side) on the top run fits on the inside of the bottom run and that the chain guard is held by the fixture securing the suspension units.

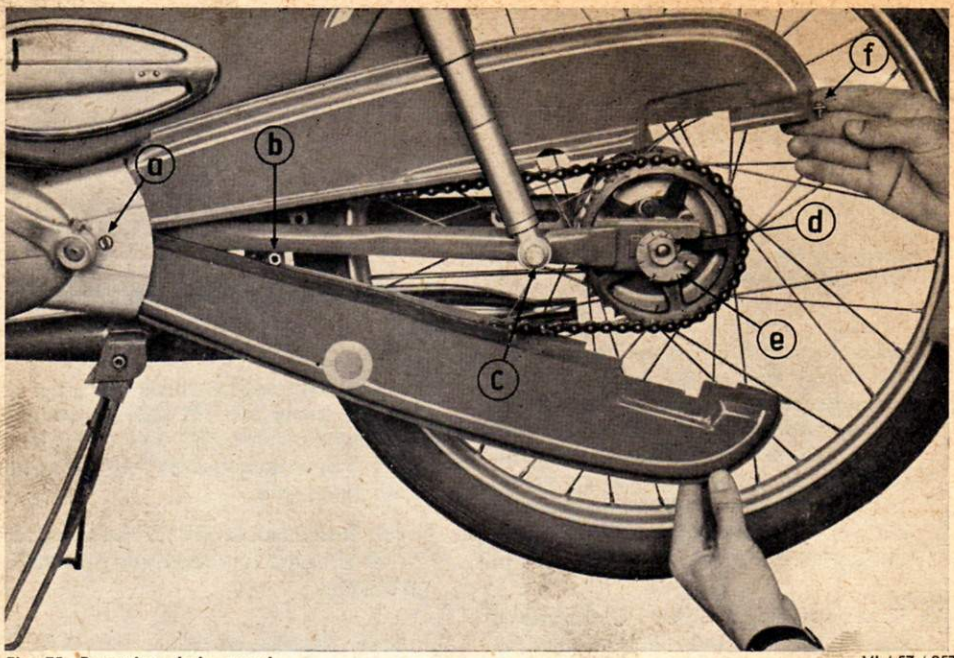


Fig. 75 Removing chain guard VI / 57 / 857

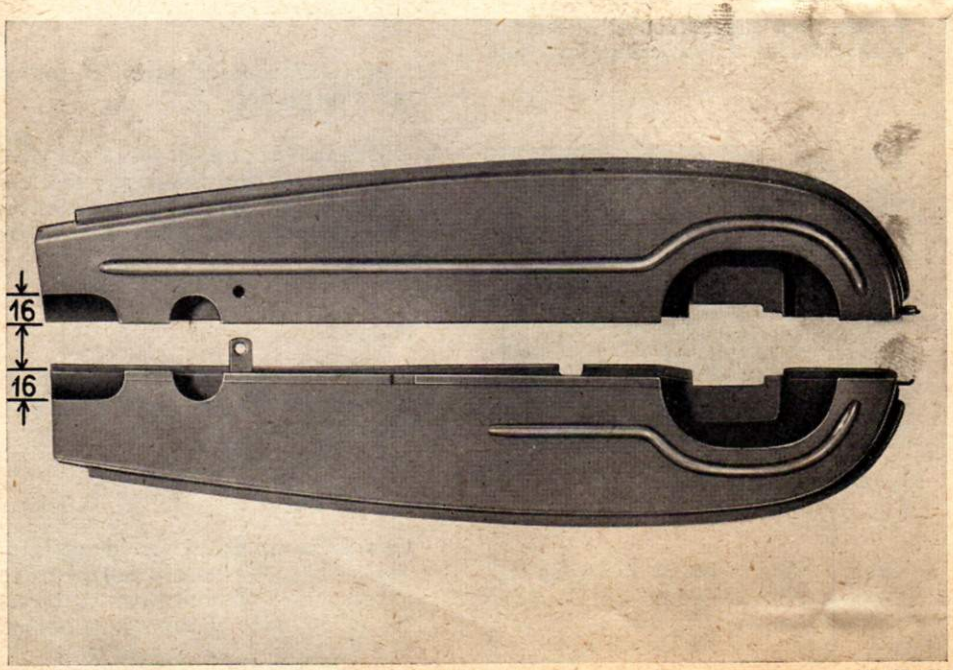


Fig. 76 Modified chain guard from frame No. 01 512 157 VI / 57 / 209

G. Removing and fitting chain drive

1. Unscrew the two M 6 x 30 cheesehead screws and remove crankcase cover.

Note!

It is not necessary to remove the chain guard when fitting a new length of chain; simply join the new chain to the old length and draw over the rear chain sprocket. Check the tension of the chain.

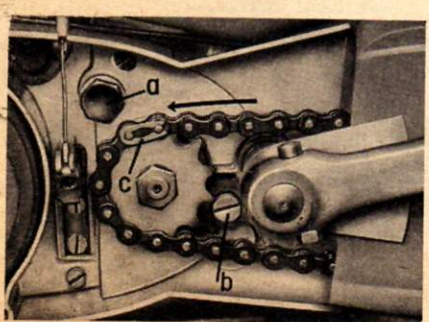
2. Remove chain guard.

3. Press securing clip off the spring link, remove spring link and withdraw chain.

4. Clean chain thoroughly in a tray of petrol and grease with DKW chain grease.

Reassembly:

5. Reverse the procedure when reassembling. It is essential that the jaws of the securing clip face into the run of the chain. (See fig. 77)



VI / 56 / 2078

Fig. 77 Correct position of the spring link securing clip
a = Oil filler plug
b = Oil level control screw
c = Spring link securing clip

H. Removing and replacing rear wheel

1. Unscrew milled nut from the brake cable and remove cable from the bracket on the brake anchor plate.

2. Remove chain guard.

3. Loosen both axle nuts (SW 21) and push rear wheel to the front.

4. Remove chain from rear sprocket. Withdraw rear wheel out of the swinging arm from the rear, tilt the Moped to one side and remove the wheel.

Reassembly:

5. The refitting of the rear wheel is made in the reverse order to that described above. See that the bracket on the swinging arm prevents the brake anchor plate from turning. Correct chain adjustment and align rear wheel.

