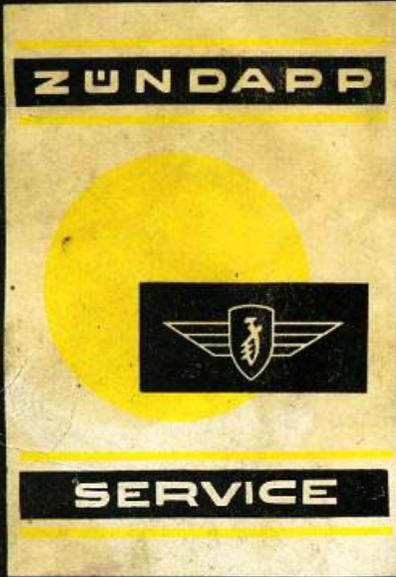
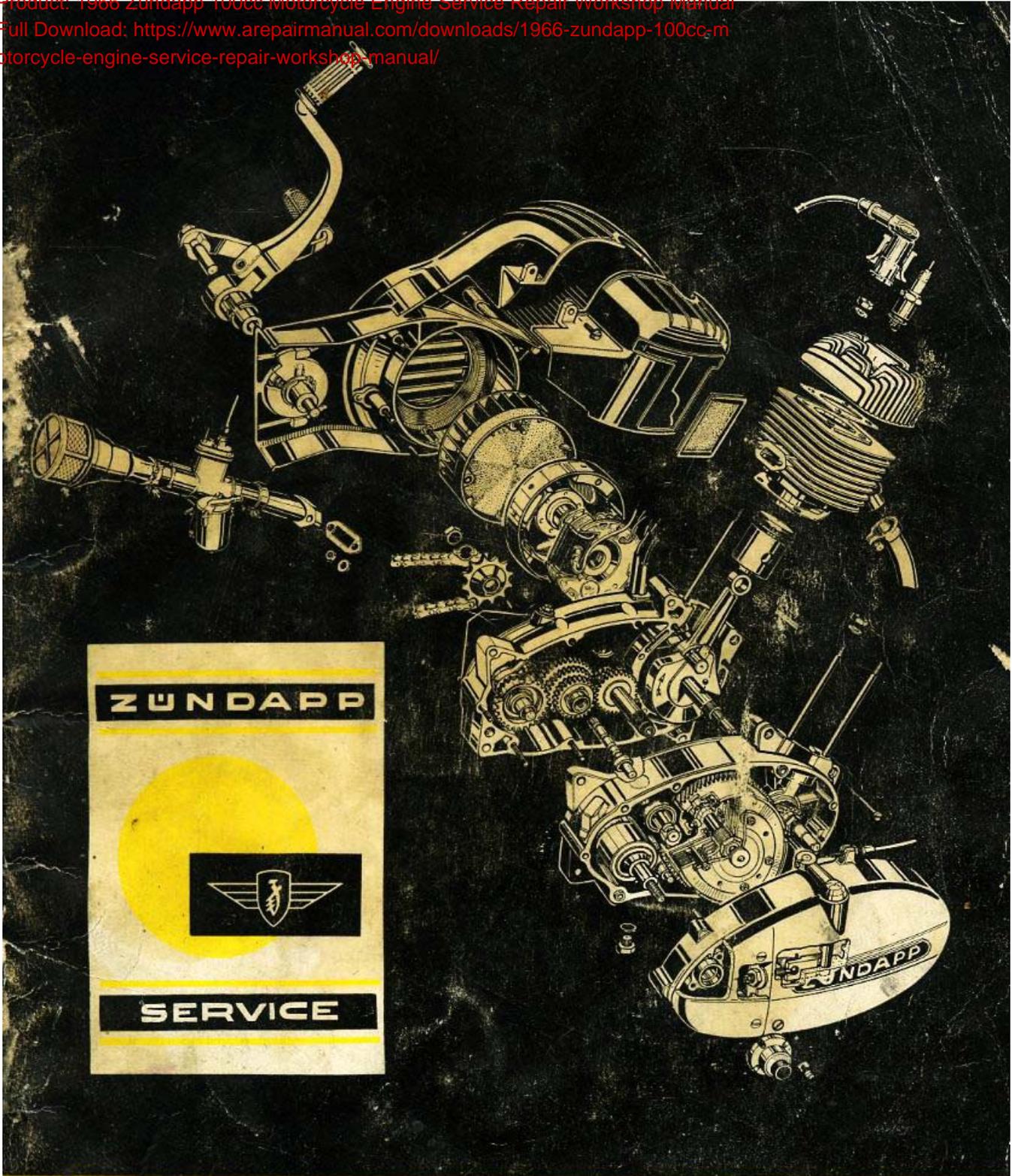


