



**SACHS 50 • Three-Speed**  
**Repair Manual**



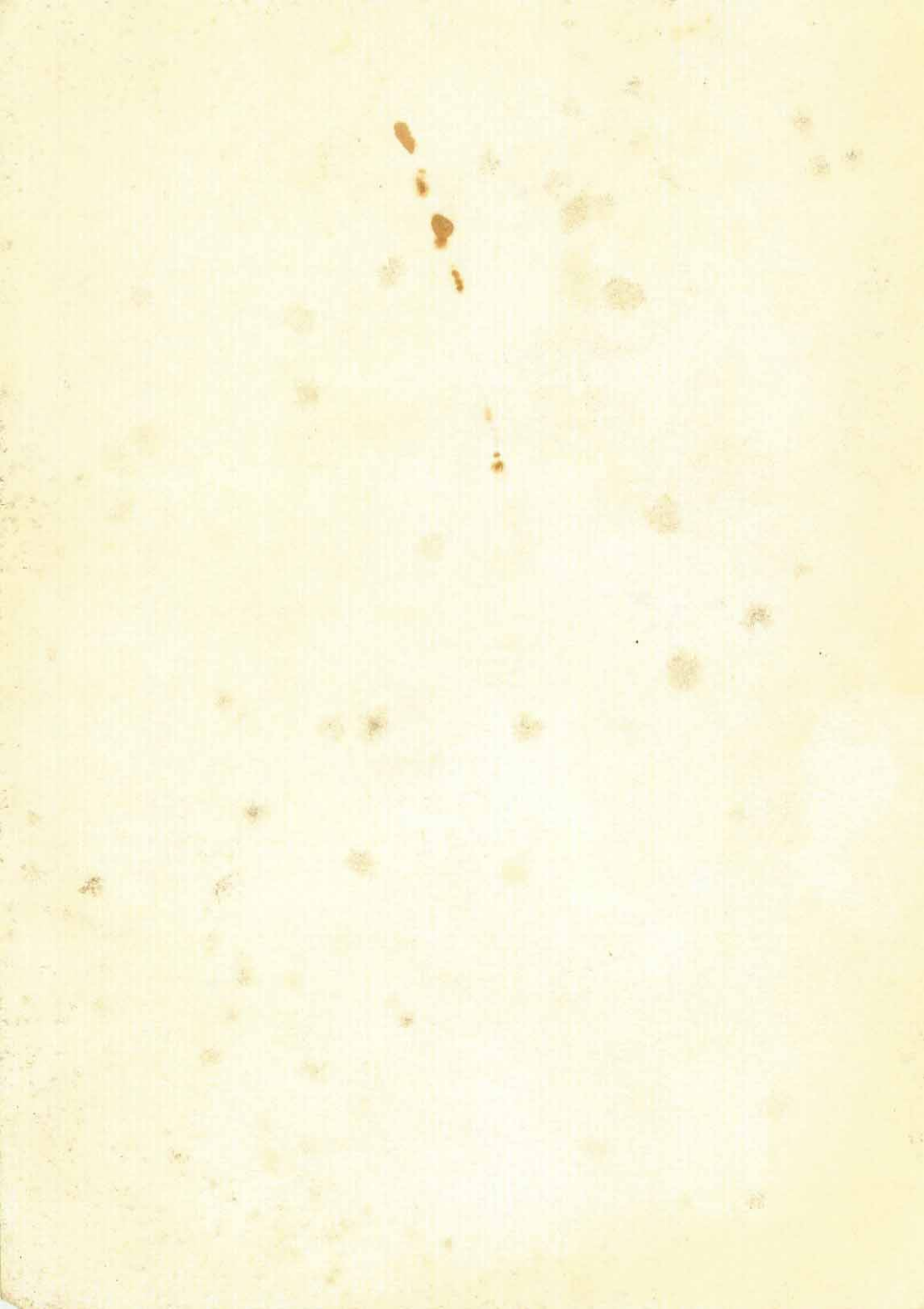
**Repair Manual**

**SACHS 50 Three-Speed**



**FICHEL & SACHS AG · SCHWEINFURT**





## PREFACE

A blue sign bearing a large "S", or the sign "Sachs Moped Service", shows every rider of a Sachs machine where he can take it for repair, should chance breakdown occur, or natural wear and tear require the renewal of some part of the power unit, and be assured of finding someone with an intimate knowledge of his power unit down to the smallest screw, also where he will not be kept waiting long for replacement parts.

As, however, not every mechanic or apprentice has been trained in the Works at Schweinfurt, but must be able to help Sachs riders all the same, especially where work of the simpler kind has to be undertaken, we have published this Repair Manual to help in servicing the Sachs 50 machine.

The instructions for taking down and assembling are fully detailed. It is only natural that a large proportion of troubles occurring in normal service call only for work on parts of the power unit accessible without completely dismantling it, and in most of such cases the unit need not even be removed from the frame. The Manual does not include quite simple jobs, such as taking down the carburetter, for instance, as the Handbook already contains all the information required.

The Sachs 50 three-speed power unit is described; basically the Sachs 50 three-speed fan-cooled unit is identical in construction, actually only the two-part fan cowling replacing the left-hand side housing cover, and the fan being bolted on to the magneto flywheel.

## TECHNICAL DATA

Cylinder bore:	38 mm
Piston stroke:	42 mm
Cubic capacity:	47 c. c.
Compression ratio:	6 to 1
Ignition:	Bosch flywheel magnet and lighting unit
Lighting output:	6 volts, 17 watts, A. C.
Sparking plug:	Bosch W 190 M 11 S
Ignition advance:	2—2½ mm before t. d. c.
Carburetter: 1/12/72:	Jet No. 56, needle jet No. 1517, needle setting, second notch from top, gas slide (throttle) No. 3
Silencer:	AB 1092, dismantable
Clutch:	Double-plate clutch
Gear:	Three-speed gear in engine unit
Gear change:	Handlebar twist-grip
Ratios in gearbox:	First, 3.44, second, 2.09, top, 1.40
Transmission to rear wheel:	Roller chain, ½" x 3/16", with rollers 7.8 mm diameter
Driving sprocket:	12 teeth, for 23" wheels
Rear wheel chain wheel:	32 teeth for 23" wheels
Final transmission ratios:	First, 35.6, second, 21.6, top, 14.45
Lubrication:	Engine, petroil mixture, 1 part oil to 25 parts petrol Gear, 200 c. c. SAE 80 gear oil

# 1. TOOLS FOR REPAIR WORK

F&S 310.48

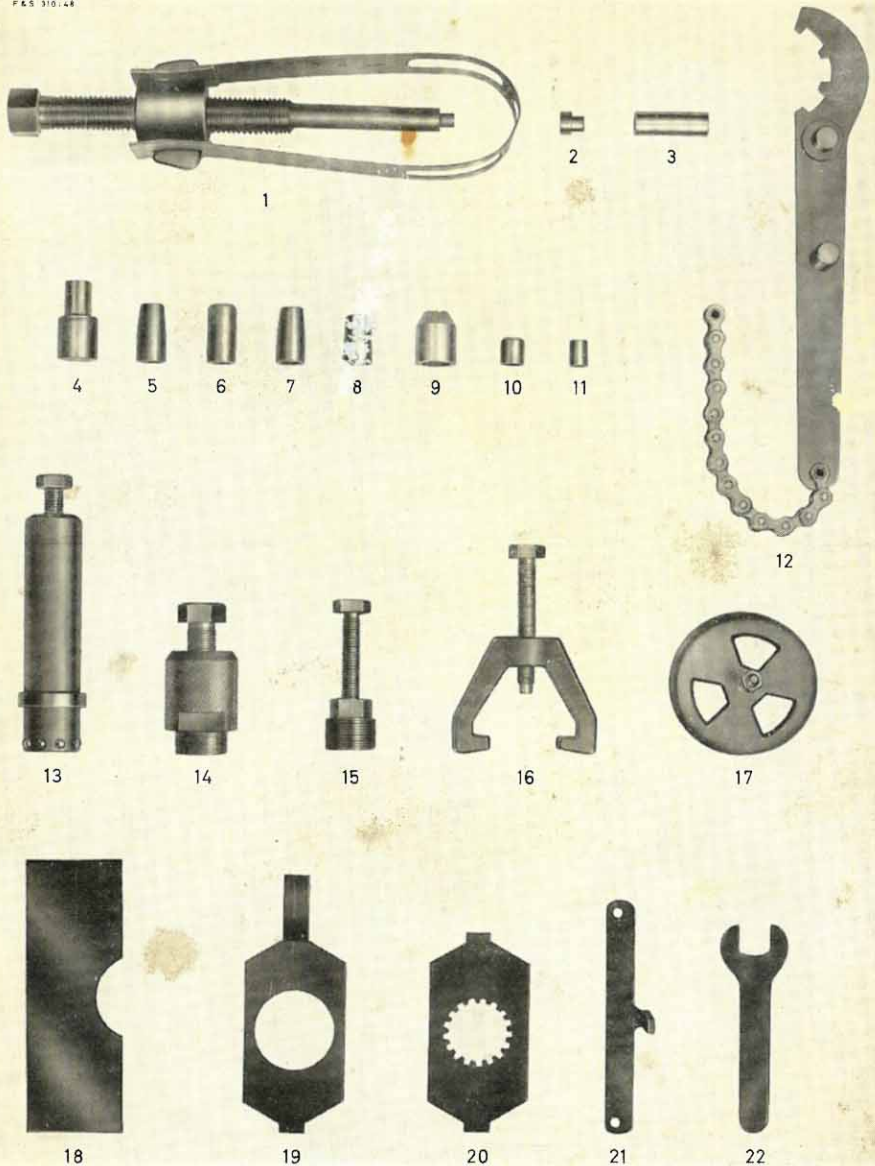


Fig. No.	Order No.	Description
	0277 079 006	Toolkit, complete.
1	0276 065 001	Gudgeon pin extractor.
2	0277 083 000	Gudgeon pin extractor. insert bush.
3	0276 023 001	Fixing pin.
4	0676 022 005	Guide pin.

Fig. No.	Order No.	Description
5	0277 077 000	Crankshaft cap (magneto side)
6	0277 072 000	Protector cap, 10.2 mm diameter.
7	0277 078 000	Slip-on sleeve for crankshaft (clutch side).
8	0278 022 000	Slip-on sleeve for crankshaft (clutch side).



## 1.2 SPECIAL TOOLS

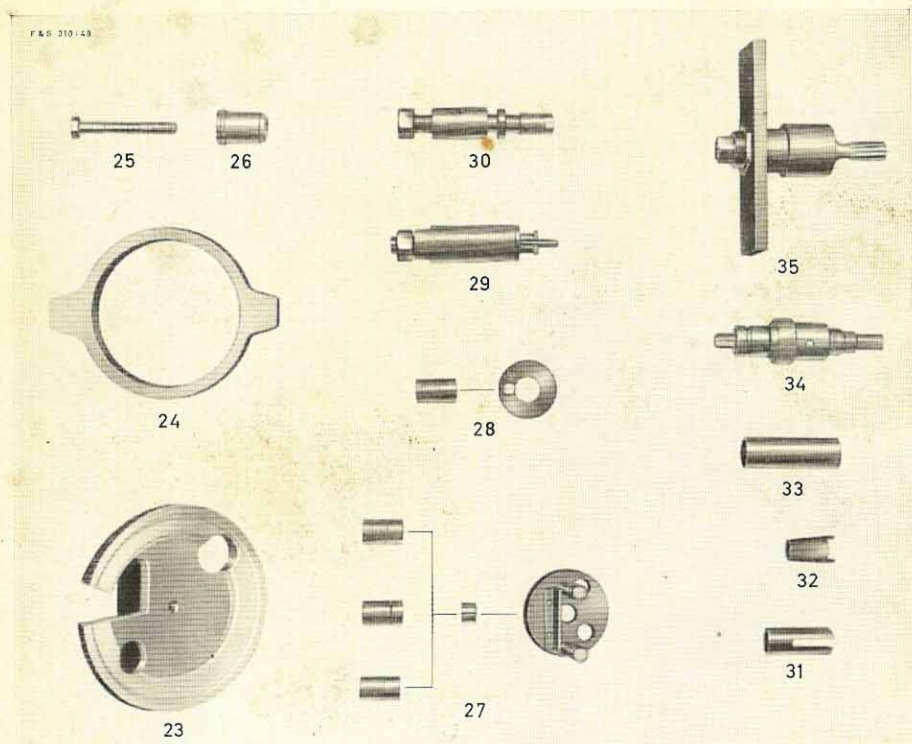


Fig. No.	Order No.	Description	Fig. No.	Order No.	Description
23	0277 000 001	Ignition set centring plate.	30	0277 008 000	Connecting rod bush extracting and inserting tool.
24	0277 080 000	Centring ring.	31	0277 088 000	Expanding sleeve.
25	0241 017 000	Hexagon bolt.	32	0277 087 000	Fitting sleeve.
26	0277 082 000	Centring piece.	33	0277 089 000	Push-on tube.
27	0277 526 000	Measuring plate, complete, with three knurled nuts.	34	0277 013 001	Jig for setting ignition advance.
28	0278 018 000	Mainshaft measuring plate, Sachs 50/3.	35	0277 066 000	Reaming jig, complete, for countershaft bush.
29	0277 014 000	Countershaft bush extractor.			
9	0276 460 000	Thrust bush	18	0276 019 001	Spacing plate.
10	0277 070 000	Protector cap	19	0278 008 000	Clutch fixing plate.
11	0278 023 000	Protector cap	20	0292 022 000	Locking plate.
12	0277 086 006	Slotted nut spanner.	21	0278 007 000	Fan holding plate.
13	0277 073 005	Ball-bearing extractor.	22	0278 024 000	17 mm spanner for gear change pin.
14	0676 011 001	Clutch hub drawer.	0297 004 000	Board to take set of tools (supplied only to order and charged extra).	
15	0277 075 005	Flywheel magnet drawer.			
16	0277 076 005	Sprocket draw dog.			
17	0276 057 000	Clutch retaining jig.			