Note!

The tension of the chain must be checked or corrected and the wheel aligned each time the rear wheel is slackened off.

J. Removing and reassembling rear wheel

1. Unscrew the two end nuts (SW 21) and remove chain adjusters.

2. Unscrew lock nut on brake anchor side. Remove brake anchor plate, washer and spacer washer.

3. Unscrew lock nut (SW 21) from the adjusting cone on the axle. The lock nut is below the counter support on the chain side.

4. Remove the nibbed washer, unscrew adjusting cone and withdraw axle from the hub.

5. Remove dust caps from both sides of the hub and withdraw the seal ring.

6. Remove steel balls (6.35 mm ⌀) from the two retaining washers (10 balls to each bearing).

7. Wash all parts in clean petrol and check for wear.

Note!

Check the fixed and adjusting cones, the two bearing cups and the steel balls most carefully. Damaged parts must be renewed. Avoid damaging the retaining rings by pressing them out of the hub with the bearing cups or by tapping out carefully with a punch.

8. To reassemble reverse the procedure accordingly. Smear the balls (10 balls to each bearing) with multi-purpose grease and replace in the bearing cups.

9. Correct the play in the bearing by screwing the adjusting cone either to the left or right and stop the cone with the lock nut.

Note!

The adjustment of bearing play is described on page 58 under "note" and operation No. 9.

K. Repairing rear wheel brake

1. Remove rear wheel.

2. Unscrew lock nut on the side of brake anchor plate. Withdraw washer, spacer washer and brake anchor plate from the axle.

3. Insert a screwdriver between brake shoe and brake cam, as illustrated in fig. 78, and lift brake shoe from the brake cam groove.

   Remove brake shoes and return springs from the brake anchor plate.

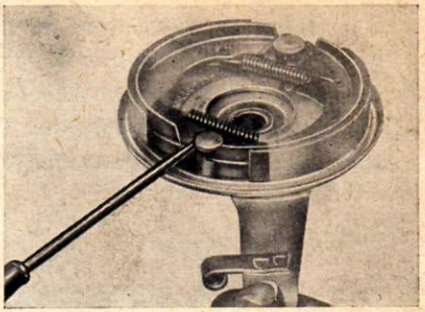


Fig. 78 Removing brake shoe VI / 57 / 501

Note!

The brake linings are stuck to the brake shoe and are exchanged as one unit.

Reassembly:

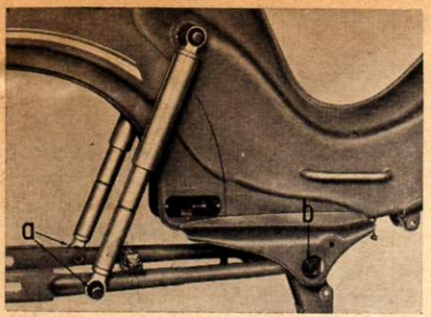
4. Grease the brake pivot bearing, check that the parts are working freely and reassemble by reversing the procedure described above.

L. Removing and reassembling rear swinging arm

1. Remove chain guard.

2. Withdraw rear wheel.

3. Remove M 8 x 50 screws from fixtures on suspension units. Watch out for the spring rings.



VI / 57 / 856

Fig. 79 Rear swinging arm mounting

4. Remove cap (covering swinging arm bearing), and unscrew the spring-stop-end nut **"b"** (SW 17).

5. Remove M 10 x 112 hexagonal screw from the swinging arm bearing and withdraw the swinging arm out of the frame from the rear.

6. Reverse the procedure when reassembling.

Note!

When only one suspension leg is being removed simply unscrew the two securing screws.

The suspension units must not be stripped down and can only be exchanged as a complete unit as required.

M. Removing and refitting gear shift cable

1. Open the lock on the chamber housing the carburetter and remove the cover.

2. Engage second gear, unscrew M 6 hexagonal nut from the gear fork shaft, remove spring washer and withdraw gear shift lever from the gear shaft or press off with a strong screwdriver.

3. Disconnect brake nipples from the gear shift lever.

4. Open the clips on the frame (3 on the left hand side, 2 on the right), remove cable.

5. Screw in the set screw on the hand control lever and disconnect clutch cable or release cable by loosening the support bracket.

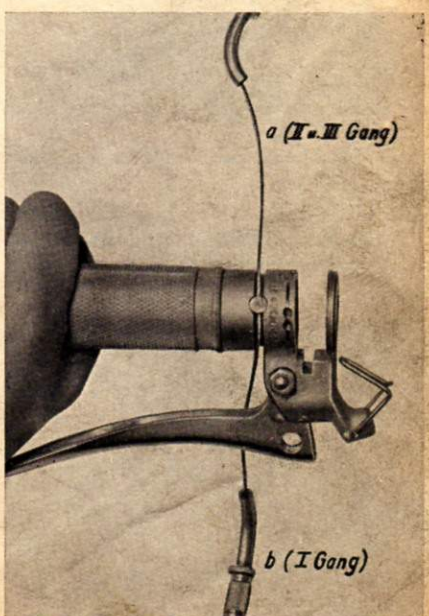
6. Loosen M 6 x 26 oval head screw and remove complete gear shift twist grip from the handlebars.

7. Withdraw the two clips from the housing and remove them from the twistgrip body.

8. Withdraw cable nipple from the twistgrip body and remove the complete cable.

Refitting:

9. Compare the length of the two bowden cables.



VI / 56 / 2085

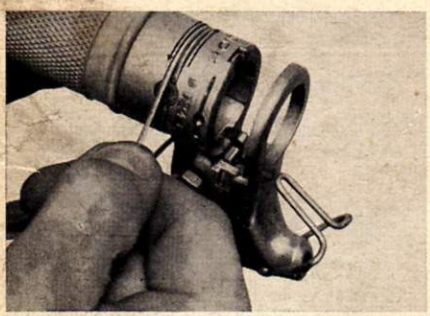
Fig. 80 Gear change cable correctly fitted in the grip tube

Note!

The cable with the shorter covering is for 2nd. and 3rd. gear and the other for Ist. gear.