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FOREWORD

Advances in the design of motorised two-wheelers during the last few years, particularly for the lower cubic capacities, have greatly stepped up engine output as well as riding comfort. ZÜNDAPP machines, in particular, have led the way and gained an enviable reputation for good engineering design and solid construction.

Each new ZÜNDAPP model will always make its contribution towards justifying our excellent reputation, so as to maintain and increase the popularity of ZÜNDAPP machines. One of the most important factors in ensuring our continuing success is a first class after-sales service. That is why we are anxious to acquaint all our distributors and appointed service stations with the latest developments. Throughout the winter months, our ZÜNDAPP training centres are holding courses for service mechanics. This manual is designed to save students at these courses the time-wasting trouble of taking copious notes and to be a permanent record which they can consult at any time to refresh their memory.

The descriptions of dismantling and assembly operations have been compiled with clarity and simplicity in view and are accompanied by numerous illustrations. We trust that every distributor who has not yet had the opportunity to attend a training course will find the manual a useful aid and reference book.

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Table of Contents

	Page
Introductory Notes	7
1. Dismantling Engine	
a) Taking off Gear Change Pedal and Fan Casing	8
b) Taking off Casing Cover, left, and Kickstarter Assembly	9
c) Dismantling Ignition System	9
d) Taking off Clutch Cover, Cover for Clutch and Gear Change Setting Controls	10
e) Taking off Pedal Gear Change Spindle and Selector Slide	11
f) Dismantling Clutch	11
g) Taking off Chain Sprocket	12
h) Taking off Cylinder and Piston	12
i) Taking off Crank Casing	13
k) Taking off Bearings, Bushes and Clutch Gear	15
l) Taking off Steel Ball Selector, on engines with manual gear change	16
2. Engine Assembly	
a) Setting Steel Ball Selector, on engines with manual gear change	18
b) Measuring Axial Play of Crankshaft	18
c) Fitting Crankshaft into Right Casing	19
d) Measuring Axial Play of Selector Shaft	20
e) Measuring Selector Gears	21
f) Measuring Starter Spindle	22
g) Assembling Engine Block	23
h) Fitting Selector Shaft to Bearing on Left Casing	25
i) Mounting Sealing Rings	25
k) Inspecting Connecting Rod	26
l) Assembling Piston and Cylinder	26
m) Mounting Chain Sprocket	27
n) Measuring Main Drive Shaft Position	27
o) Mounting Clutch	28
p) Setting Clutch Tongue and Clutch	30

q) Taking off and Mounting Gear Change Spindle . . .	30
r) Mounting Clutch Bell Cover	33
s) Setting Pedal Gear Change Spindle	34
t) Mounting Cover over Clutch and Gear Selector Assembly (Connector Cap)	34
u) Mounting Ignition System	34
v) Setting Ignition Timing	35
w) Taking off and Mounting Kickstarter Spring and Sleeve	35
x) Mounting Fan, Left Casing Cover with Kickstarter and Fan Casing	36
3. Special Service Tools	38
4. Bing Carburetors	41
5. Troubles and their Causes	48
6. Technical Data	49