### 1.3 THE F & S WORK JIG

A work jig fixture has been developed to enable all work on Sachs engine units to be carried out conveniently and accurately: its use enables all Sachs power units to be taken down and assembled.

The standard type No. 0276080000 (fig. 1) is gripped in a vice by a gripping device (s); with this, the jig can be turned (d) and tilted (k), so that work can be carried out quickly and in full view. A retaining strap and chain (h) that can be attached to the jig enables the nuts to be unscrewed easily from the flywheel magneto and sprocket.

The standard type of work jig No. 0276080000 has been produced in its basic form for the Sachs 100/two-speed unit.

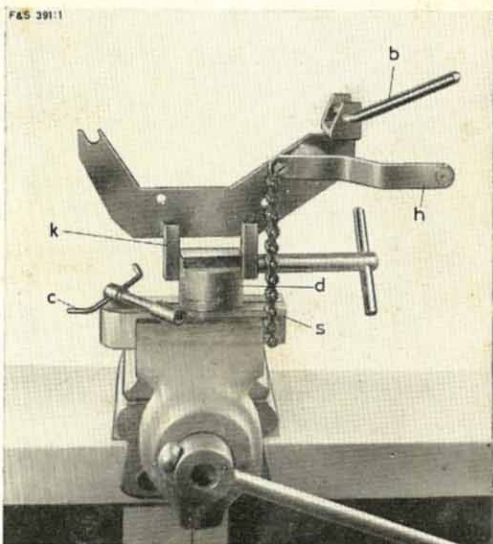


Fig. 1

An assembling plate (m) No. 277084000 — fig. 2 — with a second fixing pin and No. 8 metric wing nut, and with a bolt (n) metric 6x20 — is bolted on to the standard type 0276080000 for the Sachs 50/two- and three-speed models.

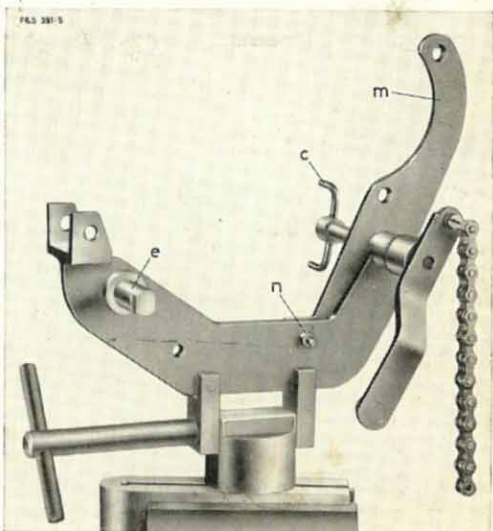


Fig. 2

## 2. TAKING DOWN THE ENGINE

F & S 316:16

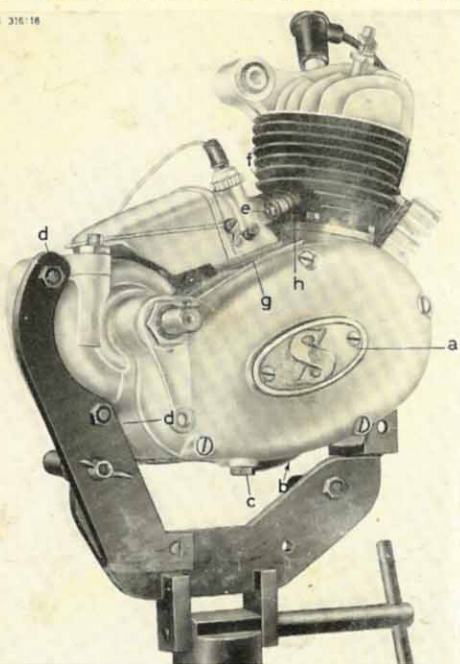


Fig. 3

F & S 316:19

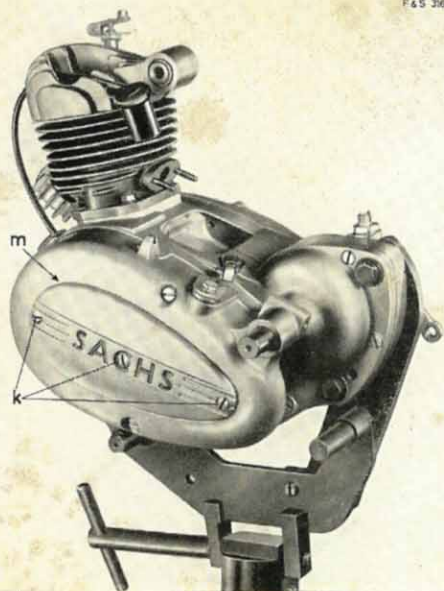


Fig. 4

Remove the engine unit from the frame and clean thoroughly before dismantling.

Unscrew cover "S" (fig. 3a) on the clutch side (with a 9 mm screwdriver): remove the oil drain (b) and level (c) plugs (using a 14 mm spanner).

Lay the engine over on its side so that all the oil can run out.

### 2.1 Fixing the engine unit in the work jig (Fig. 3)

Fix the engine unit in the F & S work jig No. 0276 080 005 by two metric 8 x 50 bolts and nuts.

"Fan cooler" — see Appendix.

### 2.2 Carburetter (Fig. 3)

Unscrew the two metric 5 fixing nuts (e) with their special "Novotex" steel washers (f) (using a 9 mm spanner); remove carburetter flange washer (h) — mineral asbestos — and the cork gasket (g) stuck on to the housing. For further details see "Working on separate components" Sachs 50/3, and also F & S booklet No. 308.41/4.

### 2.3 Gear-change control (Fig. 4)

Remove the "Sachs" front cover and cork gasket (m) — three metric 5x20 fillister head screws (using a screwdriver). (Fig. 5)

The change-gear fork (n) is raised slightly and while lifted, the slotted nut (r) is unscrewed by a screwdriver specially made and ground for the purpose (q) and taken out of the fork. The change-gear arrangement itself is left completely assembled in the magneto side housing cover (Fig. 6)

If the change-gear arrangement has to be completely taken down it can be done as follows. (Fig. 6)

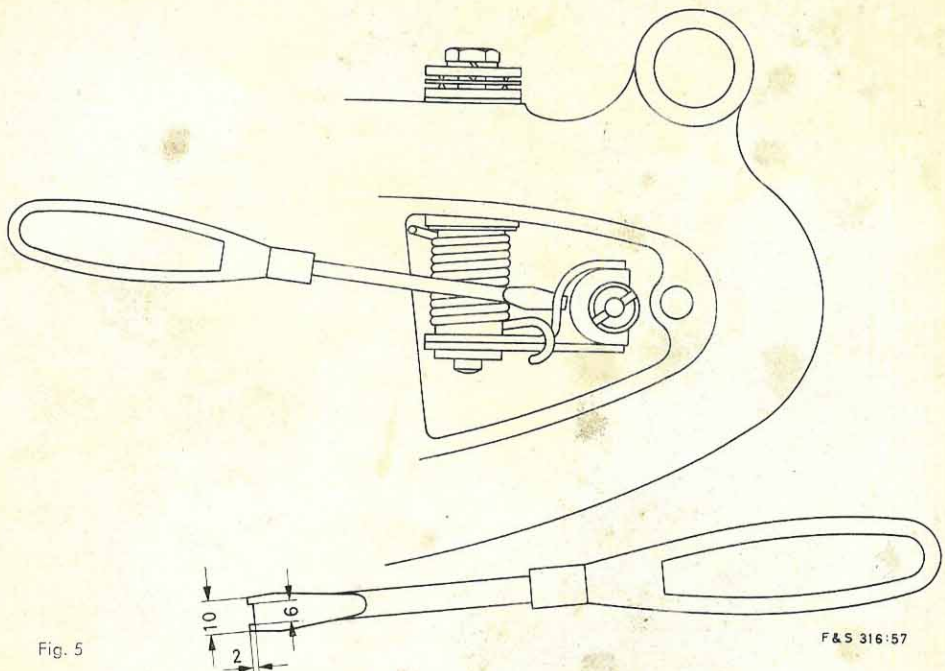
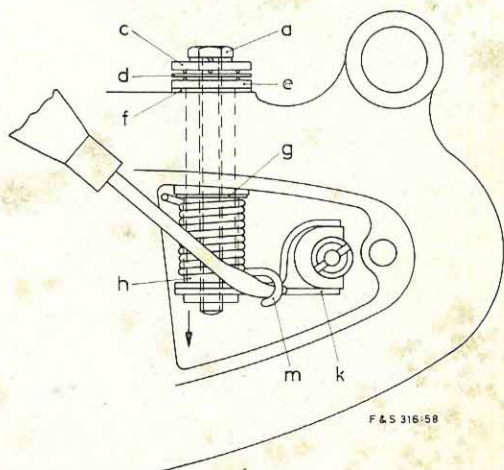


Fig. 5

F & S 316:57

Torsion spring (m) is lifted from the gear change fork by the auxiliary tool. Unscrew fixing bolt (a) (10 mm spanner) and remove it, together with the lever plate (c) and transmission plate (d). Press fork (k) downwards off control pin (e) in the direction of the arrow, using a screwdriver, and take out. Strip torsion spring (m) from its bush (h) and remove it and also its washer (g) from the control pin (e); the latter can then be taken out from the housing cover together with its spacing washer (f). Take off the magneto side housing cover — two screws, metric 5 by 35.



F & S 316:58

Fig. 6



A&S 316:20

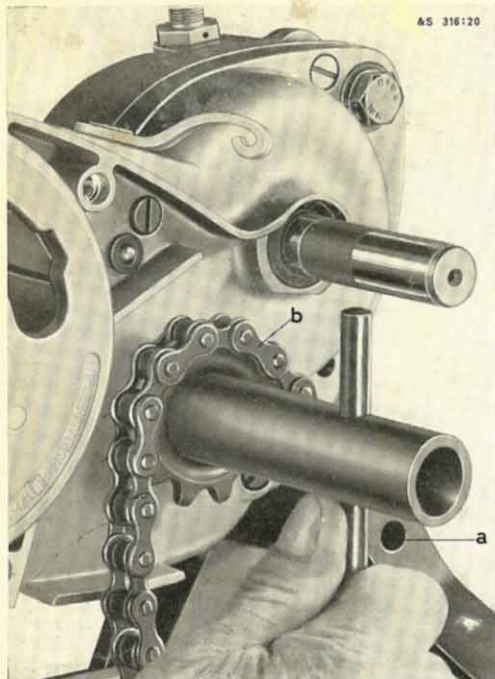


Fig. 7

## 2.4 Driving sprocket (Fig. 7)

Pressing the control rod lightly and turning the driving sprocket at the same time will place the change-gear dog in the mainshaft in top gear position. Slip the retaining strap and chain on the right-hand work jig fixing pin and pass the chain (b) over the sprocket from right to left. Unscrew nut on mainshaft (17 mm spanner) and remove its washer by tilting the unit; then take away the retaining strap and chain.