10. Grasp the twistgrip body in the left hand so that the clutch control lever points to the ground. (See fig. 80)

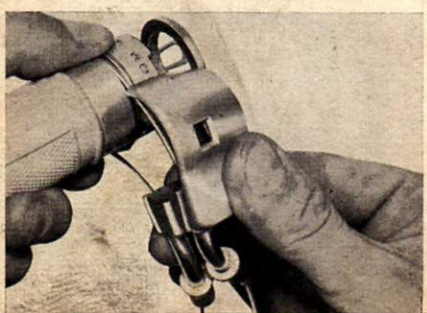
11. Press the cable nipple lying midway between the coverings on the Bowden cables firmly into its socket. The nipple must lie squarely in the socket provided for it on the twistgrip body. The shorter cable **"a"** (fig. 80) for second and third gear must point up and the longer cable **"b"** (Ist. gear) down.



VI / 56 / 1934

Fig. 81 Correct position of the gear shift cable

12. Insert both cables into the groove on the twistgrip body, hold down with one hand and lightly grease.



VI / 56 / 1933

Fig. 82 Replacing housing on the twistgrip body

Important!

The cables must sit snugly in the groove round the twistgrip body and must not be crossed. (See fig. 82)

13. Replace housing on the twistgrip body in the neutral position. Insert gear shift cables into the slots at the sides and press both clips into the housing.

14. Push grip onto the handlebar as far as it will go, pull it back about 5 mm and secure with the M 6 x 26 oval head screw.

Note!

In the third gear setting the clutch lever should be horizontal with the handlebars.

15. Push both cables through the left hand rubber grommet and into the headlamp bracket. The cables are inserted through the steering head casing so that the longer cable (Ist gear) and the shorter (2nd. and 3rd. gear) can be attached to the left and right hand sides respectively.

16. Draw both gear shift cables through the left and right rubber grommets into the chamber housing of the carburetter. The longer of the two cables should be inserted on the right hand side.

17. Replace gear shift cables in the clips on the frame and press down the clips.

18. Connect the cables to the gear shift lever and attach the coverings on the Bowden cables to the support bracket.

19. Loosen the set screw on the twistgrip and refit the gear shift lever to the gear shaft, replace spring washer and tighten with M 6 hexagonal nut.

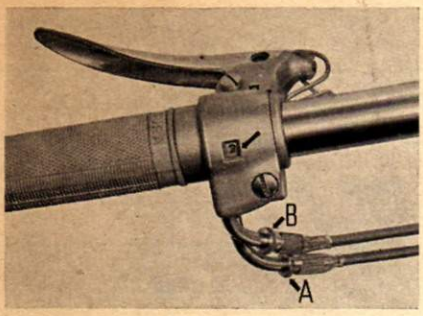
N. Adjusting gear change device

Note!

The adjustment is made from 2nd. gear, and is carried out as follows:

1. The vehicle is pushed into neutral with the engine stationary (Position 0 on the twistgrip) and the position of second gear found on the twist grip.

2. This procedure must be repeated until by adjusting the **gear cable A** (see fig. 83) on the twistgrip 2nd. gear can be engaged as distinct from the neutral position.



VI / 56 / 2087

Fig. 83 Set screws on the gear change cable

3. Now repeat the same procedure for 2nd. and 3rd. gear. Find the neutral position between the two gears on the twistgrip and then carefully engage the second gear.

Note!

When the clutch lever is set in the twistgrip body at handlebar the gears must also be set correctly in the gearbox.

4. Gear **cable "B"** must be adjusted until second gear is distinct from the third gear. (See fig. 83)

Note!

The Bowden cables must not be adjusted too tightly or the smoothness of the gear change will suffer. This same adjustment can also be made while driving, whereby, with the engine switched off and the vehicle rolling, you can easily distinct the draw key touching at the balls; and the necessary central position of the 2nd gear wheel can easily be found.

Should it not be possible to set the gear command so that the 2nd gear sets in correctly from both directions of rotation (twist grip), then there is too great clearance in the intermediate elements, such as twist grip cable lever a. s. o (e. g. loose nipple in twist grip, or too great flexibility of bowden cables because of long wear).

V. Electrical system and equipment

General:

The fly wheel magdyno is the source of electric current and when the engine is running supplies the alternating current for the lighting circuit.

A. Fault finding on the ignition system

Unscrew sparking plug, attach ignition lead to plug and check the spark by holding the plug against the side of the engine and kicking the engine over. If there is no spark the fault lies on the plug socket, ignition cable or on the ignition system itself.

Fault:	Remedy:
H. T. coil, contact breaker or earth on the output circuit.	Renew coil.
Short circuit cut out wiring or earth on the headlamp switch.	Disconnect green cable (fig. 84) in the headlamp and remove. Scrutinise for worn spots and insulate.
Contact breaker points dirty, oiled up or incorrectly adjusted.	Clean the points with petrol, check the gap between the points and adjust (0.3 — 0.4 mm).
Oxydated contact breaker points. (The vehicle may have been standing in a damp spot over a considerable period of time).	Clean the points with a new "points" file. It is better to remove the points and polish them with a carborundum stone. (Remove fly wheel cover plate).
Spark value of points too high. (Points white with metal vapour).	Condenser faulty — replace. Remove fly wheel disc and stator plate. Extract and replace condenser with special tool No. 0301-73400-00.3, re-solder lead.
Earth on the contact breaker lead.	Replace contact breaker arm.
Broken ignition coil.	Replace coil.
Strength of magnets too weak. No response to switching on the lights.	Remagnetise the fly wheel plate.

B. Fault finding on the lighting system

Fault:	Remedy:
No response from lights. Switch, bulb or lead defective.	Replace damaged parts, check cable for earth and wiring. See wiring diagram on fig. 60 for cable colours and arrangement.
No response to switching on the lights.	Remagnetise flywheel plate.

N o t e !

Measure the alternating current through the lighting system with DKW Messknirps (part No. 0301-76301-00.3).

Connect an output measure to terminal 51 in the headlamp (trough the speedometer spiral opening), allow the engine to run, switch on the lights, connect measuring instrument. Connect one cable of the instrument to the engine housing (earth) and the other to the output measure.