Introductory Notes

The comprehensive text of this extensively illustrated manual on engine dismantling and assembly applies with appropriate modifications to all models with manual or pedal gear change and kickstarter. Where the assembly sequence differs in a few respects, or where different tools are needed, special reference is made to the changes in the relevant chapters. The manual covers the following engine models:

Type	Model Description	Starting System	Gear Change System	No. of Gears
267	Scooter R 50	Kickstarter	Manual	3
267	Super-Combinette	Kickstarter	Manual	3
267	Sport-Combinette	Kickstarter	Pedal	3
276	Scooter RS 50	Kickstarter	Manual	4
276	KS 50 Super	Kickstarter	Pedal	4
276	Scooter RS 50	Kickstarter	Pedal	4
281	Motorcycle KS 100	Kickstarter	Pedal	4

The instructions take account of all modifications introduced on engines supplied as from 1965.

Complete dismantling of an engine is only called for in cases of damage to the gearbox, crank drive, kickstarter assembly (except for kickstarter spring) or the manual gear-change assembly.

Defects of the gear selector mechanism — steel-ball selector mechanism for pedal-change engines — clutch, crankshaft drive gear of engines with either manual or pedal gear change, can be remedied after taking off the clutch housing cover. Consequently, the engine need not be taken off the frame. But in all these cases, the gearbox oil must be drained off through the drain plug in the bottom of the housing. This is preferably done while the engine is still warm.

Gear-change pedal, kickstarter pedal with return spring, chain sprocket, flywheel magneto (wheel and baseplate), cylinder with piston, cylinder head and fan assembly can all be taken off and fitted without dismantling the engine. Here, of course, the oil need not be drained from the gearbox.

For air-cooled engines, consult the assembly instructions on model KS 100, and disregard all references to the fan system.

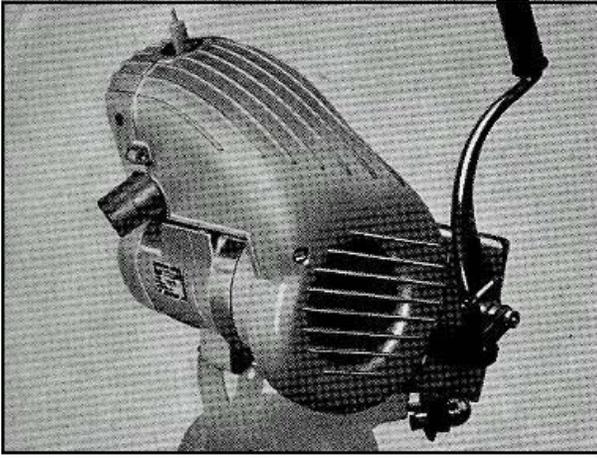


Fig. 1

1. Dismantling Engines

a) Taking off Gear Change Pedal and Fan Casing

Fit engine into service fixture SK-A 1926, draw off spark plug connector (fig. 1).

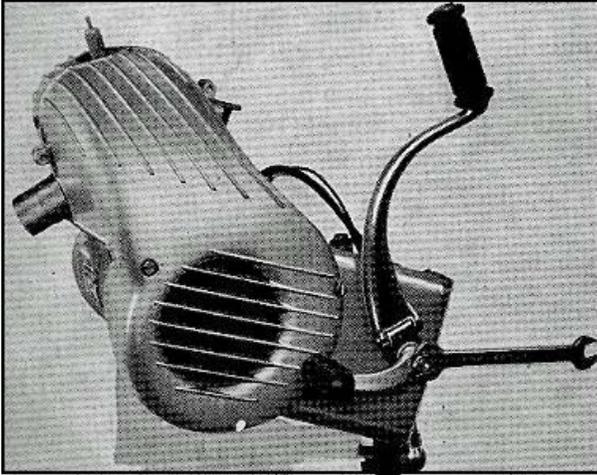


Fig. 2

Take off gear change pedal. With the 14 mm open-ended spanner or socket spanner, slacken hexagon nut. Remove serrated washer; draw pedal and spacer ring from gear change spindle (fig. 2).