F&S 316:21

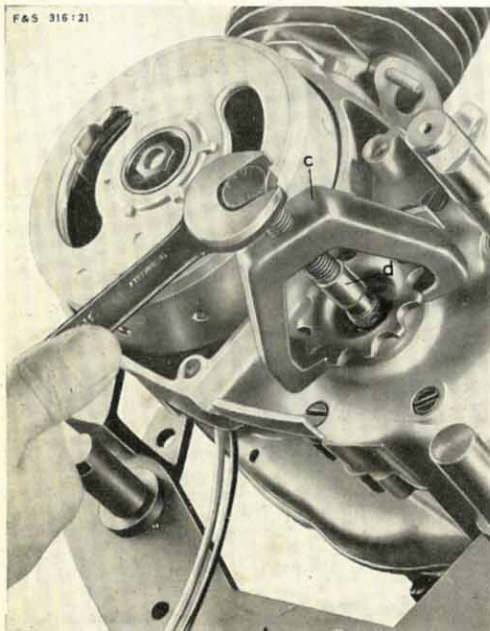


Fig. 8

(Fig. 8)

To protect the thread on the mainshaft and also the gear-change rod slip the protector cap 0278 023 000 (d) on it and draw the sprocket off by the draw dog 0277 076 005 (c), using the 17 mm spanner. The gear-change rod must be left in its top gear position while the sprocket is taken off.

## 2.5 Ignition System (Fig. 9)

Slip the retaining strap (h) on the left-hand holding pin of the work jig and place its spigot (z) in one of the slots of the flywheel magneto so that the strap is under tension when unscrewing the metric 10x1 fixing nut M by a 14 mm spanner. Remove the spring washer by tilting the engine unit.

(Fig. 10)

To withdraw the flywheel magneto, slip protector cap 0277 070 000 on to the end of the crankshaft (not visible in the illustration, as underneath the draw tool). Screw in draw tool 0277 075 005 (f) and then again insert the spigot of the retaining strap so that it is in tension. Draw off the flywheel magneto by using a 17 mm spanner. Leave the Woodruff key in the crankshaft, as removing it too soon may cause damage to the coils.

(Fig. 11)

Remove the three metric 4 fixing screws (g) for the armature baseplate, with their washers and spring washers (screwdriver). Before taking out the armature baseplate press the rubber grommets for ignition (t) and the lighting and short-circuiting cables (s) out of the housing. Remove the armature baseplate and put it aside, together with the flywheel magnet. Lift the Woodruff key (k) out of its slot by a pair of side-cutting pliers.

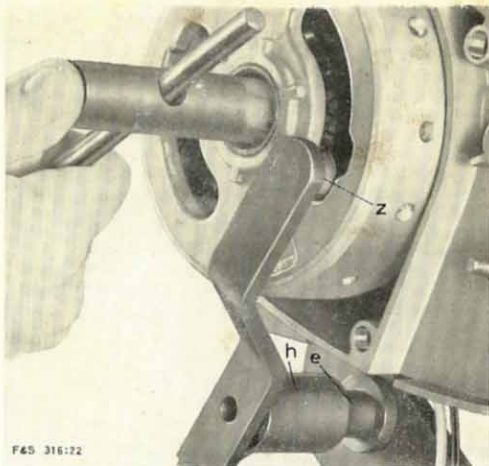


Fig. 9

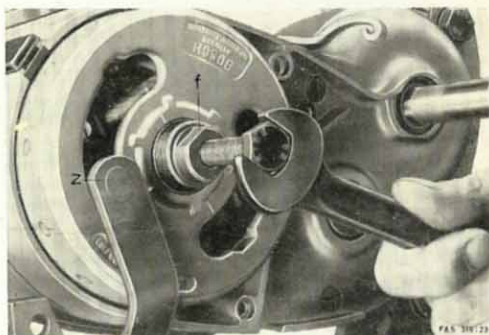


Fig. 10

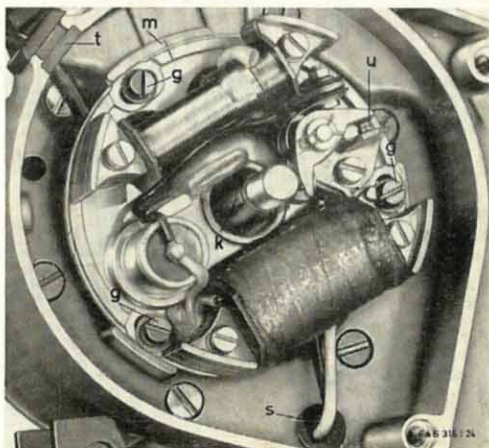


Fig. 11

## 2.6 Cylinder

The cylinder head of the Sachs 50 three-speed unit is fitted with a decompressor; if any trouble should occur the complete decompressor must be changed. Unscrew and take out the four metric 6 cylinder head bolts (10 mm spanner), remove the washers and take off the cylinder head.

Unscrew the four metric 6 nuts with spring washers on the cylinder (10 mm spanner), remove the spring washers and take off the cylinder upwards without turning it. Take away the cylinder flange gasket.

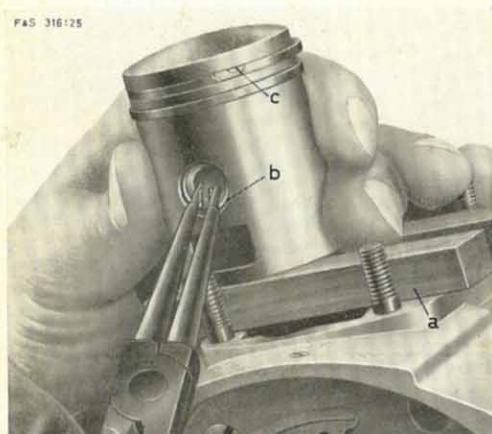


Fig. 12

### Piston (Fig. 12)

Place a slotted piece of wood (a) between the crankcase flange and piston (cover crankcase opening with a cloth if necessary). Remove gudgeon pin locking clip by a pair of round-nosed pliers.

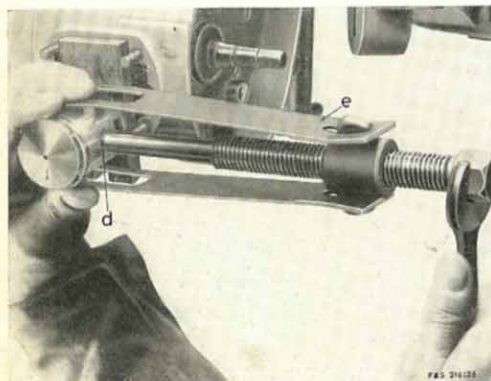


Fig. 13

### Gudgeon pin (Fig. 13)

Press out the gudgeon pin by the gudgeon pin extractor 0276 065 001 (e), using the insert bush 0277 083 000 (d).

**Be careful with the piston rings — they break easily.**

Remove the slotted piece of wood.



## 2.7 Brake Lever (Fig. 14)

Take off the circlip (s) by special circlip pliers. Note: Set the stop screw (p) of the circlip pliers so that the clip can be removed or fitted without undue expansion. Remove packing washers (m), placed between the driving bush and pedal spindle to take up end play; prise up locking tab (k) of metric 20.8 x 1 nut (n) with collar (L. H. thread) and unscrew nut (26 mm box spanner); remove locking washer. Draw off brake lever (f) and serrated thrust washer (g); take packing washers (h) from the driving bush.

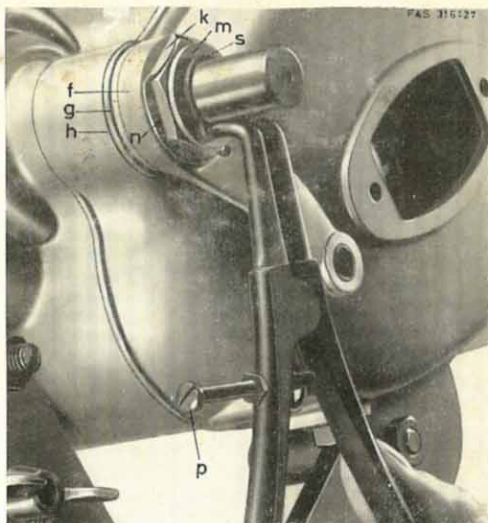


Fig. 14

## 2.8 Drive and clutch (Fig. 15)

Unscrew the five cheese-headed screws of the clutch side housing cover (9 mm screwdriver), take off cover and remove "Abil" gasket. Slacken clutch adjusting screw locknut (r) by an 11 mm spanner and screw adjusting screw right out (6 mm screwdriver).

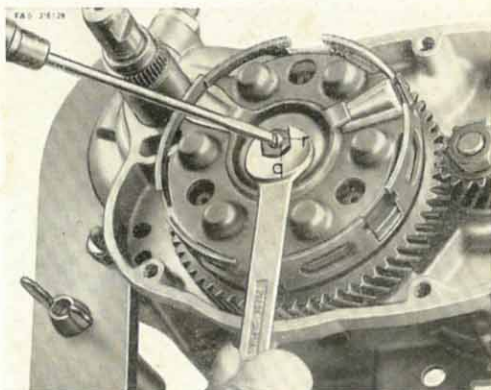


Fig. 15

(Fig. 16)

Screw the clutch retaining jig 0276 057 000 (t) into the metric 6 thread of the thrust plate. Screw up the spring plate with its six thrust springs and thrust plate by the metric 6 nut (x) of the retaining jig sufficiently far for the two cover plates (v) to be removed easily and the compressed set of springs to be taken out (10 mm spanner).

Note: Unscrew metric 6 nut (x) three or four turns until the clutch is reassembled, to prevent fatigue to the compressed set of springs.

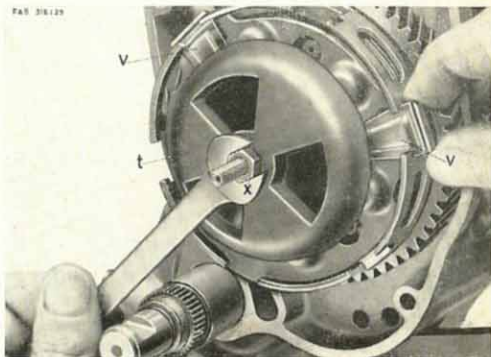


Fig. 16

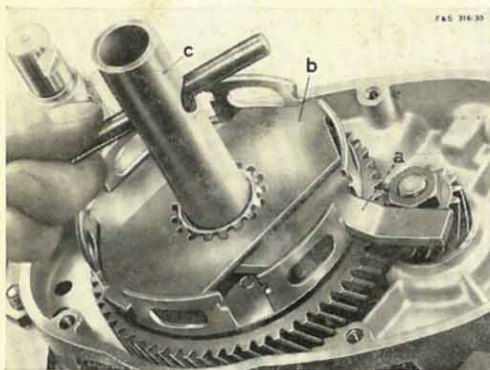


Fig. 17

Take out clutch plates (two lined and one steel) and let the two thrust pins with their intervening roller fall out of the countershaft bore by tilting the engine unit.

(Fig. 17)

Place the clutch fixing plate 0278 008 000 (a) and locking plate 0292 022 000 (b) in the clutch casing and unscrew the metric 12 x 1 nut from the clutch hub (17 mm box spanner) (c). Take out spring washer by turning engine unit over.

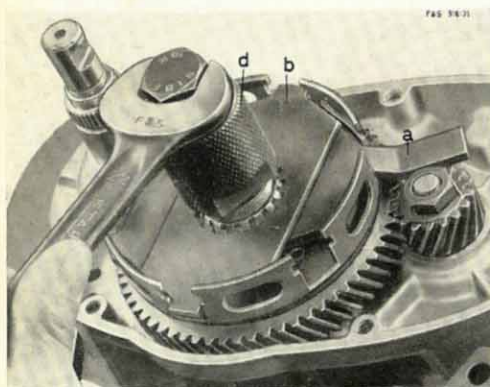


Fig. 18

(Fig. 18)

Screw clutch drawer 0676 011 001 (d) without any protector cap into the clutch hub and draw it off (22 mm spanner). Remove locking plate (b) but leave clutch fixing plate in place (a).

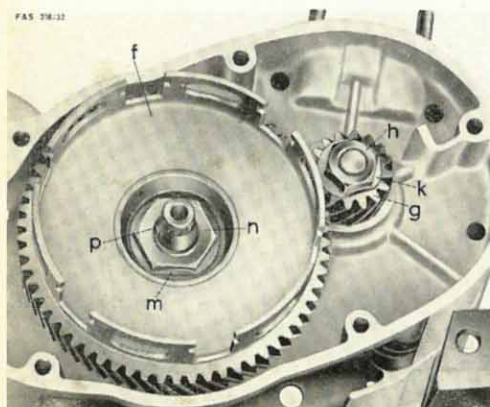


Fig. 19

(Fig. 19)

Remove Woodruff key (p) from countershaft with a pair of side-cutting pliers. Prise up locking tab (m) of the metric 20.8 x 1 nut with collar (n - left-hand thread) and unscrew nut (26 mm box spanner). Take away lock washer (m).

#### Driving gear wheel.

Prise up locking tab (k) of metric 10 x 1 nut (h - right-hand thread) and unscrew; take away lock washer (k). Remove clutch fixing plate 0278 008 000 (fig. 17a) from clutch casing.