The instrument should show a measurement of 6 volts at about 3000 r.p.m. (corresponds approx. to a speed of 24 km/h (15 mph.) in third gear). If, after having tested the bulbs and wiring, the voltage is less than 5 volts the flywheel plate must be remagnetised.

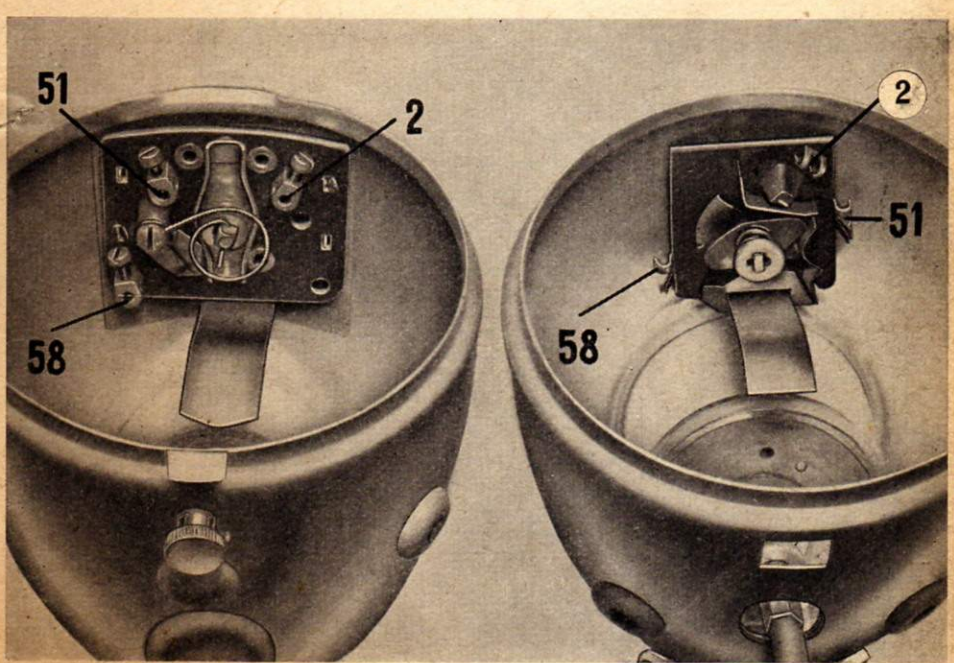


Fig. 84 Headlamp open VI / 56 / 2149

left = UNION-headlamp **right = Hella-headlamp**

Terminal 51 red lead, current from generator to headlamp
Terminal 58 grey lead, current from switch to tail lamp
Terminal 2 green lead, cut out circuit from ignition system to headlamp

N o t e : In the Hella headlamp the leads are only clipped on.

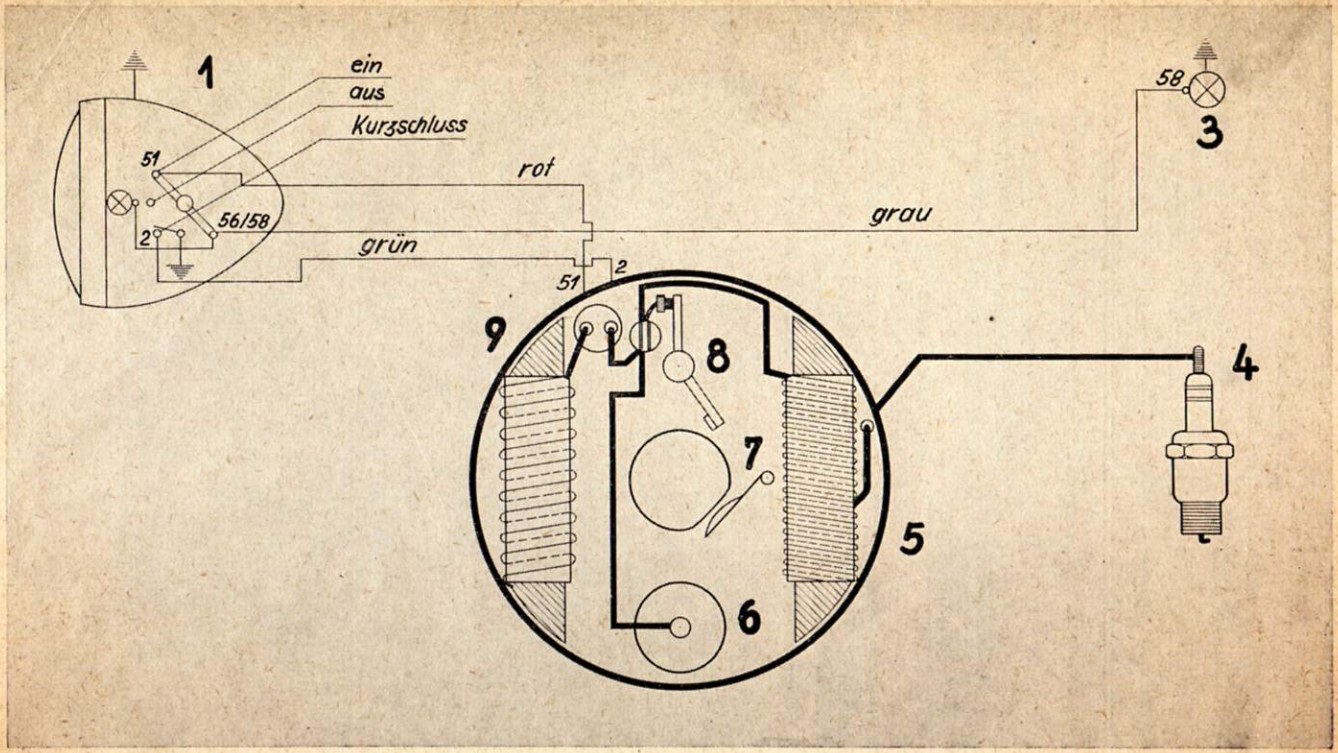


Fig. 85 Wiring diagram DKW Hummel (for 1.35 hp version)

VI / 56 / 2141

1. Headlamp with single filament
2. Light and short circuit cutout switch
3. Tail lamp
4. Sparking plug
5. Ignition coil
6. Condenser
7. Contact breaker cam
8. Contact breaker arm
9. Light coil

Lamps	Bulbs	Socket
Headlamp 78 mm ϕ	T6V 15W DIN 72601	BA 155
Tail lamp	H6V 2W DIN 72601	BA 9s

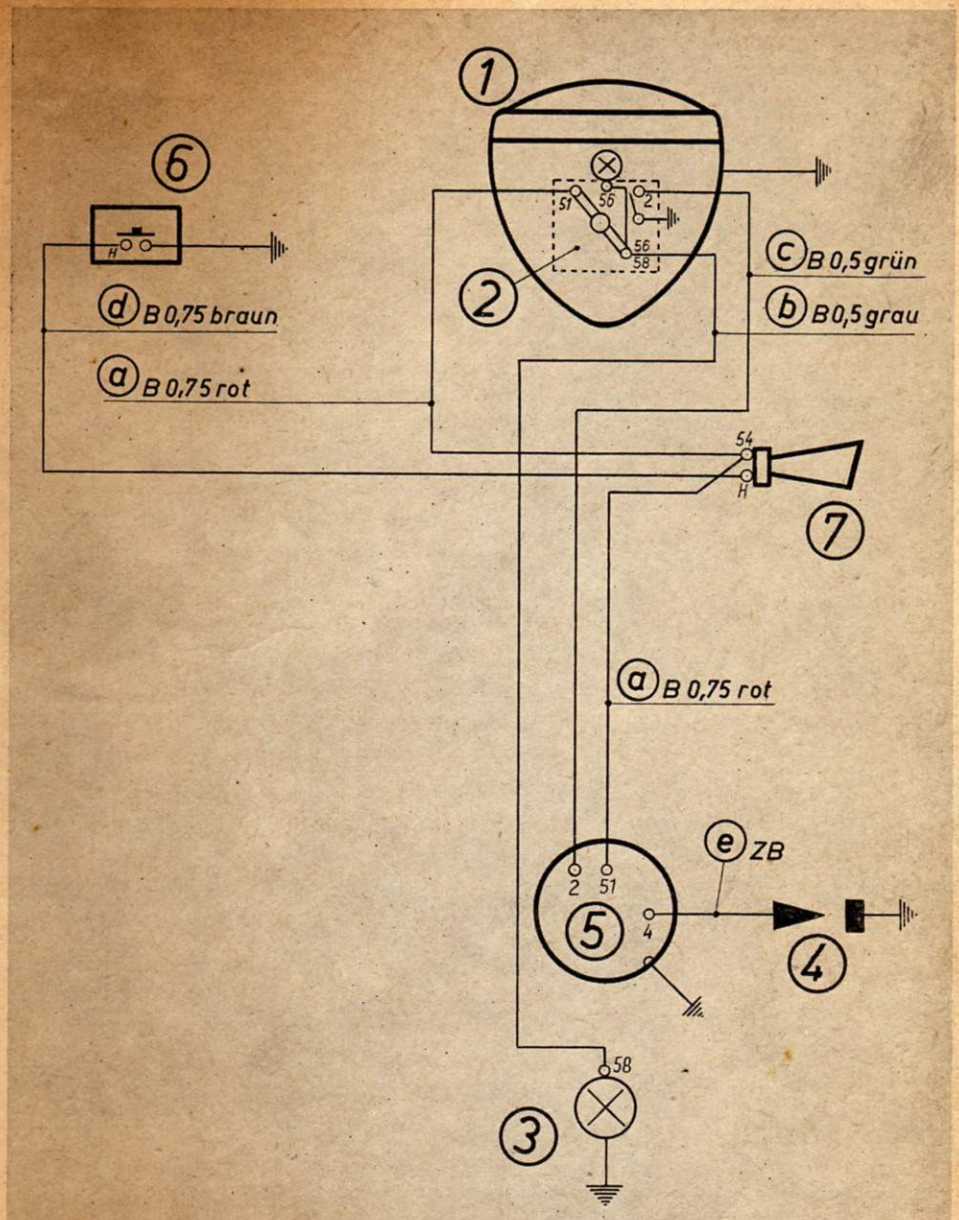


Fig. 86 Wiring diagram DKW Hummel c/w horn (Export)

VI / 57 / 843

1 = Headlamp 78 mm ϕ
2 = Light and short circuit cutout switch
3 = Tail lamp
4 = Sparking plug
5 = Fly wheel magdyno
6 = Horn button
7 = Horn

a = 0.75 ☐ red
b = 0.5 ☐ grey
c = 0.5 ☐ green
d = 0.75 ☐ brown
e = Ignition cable