(Fig. 20)

Place the thrust bush (knock-out bush) 0276 604 000 (q) on the ball-bearing bush (r). Take care not to use any of the crankshaft push-on sleeves for this.

Take the weight of the clutch casing in one hand and at the same time give the knock-out bush a smart blow with an 8-oz. hammer; remove clutch casing (f) and also driving gear (g). Remove Woodruff key from crankshaft by a pair of side-cutting pliers.

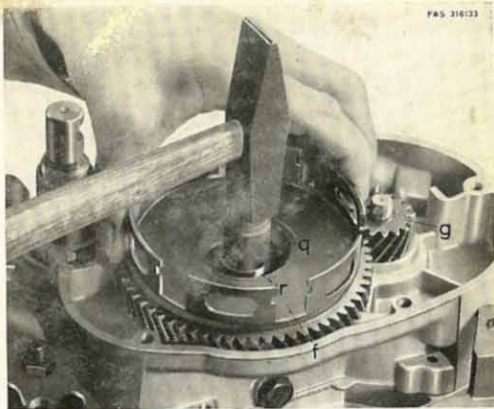


Fig. 20

(Fig. 21)

### 2.9 Crankshaft and gearbox

Unscrew 11 cheese-headed screws on the magneto side — seven metric 6 x 20 (s) and four metric 6 x 35 (t) (screwdriver). Unbolt the complete power unit housing from the F&S work jig — two bolts metric 8 x 50 (u) with nuts (14 mm spanner).

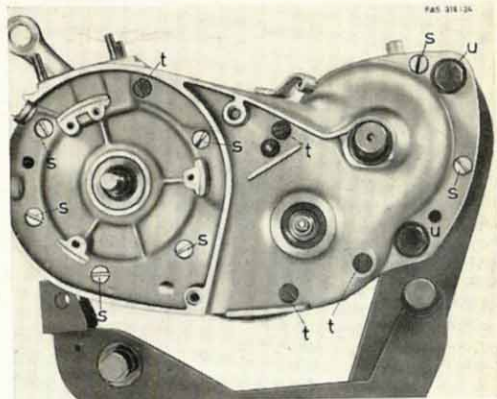


Fig. 21

(Fig. 22)

Rebolt the complete power unit housing to the work jig (y) with the joint face of the clutch housing to the jig — two metric 6 x 20 screws (screwdriver).

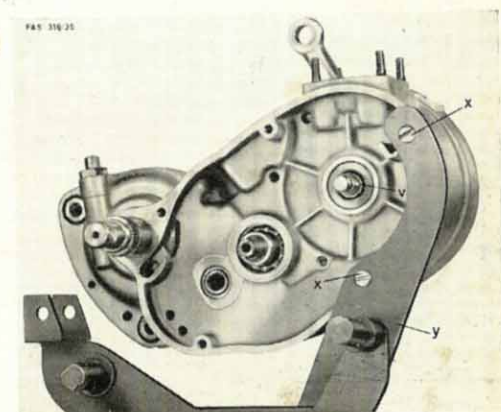


Fig. 22



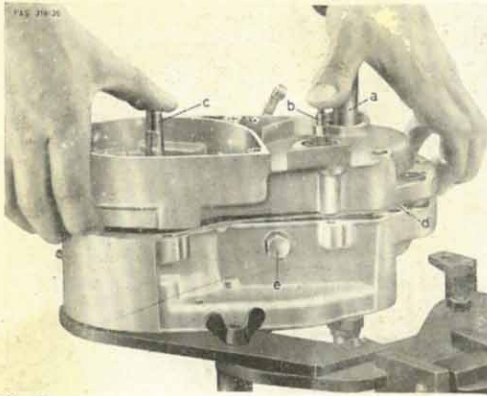


Fig. 23

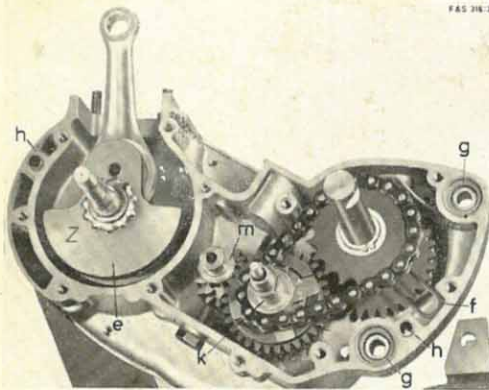


Fig. 24

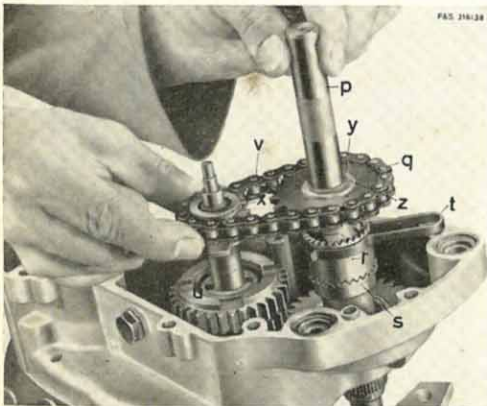


Fig. 25

(Fig. 23)

Pressing the ball of the left hand on the pedal spindle (a), the left thumb on the mainshaft (b) and the right thumb on the crankshaft (c), lift off the magneto side half of the housing by the tips of the fingers of both hands. If necessary, the halves of the housing can be parted by tapping the crankshaft and pedal spindle lightly with a rubber hammer (not the selector rod of the mainshaft) and then drawing apart as just described.

Remove the "Abil" gasket (d) between the two halves of the housing.

Note: It is essential to replace this "Abil" housing gasket (d) by a new one when reassembling the unit.

(Fig. 24)

Remove packing washers (shims) from mainshaft (k) and counter-shaft (m), and also any that may have stuck in the magneto side half of the housing.

Take out crankshaft (e); this can be done with the connecting rod in any position.

So that, when assembling, there may be no mistake between the crankshafts for the Sachs 50/2, the Sachs 50/3 with chain drive and the Sachs 50/3 with gear drive, for easy identification the figure "3" is etched on the crank web of the Sachs 50/3 chain drive and the letter "Z" on the crank web of the Sachs 50/3 gear drive. Do not refit the crankshaft without using the slip-on sleeves.

(Fig. 25)

Take out together by both hands the pedal spindle (p) complete

with chain wheel (q), driver (r) with brake spring (s) and the driver bush (s), also from the mainshaft (u) the complete chain sprocket (x) together with chain (v).

(Fig. 26)

Take out mainshaft (a) with its complete set of change-gear wheels (b, c and d) and thrust washer, also layshaft (e) with cover plate, ball-bearing bush and running bronze bush, all together.

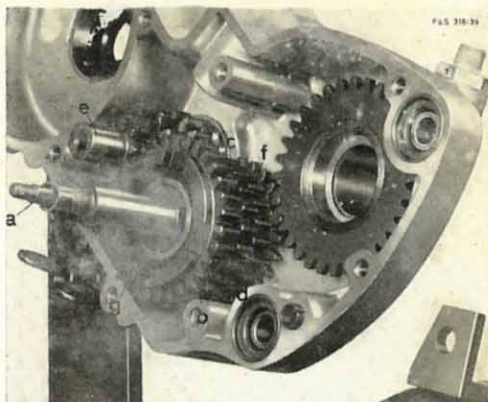


Fig. 26

(Fig. 27)

#### Speedometer Drive

Take out the large plain gear with the pressed-in helical gear wheel (h) and thrust washer (k) in its bore. The helical pinion (n) with its bearing bush (p) can be withdrawn after unscrewing the screwed connection (q) from the housing part.

Take the cover plate and rollers for the mainshaft bearing from each half of the housing.

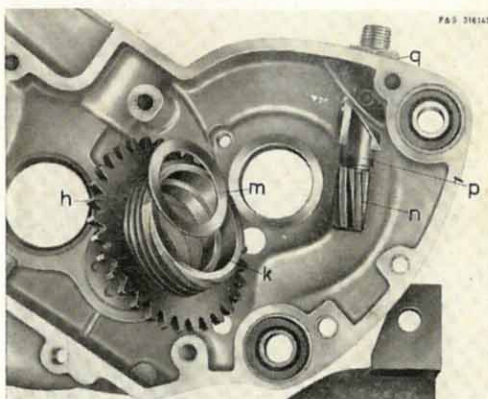


Fig. 27

If there is any cause for removing the clutch lever from the magneto side half of the housing, its keeper (slotted pin) must be pulled out by a pair of side-cutting pliers. The sealing washer (with protector cap) for the clutch lever must also be changed, if damaged.

Unscrew the clutch side half of the housing from the work jig; press out the rubber bushes for the engine fixing from both halves of the housing.

The engine unit is now completely dismantled; clean the housing and gear parts, check all parts and renew as necessary.

**For repairs and renewals:**

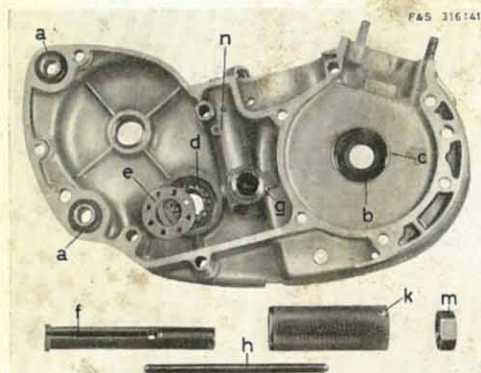
**Use none but genuine Sachs parts.**



## 3. WORKING ON SEPARATE COMPONENTS

### 3.1 Changing the roller and single-thrust bearing outer races in the two halves of the housing.

Before heating the halves of the housing, press out the rubber bushes (a) for the engine unit fixing from both halves of the housing, if this has not already been done.



Heat up the halves of the housing to 60 to 70 degs. C. (Be careful with a welding burner, the housing material is die-cast electron) and remove the outer races by tapping the housing lightly with a rubber hammer. It is best to have new outer races ready to hand before heating, so that they can be pressed in at the same housing temperature; this saves repeated heating.

Fig. 28

Note : Do not transpose single-thrust bearings.

All outer races, especially those for the single-thrust bearings, must be pressed in again to secure a good seating after the two halves of the housing have cooled down.

### 3.2 Pre-assembling the magneto side half-housing

#### 3.21 Crankshaft bearing

Press in the "Buna" sealing washer 0250 090 000 (rubber lip on inside of housing) and the single-thrust bearing outer race (c) E15.

#### 3.22 Mainshaft bearing

Press in together the "Buna" sealing washer 0230 011 000 (rubber lip with annular spring towards outside of housing), spacing washer 0244 078 000 and roller bearing outer race (d) 0232 025 000; place 15 rollers 0232 014 000 (4 x 8 mm) in position with high melting-point grease and cover with spacing washer (e) 0244 078 000.

#### 3.23 Countershaft bearing

Bronze bush (g) 0233 002 005 is a component of the half-housing, if defective, extract by the special draw tool No. 0277 014 000.

#### 3.24 Using the special draw tool 0277 014 000

Take the tool apart and, by overcoming the gripping pressure, enter the collet (f) with the grippers in the bronze bush (g). Press the rod (h) up to the stop in the collet to expand the two grippers, then extract the bronze bush by the thrust sleeve (m) and nut (k). Press new repair bush 0233 002 009 (bore diameter 12.8 mm) into housing.

**Note:** Set the oil lubricating groove in the bronze bush in line with the oil lubricating hole in the housing; drill oil hole 4 mm diameter through from the housing into the bronze bush. Reamer out the bronze bush with the special reamering tool 0277 066 000.



### 3.25 Using the special reamering tool 0277 066 000

Remove the ball-bearing outer race for the ball-bearing bush from the clutch side half-housing (heating it up to 60 to 70 deg. C. to do so), to enable the reamering tool to be used. Set the guide (a) for the reamer (b) in the bearing seating and tighten it by the fixing plate (c) and metric 24 x 1 nut (left-hand thread). Then screw the two halves of the housing together by three metric 6 bolts, using the two locating sleeves as guides, and reamer out the bronze bush with the finishing reamer (b).

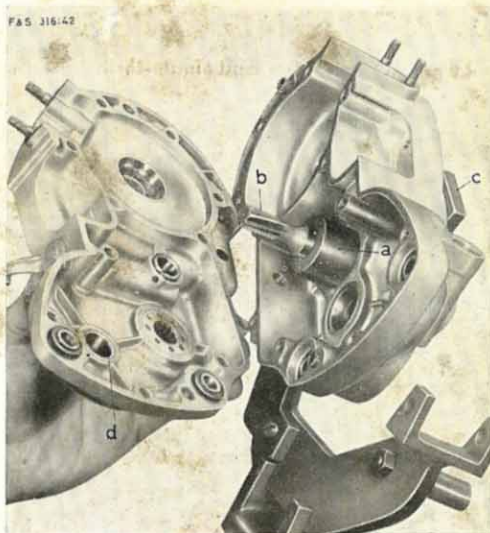


Fig. 29

### 3.26 Pedal spindle bearing

Bronze bush (d) 0232 039 000 with "Buna" sealing washer 0250 084 000 (rubber lip on the bronze bush) is a component of the half-housing.