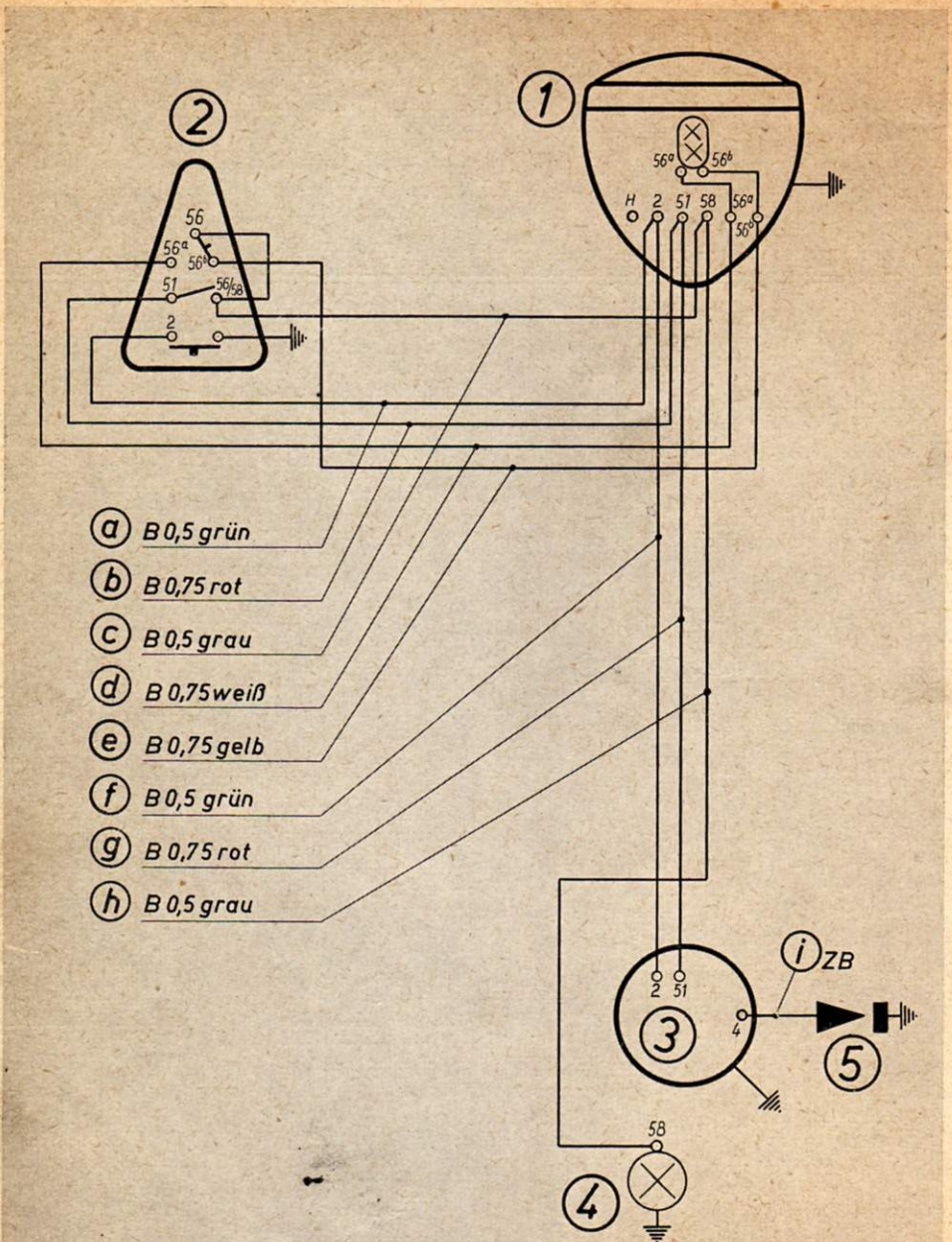


Fig. 87 Wiring diagram DKW Hummel c/w headlight and dipper light (Export) VI / 57 / 844

1 = Headlamp 85 mm ϕ
2 = Switch on handlebar
3 = Fly wheel magdyno
4 = Tail lamp
5 = Sparking plug

a = 0.5 ☐ green
b = 0.75 ☐ red
c = 0.5 ☐ grey
d = 0.75 ☐ white
e = 0.75 ☐ yellow
f = 0.5 ☐ green
g = 0.75 ☐ red
h = 0.5 ☐ grey
i = Ignition cable

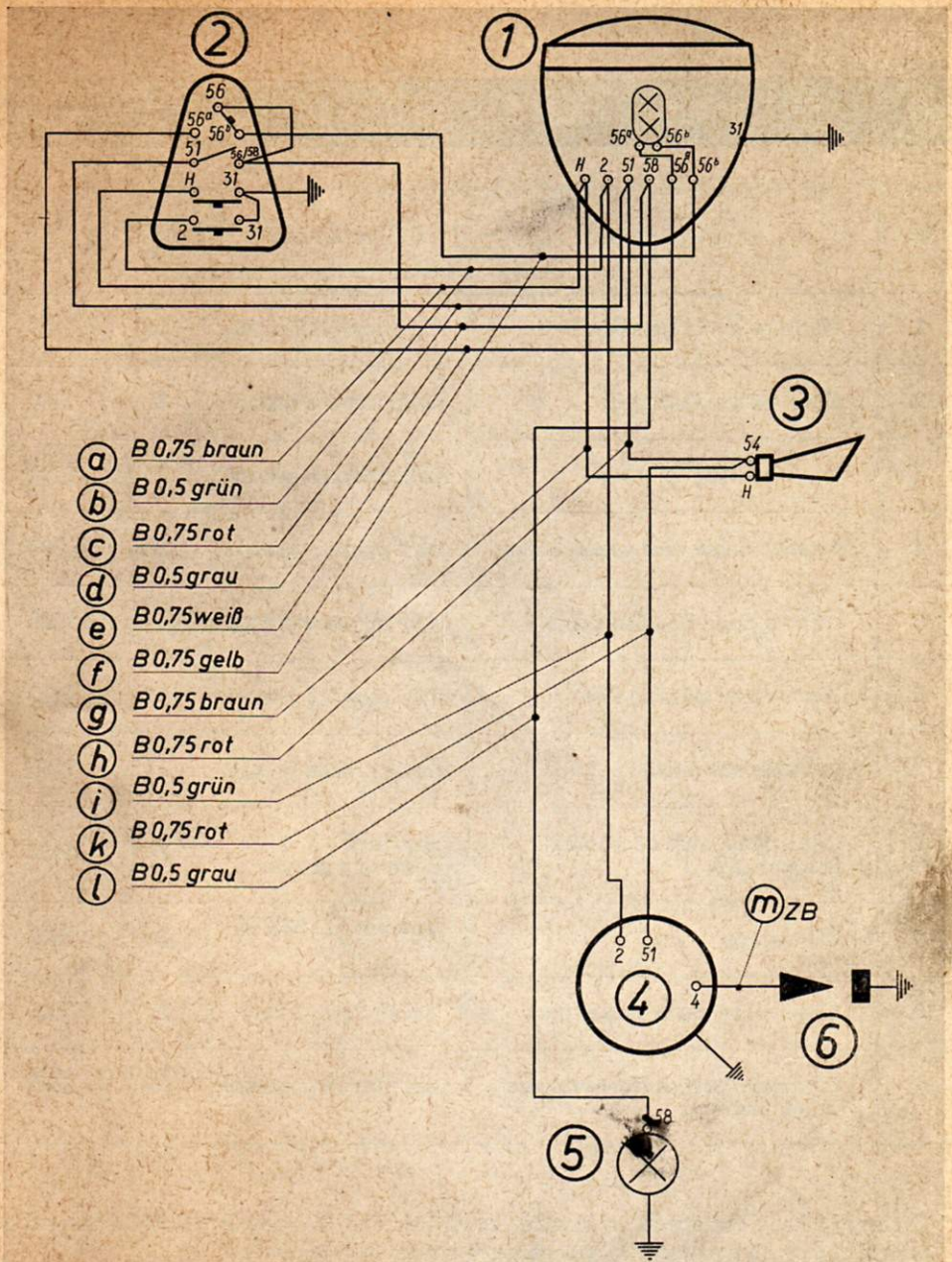


Fig. 88 Wiring diagram DKW Hummel c/w horn, headlight and dipper light (Export) VI / 57 / 845

1 = Headlamp 85 mm ϕ
2 = Switch on handlebar
3 = Horn
4 = Fly wheel magdyno
5 = tail lamp
6 = Sparking plug

a = 0.75 ☐ brown
b = 0.5 ☐ green
c = 0.75 ☐ red
d = 0.5 ☐ grey
e = 0.75 ☐ white
f = 0.75 ☐ yellow

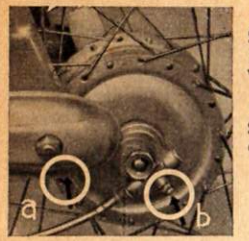
g = 0.75 ☐ brown
h = 0.75 ☐ red
i = 0.5 ☐ green
k = 0.75 ☐ red
l = 0.5 ☐ grey
m = Ignition cable

VI. Lubrication Schedule for the DKW Hummel Moped

No.	Lubrication point	Type of lubricant	Diagram No.	Greasing every. .miles
1.	Oil level in the gearbox	Gearbox oil SAE 80	8b	1200
2.	Gear change twist grip	Multi-purpose grease	3	1200
3.	Throttle twistgrip	Multi-purpose grease	2	1200
4.	Bowden cable rear wheel brake	Multi-purpose grease	6	1200
5.	Gear change Bowden cable	Multi-purpose grease	4	1200
6.	Front wheel steering link	Multi-purpose grease	1a	1200
7.	Speedometer drive	Multi-purpose grease	1b	1200
8.	Lubrication wick on contact breaker cam	Bosch FT 1 V 4 hot bearing grease	7	2400
9.	Oil change	Gearbox oil SAE 80 600cc.	8a	3600
10.	Chain drive clean and grease	DKW-chain grease	5	3600
11.	Clean and grease front and rear wheel bearings	Roller bearing grease	—	3600

* Greasing schedules depend on weather conditions and the way in which the vehicle is driven; it may be necessary to grease much earlier than stipulated.

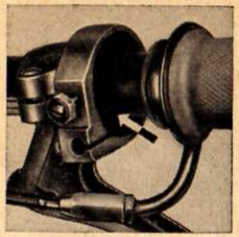
89/1 VI/56/2173



◄ 1a Swinging arm joint (front wheel)

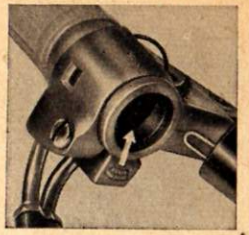
◄ 1b Speedometer drive

89/2 VI/56/2174



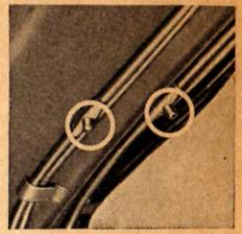
2 ► Throttle twistgrip

89/3 VI/56/2175

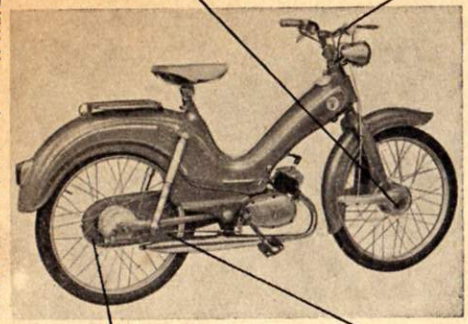


◄ 3 Gear change twistgrip

89/4 VI/56/2176



4 ► Gear change cable

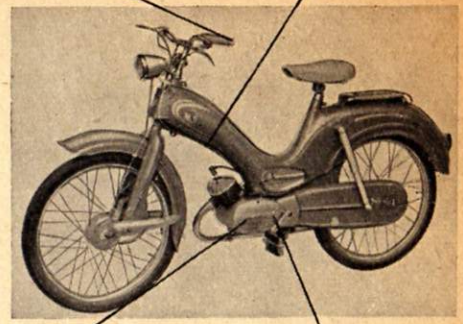


VI/56/2170

Greasing diagram for the DKW "Hummel"

up to frame No. 01 516 923

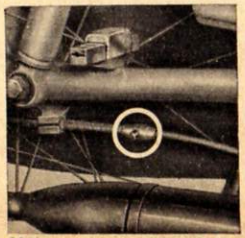
VI/56/2172



89/5 VI/56/2177

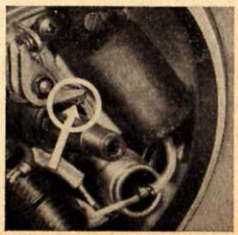
◄ 5 Secondary transmission chain

89/6 VI/56/2178



6 ► Cable to rear brake

89/7 VI/56/2179



◄ 7 Contact-breaker cam

8a ► Top up oil in gearbox

8b ► Check level of oil in gearbox

89/8 VI/56/2180

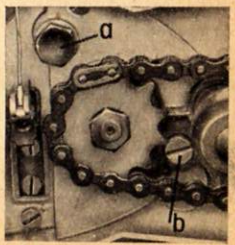
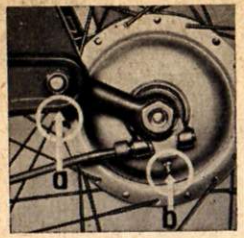


Fig. 89 Greasing diagram for the DKW Hummel up to frame No. 01 518 923.

Fig. 90 Greasing diagram for the DKW Hummel from frame No. 01 518 924 up to frame No. 01 551 100.