### 3.27 Clutch lever bearing

Place "Buna" sealing washer 0650 017 000 and protector cap 0246 012 000 in together (rubber lip towards the housing). Then oil clutch lever, insert, and lock by slotted pin with rubber sealing washer.

### 3.28 Engine fixing

Press in the two rubber-bushed bearings 0260 021 000 for the engine fixing (fig. 28a) by a hand press, taking care that the large diameter of the steel bush is on the outside of the housing as the fixing in the frame.

Press in the rubber-bushed bearings in both halves of the housing and in the cylinder head similarly.

## 3.3 Pre-assembling the clutch side half-housing

### 3.31 Crankshaft bearing: see Magneto side (point No. 3.21).

### 3.32 Mainshaft bearing

Place washer 0244 078 000 in position and press in outer race 0232 049 000 (e); then place fifteen rollers 0232 002 000 (4 x 6 mm) in position with high melting-point grease and cover with washer 0244 078 000 (f).

### 3.33 Layshaft bearing

Press in single-thrust bearing outer race E15 (g) for the ball-bearing bush.

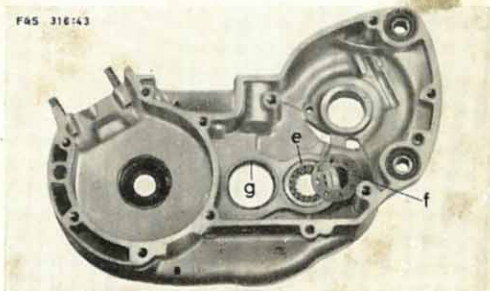


Fig. 30

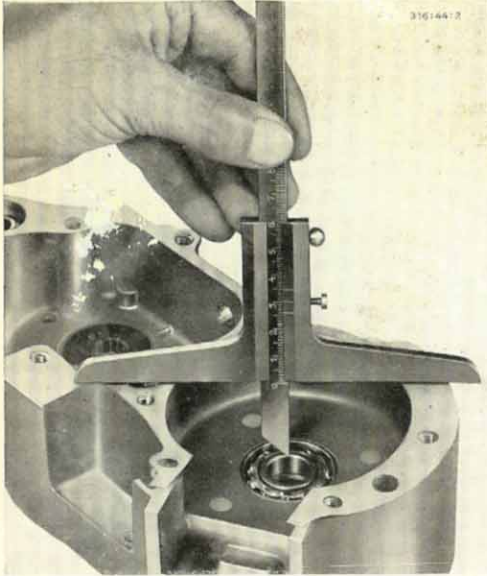


Fig. 31

This difference of 2.20 mm is distributed evenly, i. e., 1.10 mm either side, by packing washers (a) on both sides of the crankshaft, placed behind the ball-bearing inner races (b). Always use the spacing plate in every case (0276 019 001) when drawing on the inner races, placing it between the crank webs to serve as a support, so that the inner races, heated up to 60 to 70 degs. C., can shrink on as they should.

**Caution:** Never grip the crankshaft by the journals in a vice and try to knock on the inner races, as the only result will be to force the crank webs together and make the crankshaft unusable.

### 3.43 Changing the single-thrust bearing inner races

Strip the cage of balls (c) from the crankshaft ball-bearing inner race (b) and draw the inner race off by the special draw tool 0277 073 005 and protector cap 0277 070 000. The inner races can be drawn on as already described.

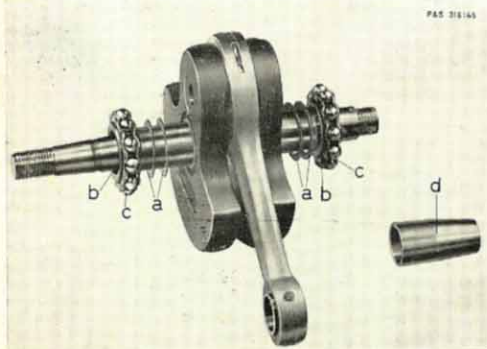


Fig. 32

## 3.4 Crankshaft

**3.41 Crankshafts repaired elsewhere or any that have been ground, welded or brazed will not be accepted for exchange.**

**3.42 Measuring up the half-housings for fitting the crankshaft.** Fit the "Abil" gasket to the housing. Crankshaft end play 0.05 to 0.15 mm.

**Example:**

Size of clutch side half-housing plus gasket:	26.30 mm
Size of magneto side do. plus:	6.10 mm
Space in housing:	<u>32.40 mm</u>
Size of crankshaft (electrically recorded):	<u>30.10 mm</u>
	2.30 mm
End play:	<u>0.10 mm</u>
Difference:	2.20 mm

### 3.44 Changing gudgeon pin bush.

The "Hunger" special reamering tool.

Extract the worn bush by the special extractor 0277 008 000 and insert bronze repair bush 0232 038 005 by the same tool. Then reamer out to finished size by the "Hunger" special reamering tool (see F&S List 308.81).



### 3.5 Piston and Cylinder

The tolerance sizes of cylinder bores are marked by coloured spots (white: oversize; red: undersize) in the cylinder suction passage and on the piston crown. A red cylinder mates with a red piston and a white cylinder with a white piston. This arrangement applies basically to all Sachs engines, irrespective as to whether new or exchange cylinders are concerned.

Cylinders with more than two cooling fins broken or any that have been welded or brazed will not be accepted in exchange.

### 3.6. The flywheel magneto lighting and ignition unit

#### 3.61 Repairing the ignition set

Put the armature baseplate in the centring piece 0277 000 000 and fix by the distance bushing 0277 082 000 and hexagon bolt 0241 017 000. When placing the armature baseplate in position, pass the wires for ignition, lighting and the contact-breaker through the respective holes in the centring plate. Remove defective ignition and lighting armatures and replace by new ones. Put on centring ring 0277 080 000, press the new armatures against the centring ring by the thumb and forefinger, and fix in position by the cheese-headed screws with spring washers, using a screwdriver. When the centring ring is removed the air gap between

the armature cores and flywheel magnet is set. Fasten the ignition cable to the push-in pin connection of the ignition armature (don't solder it), but be careful not to damage the windings.

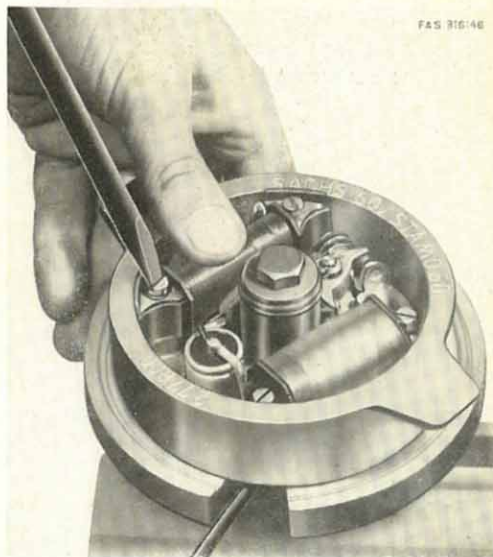


Fig. 33

#### 3.62 Changing the condenser

Unsolder contact-breaker and ignition armature wires; press defective condenser out of the armature baseplate by a round piece of wood. Burrs pressed into the bore must be removed with a triangular scraper, then the new condenser can be put in and lightly burred over again carefully. Solder the ignition armature and contact-breaker cables on again.



### 3.63 Changing the contact-breaker

Unscrew contact-breaker wire, noting the order of the insulation on the contact plate; remove contact-breaker arm from the small-headed screw (clamping spring). Unscrew contact plate.

Fit new parts in the reversed order, being careful with the insulation on the contact plate and also to see that the contact-breaker points are exactly opposite one another. Grease the felt pad with high melting-point grease (Bosch special grease).

### 3.64 Adjusting the contact-breaker in the centring jig

Place the fibre heel on the contact-breaker arm against the spacer bush; the diameter of this bush is equivalent to the contact-breaker cam in the magnet flywheel. By altering the contact plate of the contact-breaker the points of the latter can be set at the correct gap of 0.35 to 0.45 mm.

## 3.7 Carburettor

It is essential for the carburettor to be cleaned often, depending on the amount of dust in the air drawn in. Detach the carburettor from the cylinder to do this. Press

the spring clip away from the filter casing and take out the filter insert with the baffle. Wash the insert well in petrol, soak in engine oil and then let drip. Wash the carburettor casing well with petrol also; the jets and float must be taken out for this and the drain plug unscrewed on the mixing chamber underneath the throttle. Check the jet needle and needle jet for wear. The jets can be cleaned without taking off the carburettor; they are accessible from outside and need only be inscrewed, blown through with air, cleaned and washed out. On no account must they be touched with steel wire. Reassemble the carburettor after cleaning all parts.

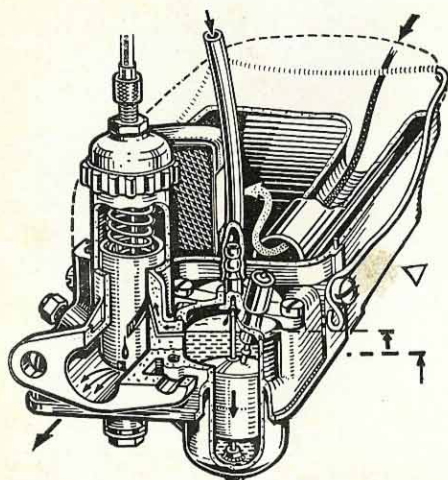


Fig. 34

The operation of the carburettor as regards the starting arrangement and other technical details will be found in the "Sachs 50 Three-speed Handbook".

## 4. ASSEMBLING THE ENGINE UNIT

### Fitting in the Gear

Fig. 22

Screw the clutch side half-housing to the F&S work jig (y), with the joint face against the jig, by the metric 6 x 20 cheese-headed screws (x), using a 9 mm screwdriver. Screw in the oil drain plug with its washer (fig. 23, e) (14 mm spanner).

### Speedometer drive

Fig. 27

Place helical pinion (n) with bearing bush (p) complete in the housing and screw up with the threaded connection (q) (17 mm spanner).

Insert thrust washer (m) into the bore (k) of the helical gear (h).

Press "Buna" washer (lip towards the inside) into the driving bush and cover with 1.5 mm thrust washer.

Insert helical gear and driving bush into the housing.

Note: Fill the recess in the bore of the driving bush with high melting-point grease.

### Gear

Fig. 26

Insert ball-bearing bush with its integral bronze bush and cover washer, with the chamfered side towards the countershaft gear wheels (e), then place mainshaft (a) in position, complete with the small shrunk-on disc wheel (f) and thrust washer (fig. 35, f) — 0246 042 000. The teeth must be carefully set at the same height as the large disc wheel on the speedometer driver.

If necessary the height must be adjusted by suitable packing washers 0246 008 000—008 002 placed under the helical gear of the speedometer drive (fig. 27, m).

### The change-speed gear cluster individually

Fig. 35

Mainshaft (a) being already entered into the housing, complete with the fixed thrust washer (b), small disc wheel (c), selector dog (d), selector rod (e) and the fixed thrust washer (f) — 0246 042 000, 1.5 mm — then slide on in succession:

Change-speed gear (g), top gear (21 teeth, with the recessed side outwards).

Spacer ring (h), 5 mm.

Change-speed gear (k), 2nd speed (23 teeth, both sides the same).

Spacer ring (m), 7.5 mm (for neutral).

Change-speed gear (n), 1st speed (31 teeth).

Packing washer (o).

Chain pinion (p).

Place packing washer (o) — 0246 043 000 — 043 003 (according to requirements in each case) on the 1st speed gear wheel (n) to bring to the same height as the collar on the mainshaft (better seating for the chain pinion — fig. 26, g).

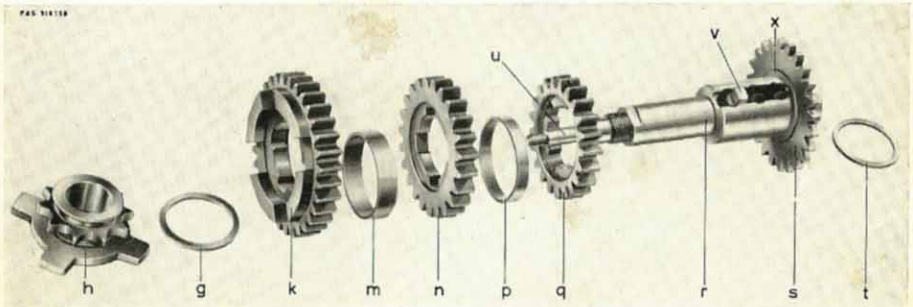


Fig. 35



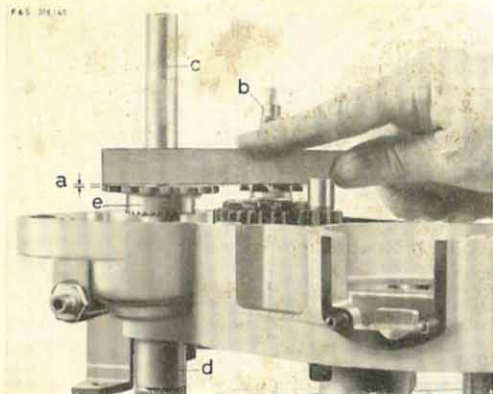


Fig. 36

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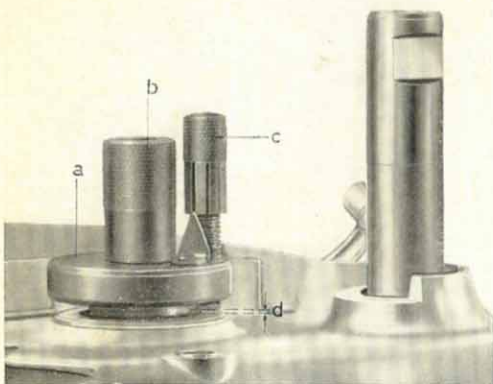


Fig. 37

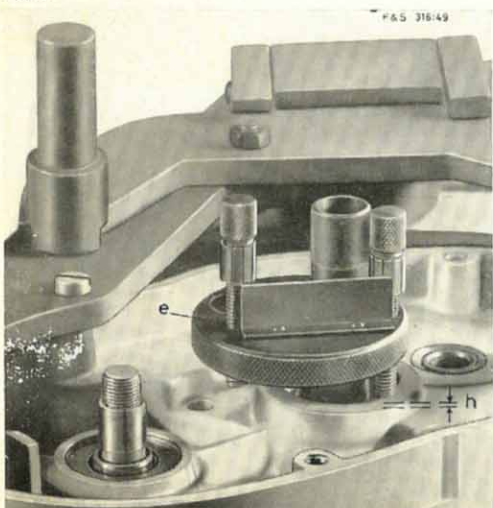


Fig. 38

To line up the chain (a) between the chain pinion on the mainshaft (b) and the chain pinion on the pedal spindle (c) the pedal spindle is entered so that the circlip groove nearest the crank cotter seating enters the driving bush (d) first.

Then, driver (fig. 25, r) with the brake spring (t) is placed on the pedal spindle (p) and the brake spring (t) inserted in the small housing recess (fig. 24, f) next to the locating sleeve (h).

Place the chain sprocket on the pedal spindle.

Fig. 36

The difference (a) and any misalignment must be made up by spacing washers 0246 015 003 under chain wheel (e), using a straight edge. When this has been done, the space above the chain wheel (fig. 25) up to the circlip groove must likewise be made up with spacing washers (z). Assembly can then be completed by fitting circlip (y) by special circlip pliers, making sure that the chain wheel runs easily.

To place the chain on the sprockets, the pedal spindle already assembled, and also the chain pinion on the mainshaft, are taken out of the housing again and then replaced together with the chain in position, as fig. 25 shows.

#### Measuring mainshaft and layshaft play

Before measuring up the end play, grease the "Abil" gasket for the housing (fig. 23, d) and lay it on the joint face of the clutch side half-housing. (Do not use any jointing compound.) Insert the two locating sleeves (fig. 24, h), then place the magneto side half-housing on the clutch side half-housing for the time being and tighten by four metric 6 bolts. Mainshaft end play (fig. 37, d) should be 0.1 to 0.2 mm; layshaft (fig. 38, h) should be 0.05 mm maximum. Mainshaft end play is found by measuring plate 0278 018 000 (fig. 37, d), and layshaft end play by measuring plate 0277 026 000 (fig. 38, e).



## Using the Measuring Plates

(As an example, fig. 37 — measuring mainshaft end play).

Screw back the adjusting screw (c) before setting up the measuring plate in position. Set up the measuring plate (a) on the end of the shaft and tighten by the knurled fixing nut (b). Press the measuring plate against the housing and, holding it there, screw the adjusting screw down until it can be felt to touch the housing; then pull the plate away from the housing and screw the adjusting screw down further until it touches the housing again, noting the marks on its scale. The result of the marks read equals the axial or end play of the shaft measured, each mark on the scale on the adjusting screw equalling 0.1 mm.

The instruction just given applies equally to measuring layshaft end play, using measuring plate 0277 026 000 (fig. 38).

The requisite adjustment to set the end play prescribed is made by placing packing washers on the main and layshafts (fig. 24, k, m) after removing the magneto side half-housing.

The method of loosening or easing a tight shaft by hitting the end of the shaft axially with a hammer, as commonly practised by mechanics, must not be used on any account on the gear mainshaft of our Sachs 50/3 unit, as such treatment might well displace the speedometer driving wheel axially on the shaft (the large plain gear wheel) and interfere with the lateral clearance of the mainshaft.

We must expressly point out that when assembling our Sachs 50/3 unit the end play on the gear mainshaft must be adjusted very carefully, the maximum end play being 0.1 to 0.2 mm. If the end play is not right at the first attempt, it is much the best way to open up the unit again and insert the correct packing washers.

### 4.2 Crankshaft

The crankshaft is already measured up and the end play adjusted (fig. 32). To avoid damaging the Buna washer in the half-housing when placing the shaft in position, the push-on sleeve No. 0278 022 000 (fig. 32, d) should be slipped on to the short crank journal (driving side).

Before placing the magneto side half-housing in position, make sure that the mainshaft roller bearing (fig. 28, e, d and fig. 30, e, f) is complete; that the "Abil" gasket is on the housing (fig. 23, d); that the two locating sleeves (fig. 24, b) are in place, and also the two fixing plates (fig. 24, g) and the rubber-bushed bearings for fixing the unit are in position.

The two halves of the housing can now be screwed together by seven metric 6 x 20 screws (fig. 21, s) and four metric 6 x 35 screws (fig. 21, t). Use a 9 mm screwdriver. Unscrew the power unit from the work jig and then replace it in the jig by two metric 8 x 50 bolts and nuts (fig. 21), using a 14 mm spanner.

**Note:** The seven metric 6 x 20 screws and the four metric 6 x 35 screws are best tightened by using a torque wrench, applying a loading of 5.06 to 6.5 ft. lb.

### 4.3 The drive and clutch

**Note:** Remove grease from tapers on the ball-bearing bush and clutch casing before assembling.

Insert driving pinion Woodruff key (fig. 22, v) into crankshaft, placing the clutch casing (f) and driving gear (g) in position singly. Tighten clutch casing (fig. 19, f) by metric 20.8 x 1 nut (n, left-hand thread, collar downwards) and lock by locking washer (m). 26 mm box spanner — tightening load 14.46 to 18.08 ft. lb. Tighten driving gear (g) by metric 10 x 1 nut (h) — right-hand thread — and lock by locking washer (k), fig. 19, using a 17 mm spanner. Tightening load 25.31 to 28.93 ft. lb.

For these two operations place the fixing plate 0278 008 000 (fig. 18, a) in the clutch and insert Woodruff key (fig. 19, p) into countershaft.

Remove grease from countershaft and clutch hub tapers. Mount clutch hub (being careful of the key), then the extra locking plate 0292 022 000 (fig. 18, b), screw on metric 12 x 1 nut with spring washer and tighten — using 17 mm spanner with a loading of 25.31 to 28.93 ft. lb.

Remove fixing and locking plates (fig. 17, a and b).

Smear split clutch pin and roller with high melting point grease and enter. Place clutch plates in position — lined plate — steel plate — lined plate in succession, then the spring assembly (thrust plate, 6 clutch springs and spring plate) held together by the special jig (fig. 16, t). Push in the two cover plates (v), slacken the nut (x) on the spring clamping device (t) and remove. See that the two cover plates seat properly (v), readjusting if necessary (fig. 15).

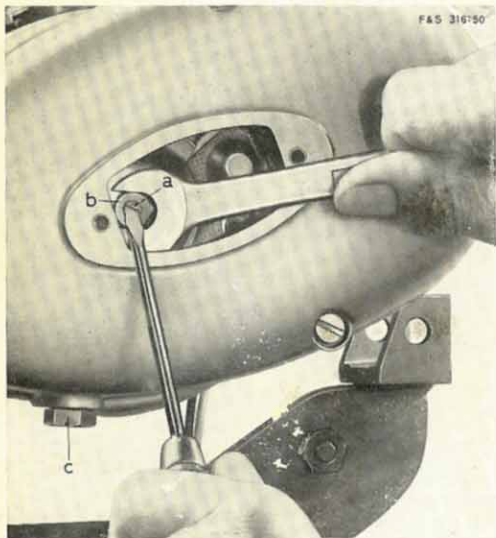


Fig. 39

Screw in the clutch adjusting screw (a) — metric 6 — with its locknut (r); adjust clutch and then tighten locknut (r). The clutch lever play on the unit must be 8 to 10 mm.

Put on the clutch side housing cover with its "Abil" gasket, being careful with the Buna packing washer (lip outwards). Screw down housing cover by five metric 6 screws, using a 9 mm screwdriver with a loading of 5.06 to 6.5 ft. lb. Screw in the oil level plug (c) and its washer and tighten (14 mm spanner). The clutch can be readjusted (fig. 39, a, b) at any time when the engine unit is in the frame by unscrewing the "S" cover plate.

#### 4.4 Fitting Brake Lever

The end play for driving bush and pedal spindle to be 0.1 to 0.2 mm in each case. Fit packing washers (fig. 14, h) on to the ground collar of the driving bush (not in the recess behind the serrations) this being best done by drawing out the pedal spindle somewhat. Make the adjustment so that the ground collar disappears altogether by fitting spacing washers (h), only the groove turned in the driving bush remaining free. Mount in succession the serrated thrust washer (g), serrated brake lever (f) and locking plate (k). Tighten the metric 20.8 x 1 nut (n) with the collar downwards (26 mm box spanner) and bend up locking tab against flat of nut. Tightening loading for the metric 20.8 x 1 nut, 7.23 to 10.84 ft. lb. Next, draw out pedal spindle and fit adjusting washers (m) as far as the groove turned in it, leaving the groove free for a 1.5 mm circlip (s) which can be placed in the groove by special circlip pliers with the stop (p) set exactly to the opening required (fig. 14).

#### 4.5 Bosch flywheel magneto and lighting set — fig. 11

Insert Woodruff key (k) in crankshaft. Place armature baseplate into housing (with contact breaker (u) on right at top) with the round rubber grommets (s) for the lighting wire (yellow) and the contact-breaker wire (black), also the longer rubber grommet (t) with their rounded ends in first, tightening with three metric 4 screws (g), with plain and spring washers. (Screwdriver, fig. 11.) Set the chisel cut (m) on the armature baseplate in line with the chisel cut on the housing. Remove grease from crankshaft and magneto flywheel tapers and fit the flywheel (be careful with the key). Set the retaining strap of the work jig (fig. 10, z) in tension in the magneto flywheel slot and tighten the metric 10 x 1 collar nut with its spring washer (14 mm spanner). Tightening loading 18.08—21.69 ft. lbs.



#### 4.6 Piston and Cylinder

Scrape off any "Abil" housing gasket protruding.

Place cylinder flange gasket in right position for the two transfer passages and on it place a slotted piece of wood (fig. 12, a) for the piston to rest on. Attach the piston to the connecting rod by the gudgeon pin; the arrow on the piston (fig. 13) must point in the direction of travel, or the locking pin (fig. 12, c) for the top piston ring towards the magneto side. Insert gudgeon pin by hand. For pistons with bushed gudgeon pin bearings, grease slightly with high melting point grease when assembling. Lock gudgeon pin at both ends (fig. 12, b) with locking clips, making sure they are properly seated. Oil the cylinder (fig. 40) and, without turning, place on the piston; remove the slotted piece of wood (a) and run the piston up and down in the cylinder bore a few times; then screw down the cylinder by tightening diagonally the four metric 6 nuts with spring washers (10 mm spanner).

Tighten cylinder head by screwing down diagonally the four metric 6 bolts and plain washers. Before finally tightening, make sure that the fixing eye on the cylinder head is accurately in line with the two fixing eyes on the unit housing. To prevent any distortion arising in the frame, it is advisable to slacken the cylinder head again when fitting the engine unit into the frame and to retighten the cylinder head when the unit has been bolted into the frame again. (Tightening loading 7.23 to 10.84 ft. lb.).