90/1 VI/57/625



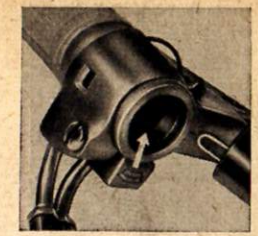
◄ 1a Swinging arm joint (front wheel)

◄ 1b Speedometer drive

90/2 VI/56/2174

2 ► Throttle twistgrip

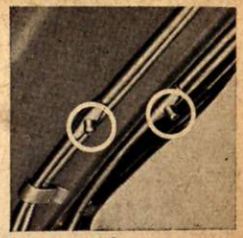
90/3 VI/56/2175



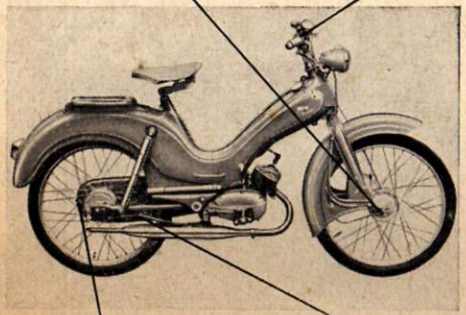
◄ 3 Gear change twistgrip

4 ► Gear change cable

90/4 VI/56/2176



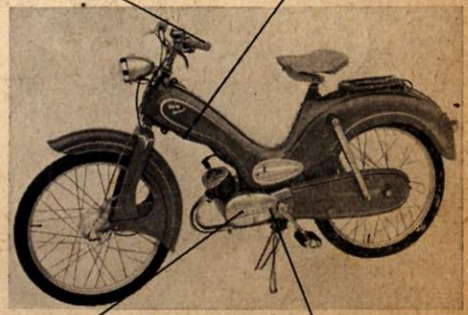
VI/57/787



Greasing diagram for the DKW "Hummel"

from frame No. 01 518 924

VI/57/306

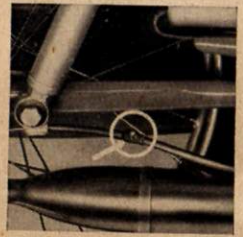


90/5 VI/56/2177

◄ 5 Secondary transmission chain

6 ► Cable to rear brake

90/6 VI/57/635



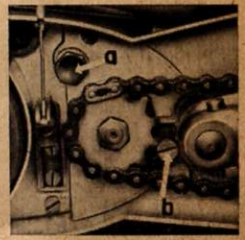
90/7 VI/56/2179

◄ 7 Contact-breaker cam

8a ► Top up oil in gearbox

8b ► Check level of oil in gearbox

90/8 VI/56/2180



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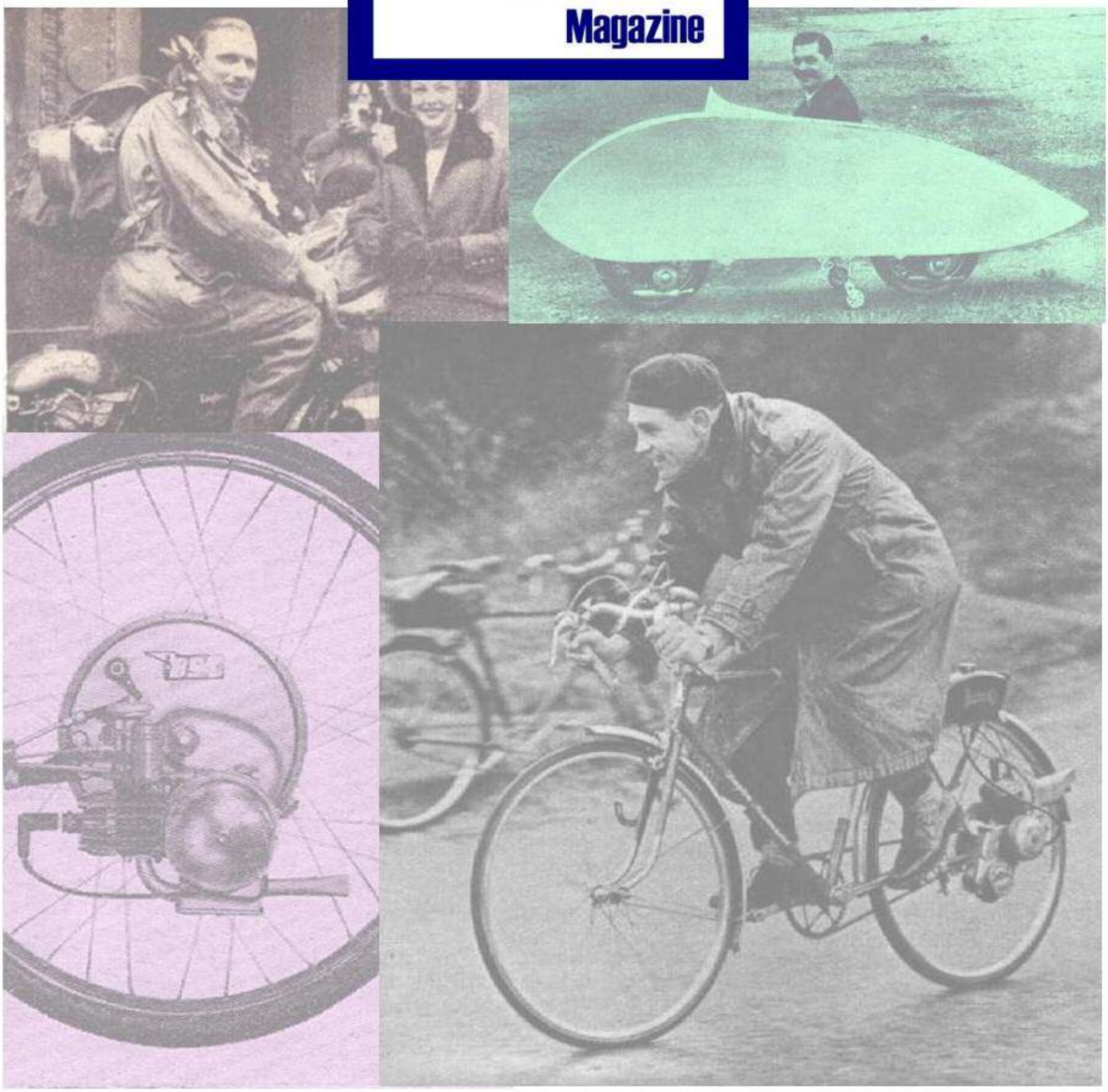

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