#### 4.62 Ignition adjustment

The ignition advance is 2 to 2.5 mm (fig. 42), and the gap of the contact-breaker points 0.35 to 0.45 mm (fig. 43, d).

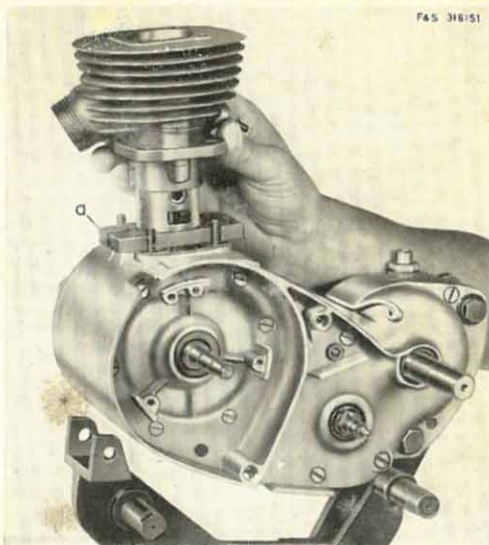


Fig. 40

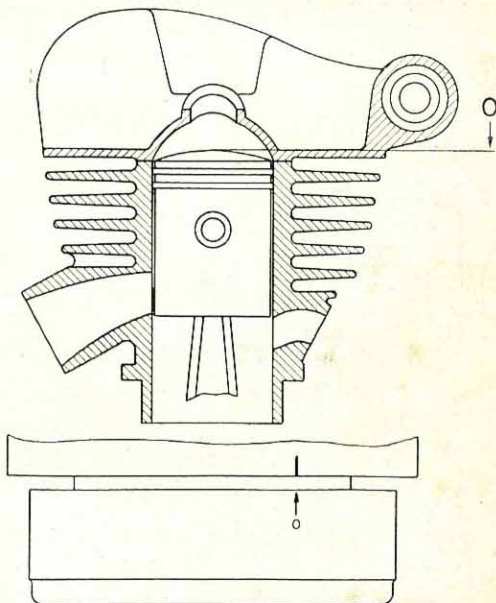


Fig. 41

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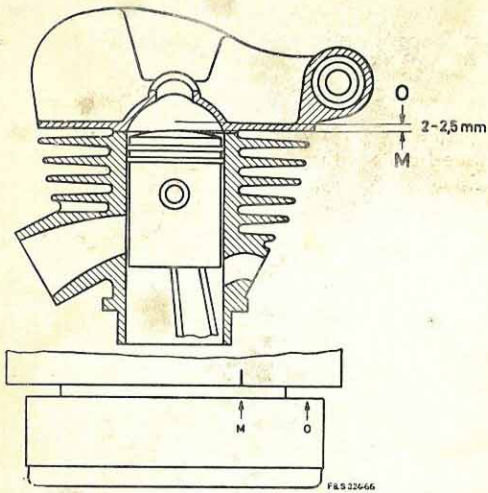


Fig. 42

There are two marks on the flywheel magnet, "O" coinciding with the mark on the housing when the piston is at its top dead centre (fig. 41), and "M", giving the correct ignition advance, 2—2.5 mm (fig. 42). Adjust the gap between the contact-breaker points so that the points are 0.35—0.45 mm open when the cam is at its peak lift (fig. 43). The ignition timing point is given by setting the magnet flywheel to the "M" mark, when the points should just begin to open (commencement of ignition — fig. 42). The ignition advance can be corrected by turning the baseplate in its slots; turning against the direction of running advances the ignition, turning in the direction of running retards it. The screws fixing the armature baseplate (fig. 11, g) must always be tightened after a correction of this kind, so that the pull of the magnets does not turn it when the flywheel magnet is put on. When the ignition setting is correct, the distance between the pole shoe and armature should be 6—11 mm (fig. 43, a). There are no marks on new flywheels. First of all, find t. d. c. (fig. 41) (jig for setting ignition advance 0277 013 001); turn crankshaft backwards until piston is 2—2.5 mm below t. d. c. (fig. 42), then stamp a new "M" mark opposite the mark on the housing.

Screw in the sparking plug W. 175 T. 11 or W. 190 M 11 S; see that the spark gap is 0.4 to 0.5 mm and if wider, correct by bending the side (earth) electrode. Attach ignition cable to the plug.

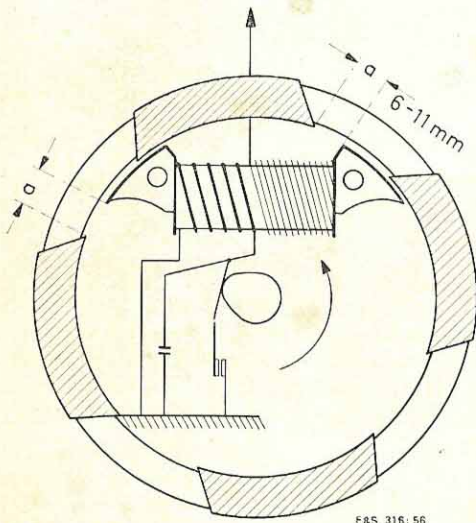


Fig. 43

It is advisable to check the ignition adjustment at every inspection, and to readjust if necessary, as the engine performance depends on it and various lighting troubles originate in faulty ignition setting.

#### 4.63 Checking the ignition timing

Note: The Sachs 50 two and three-speed units with gear drive run anti-clockwise. Two horizontal lines (fig. 44, a) are engraved on the flywheel magneto, the right-hand one being marked "M". These two horizontal marks (a) must be in line with the holes (b) for fixing the housing cover and in this position the contact-breaker points (c) must just be starting to open.

#### 4.7 Driving chain sprocket (fig. 7)

Place the sprocket on the mainshaft but do not drive it on; place the washer on it and screw on the metric 12x1 nut. Slip the retaining strap with chain (fig. 7, a) on to the work jig and lay the chain (b) over the sprocket from left to right, then tighten the metric 12x1 nut (tightening loading 36.16 ft. lb.) — 17 mm spanner.

Fan Assembly — see

Appendix

Housing Cover — Magneto side (Fig. 44)

Before putting the cover on, smear the joint face with jointing compound to prevent water entering the ignition system. When placing on, be careful of the sealing washer (d) for the mainshaft; cap 0278 023 000 can be used to protect it. Tighten down the cover by two metric 6 screws (e) (Screwdriver, tightening loading 5.06 to 6.5 ft. lb.).

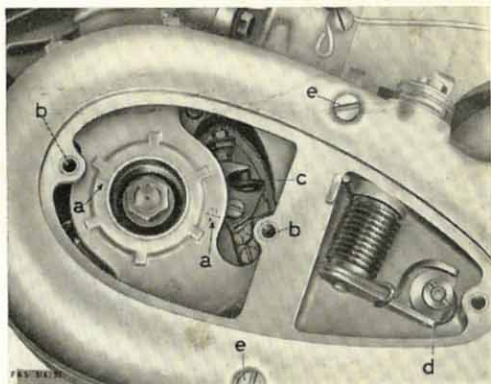


Fig. 44

#### 4.8 Carburetter — Fig. 3

Place the carburetter flange washer (mineral asbestos) — h — in position; lay or stick the cork gasket (g) for the carburetter on the housing (jointing compound). Fit carburetter, making sure that the two eyes of the mineral asbestos washer are seated in the two holes of the carburetter flange, otherwise the flange will distort and the engine draw in air at the wrong place.

The two special washers (f) must be placed with their "Novotex" sides on the carburetter flange. Put the two metric 5 nuts on (e) and tighten — 9 mm spanner (fig. 1).

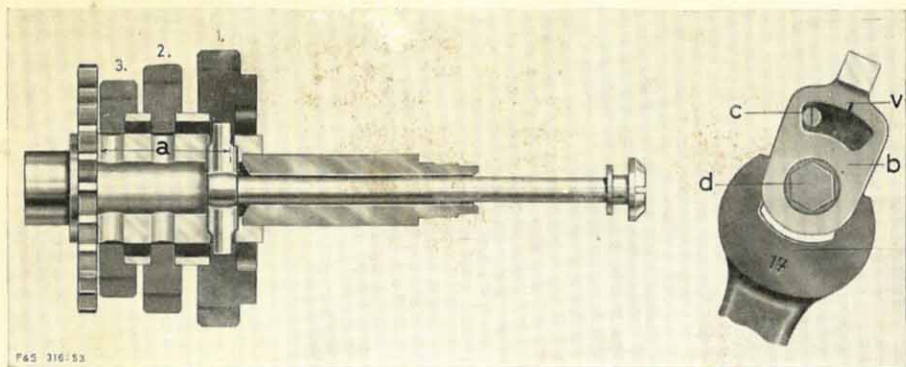


Fig. 45

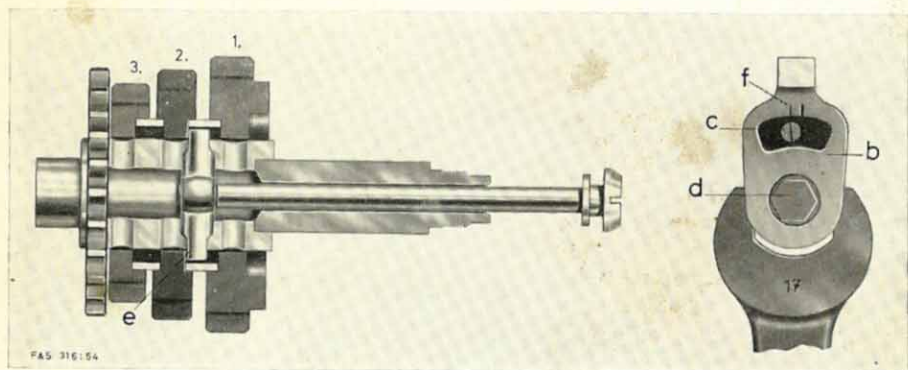


Fig. 46

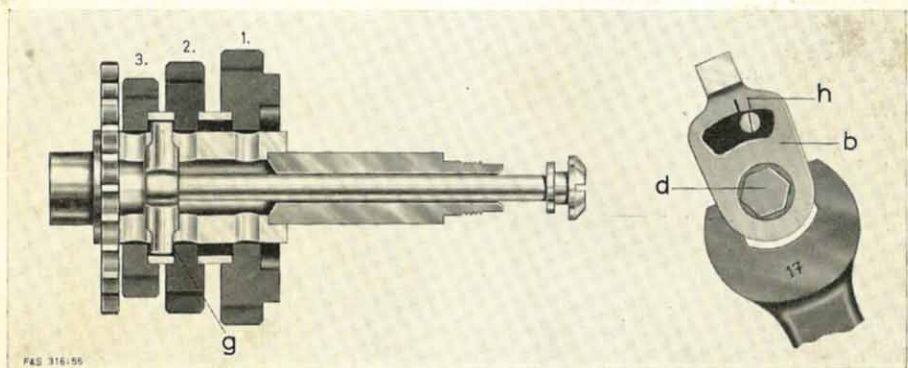


Fig. 47



## 4.9 Change-speed gear arrangement

### 4.91 Assembling — Fig. 5

The following is the procedure if only the slotted nut has been removed, the gear control still being in the housing cover, completely assembled.

Lift the striking fork (d) by a screwdriver, enter the slotted nut (r) into the striking fork and let it rest on the selector rod after taking the screwdriver away. Using the specially-ground screwdriver made for the purpose (q) screw in the slotted nut up to the stop and tighten slightly only; then grease well with high melting-point grease.

If the change-gear mechanism in the magneto side housing cover has been completely taken down, however, reassembly is carried out as described in the following (fig. 6).

Enter the operating rod (e) with its packing washer (f), transfer washer (d), lever (c) and fixing bolt (a) with spring washer in the hole drilled in the magneto side cover. Push spacing washer (g) and spacer bush (h) over the operating rod.

**Note :** The thickness of spacing washer (g) must be such as to leave about 0.1 mm play between the shoulder on the ends of the operating shaft (e) and spacer bushing (h). (The spacer bushing must be freely movable).

Thread the torsion spring (m) with its straight end first, on to the spacer bush (h), resting this end of the spring against the side of the housing on the left, to give the spring its initial tension. Set the operating (selector) fork (k) so that the bosses on the selector rod (e) fit exactly into the fork slot and are not canted. Screw up the fixing bolt (a) with its spring washer only lightly until the change-gear arrangement has been adjusted. Use a suitable tool to clip the hooked end of the torsion spring (m) over the selector fork.

Raise the selector fork (fig. 5) by a screwdriver and enter the slotted nut (r) into it, letting the nut rest on the selector rod after removing the screwdriver. Screw the slotted nut in by the specially-made split screwdriver (q), down to the stop, but only tighten lightly; grease well with high-melting-point grease afterwards.

### 4.92 Adjusting the gear change — Fig. 45

Hold the flat of the gear-change spindle under the transmitting plate by a 17 mm spanner 0278 024 000 and place the gear selector rod in first gear position with the gear selector against the resistance of the torsion spring. The sprocket may have to be turned to enable this movement to be carried out. When this first gear position is found, slacken the fixing bolt (d) and set the left side of the recess in lever (b) against the slotted stop pin (c) (fig. 46).

With the same 17 mm spanner on the gear change spindle, let the spring exert its tension and slide the selector rod in the direction of second gear. Turn the sprocket, so that the gear selector does not slip through second gear but rests up against the second gear wheel (e). In this position, make a pencil mark (f) on lever (b), opposite the chisel cut on the slotted stop pin (c). Now hold the gear-change spindle firmly against the resistance of the spring and turn the sprocket at the same time, so that the selector slips through the second gear wheel. Then turn the sprocket again and, by means of the spanner, bring the gear change spindle against the thrust of the spring up against the second speed wheel (g) but from behind; in this position make a pencil mark again (h) on lever (b) opposite the chisel cut on the slotted stop pin (c). If the two pencil marks (f and h) are now equidistant from the chisel cut (fig. 45, v) on lever (b), the gear-change adjustment is correct and the fixing bolt (d) must be

well tightened up again. In many cases, however, one pencil mark will be farther from the chisel cut on the lever than the other; in that case, slacken the fixing bolt (d), set lever (b) opposite the mark on the slotted stop pin, and tighten the fixing bolt again.

#### 4.93 Rechecking the gear-change

Rub out the pencil marks made on the lever when adjusting the gear-change. With the 17 mm spanner 0278 024 000 turn the gear-change spindle and lever so that the selector is up against the second gear wheel, firstly in front and secondly at the back (see "Adjusting the gear change"). The position of lever (b) relative to the chisel cut on the slotted stop pin (c) is again marked with pencil in each case. If these marks are equidistant either side of the chisel cut (fig. 45, v) on lever (b) the gear-change or its adjustment is correct. If not, the gear-change must be adjusted afresh, though in such case the transmission plate must, if possible, be renewed.

#### 4.10 Housing cover — Fig. 4

Screw on the "Sachs" housing cover with its cork gasket (m) by the metric 5 fillister-headed screws, and tighten (screwdriver).

#### 4.11 Gear Oil

Pour 200 c. c. of SAE 80 gear oil in through the filling orifice on the clutch side — fig. 3, a ("S" plate). Then screw on the "S" plate (fig. 3, a) with its cork gasket by two fillister-headed screws (screwdriver).

Remove the power unit from the F & S work jig.  
Fit power unit into frame.

You can tell genuine Sachs parts by this sign on the packing:





# Appendix to Repair Manual Sachs 50/3 Sachs 50 G 3 L (With fan and pedalling gear)

## Taking down the fan arrangement

Fig. 1

Take off cover (a) with louvres — 1 screw (b), metric 6 x 40 and 2 screws (c) metric 6 x 20 — (screwdriver).

The screw (b), metric 6 x 40, acts at the same time as the fixing for the fan casing to the angle plate (fig. 6, z) on the engine casing.

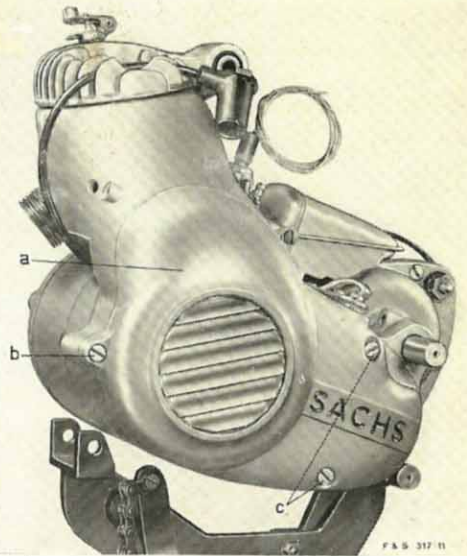


Fig. 1

Fig. 2

Take off fan rotor (d) — two metric 5 nuts (e) with "Ateco" spring washers — (on spacer bolts in flywheel magneto) — (8 mm spanner).

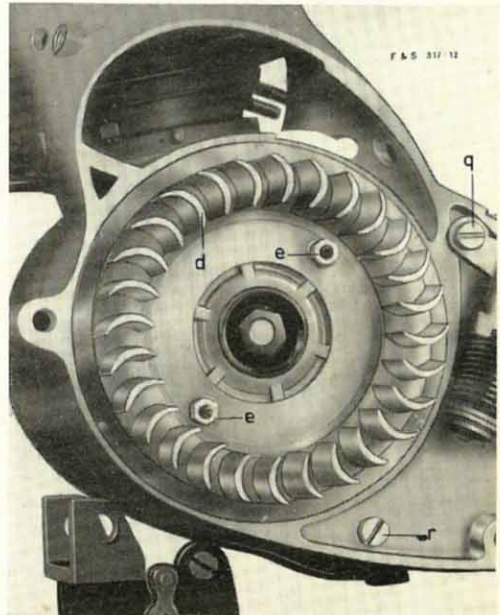


Fig. 2



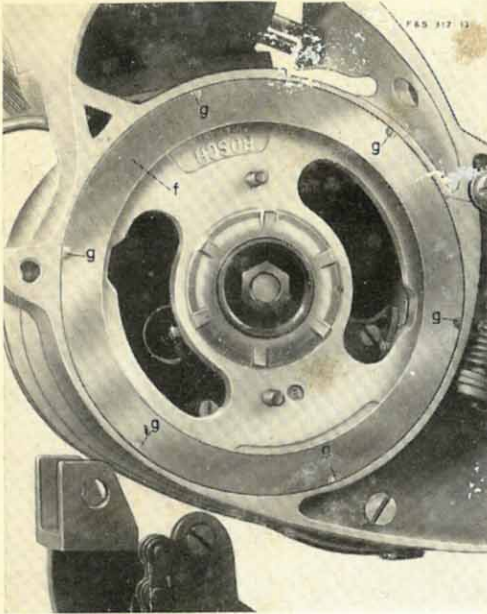


Fig. 3

Fig. 3  
Take out cover plate (f)  
with the six fixing lugs (g).

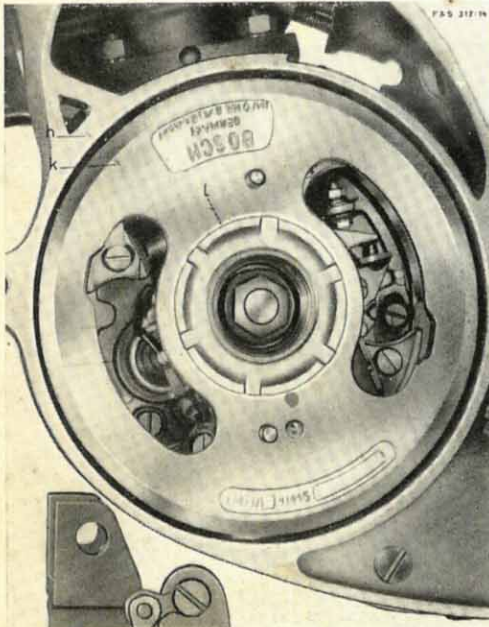


Fig. 4

Fig. 4  
Note marks on fan housing (h)  
and on magneto flywheel (k) —  
ignition timing.  
The magneto flywheel has a  
centring (l) as a guide for the  
fan rotor.

### Fan housing.

Fig. 5

Lift operating fork slightly by a screwdriver so that the torsion spring (m) is released and does not exert any pressure on the operating rod.

Then unscrew slotted nut (n) by the screwdriver specially made for the purpose.

Unscrew fan housing, 1 screw (q), metric 6 x 35, and 1 screw (r) metric 6 x 40 — (Fig. 2). (Screwdriver.)

The screw (o), metric 6 x 20, for fixing the selector rod bearing (s) is left in the fan housing to hold the change-gear arrangement, the latter only needing to be removed in case of necessity. Even if taking down the change-gear arrangement should be necessary, the selector rod bearing (s) with its "Buna" sealing washer (p) remains in the fan housing.

The change-gear arrangement can be taken down as described in the Sachs 50/3 Repair Manual (F & S List No. 316.8).

If the fan housing has to be changed owing to breakage or other damage, the change-gear arrangement with the selector rod bearing (s) and its "Buna" washer (p) can be fitted into the new fan housing after being taken down.

### Cowling — Fig. 6

Tilt the engine in the work jig, take out the metric 6 fixing screw (t) — (screwdriver) — and take away the cowl (u).

### Assembling the fan-cooling arrangement

(To follow 4.7 — Driving Chain Sprocket — page 29, of the

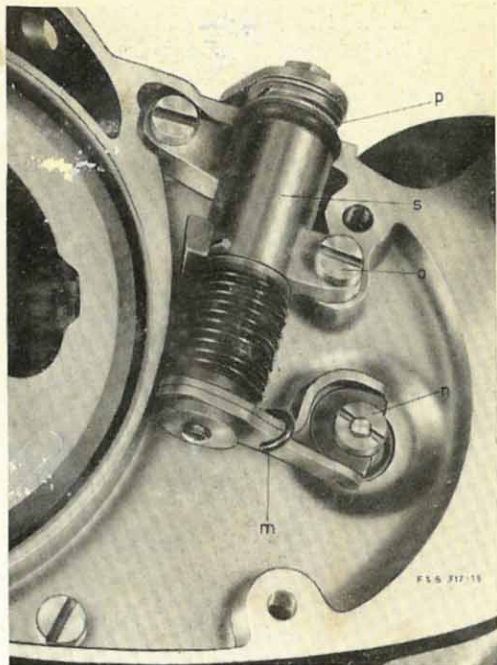


Fig. 5

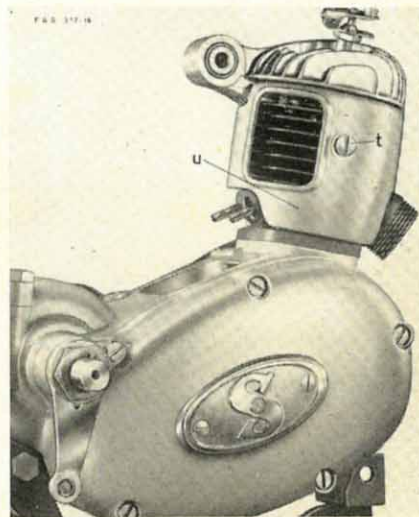


Fig. 6



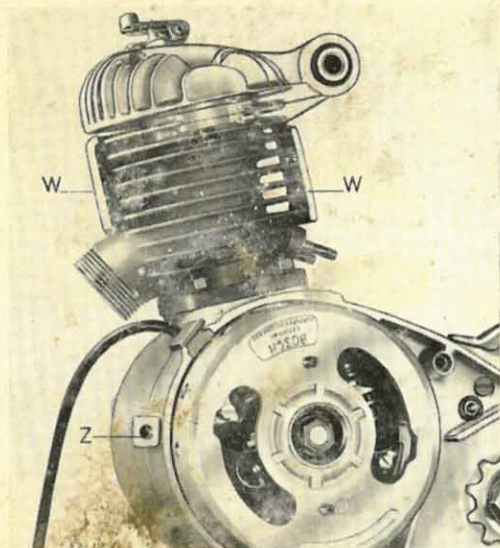


Fig. 7

Sachs 50/3 Repair Manual, F&S Booklet No. 316.8)

Smear the joint face of the magneto side half-housing with jointing compound.

Place the fan housing (fig. 2) on the engine housing (watch the locating dowels) and tighten — 1 screw (q), metric 6 x 35 and 1 screw (r) metric 6 x 40 (screwdriver). Insert slotted nut (fig. 5, n) in the change-gear fork and screw on to selector rod (special screwdriver). (See Sachs 50/3 Repair Manual, F&S Booklet 316.8).

Place the cover plate (fig. 3, f) with the 6 fixing lugs (g) in position, but make certain that the protuberances of the fixing lugs point in the direction of the cover.

Place fan rotor (fig. 2, d) in position and tighten — two metric 5 nuts with "Ateco" spring washers (8 mm spanner). The fan rotor centres itself on the magneto flywheel (fig. 4, l). Smear the joint face of the fan housing with jointing compound.

Place the cover (a) with louvres (fig. 1) in position and screw down — 2 screws metric 6 x 20 (c) and 1 screw metric 6 x 40 (b). (Screwdriver.)

Fig. 7

Note the angle piece (z) on the housing.

Place the cowling (fig. 6, u) in position and tighten by 1 screw (t), metric No. 6. (Screwdriver.) In doing this, see that the open part the cowling is slightly pressed together, so as to fit into the fan housing and be placed between the projecting parts (fig. 7, w) of the fan housing.





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