Not applicable to engines with manual gear change

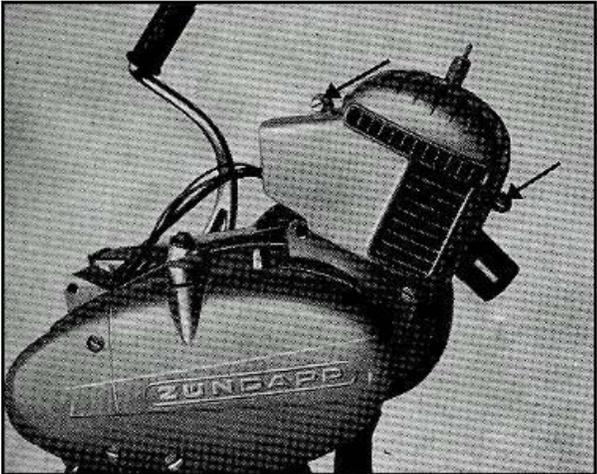


Fig. 3

Take off fan casing cap, first removing two cylindrical screws, M 5 x 15 (fig. 3).

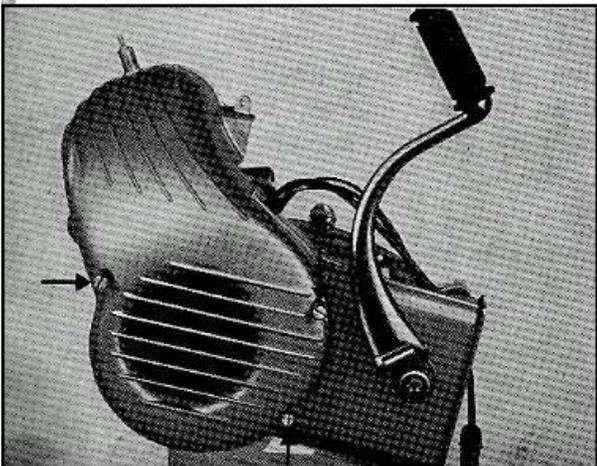


Fig. 4

Remove 3 cylindrical screws, M 6 x 45, from the left side of the fan casing, then take casing off (fig. 4).

b) Taking off Casing Cover, left, and Kickstarter Assembly

With a 10 mm socket key, take off 2 hexagon screws, M 6 x 35, then remove left-hand casing cover, complete with kickstarter, kickstarter spring and cover plate which also acts as the kickstarter stop (fig. 5). On air-cooled engines, slacken 2 cylindrical screws, M 6 x 45, instead of the hexagon screws mentioned above.

Take the 4 cylindrical screws, M 5 x 20, off the flywheel magneto, then remove fan.

c) Dismantling Ignition System

Holding the flywheel firmly with service tool SK-A 251, take off the wheel nut with the 14 mm socket spanner (fig. 7).

Fit press-off bolt SK-A 263 to wheel, hold assembly firmly in position with tool SK-A 251 and press wheel off the magneto spindle on the crankshaft. Remember the key which secures the wheel to the crankshaft (fig. 8).

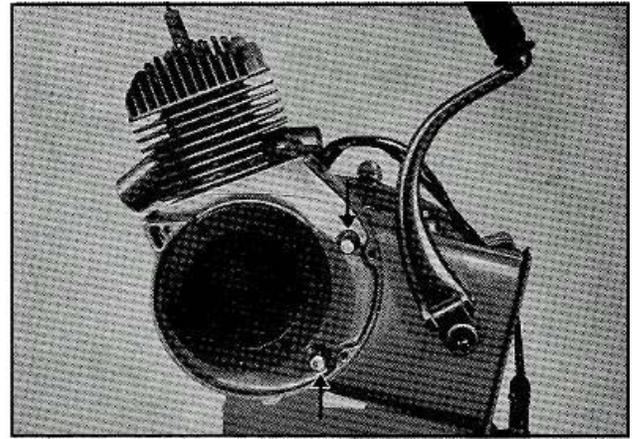


Fig. 5

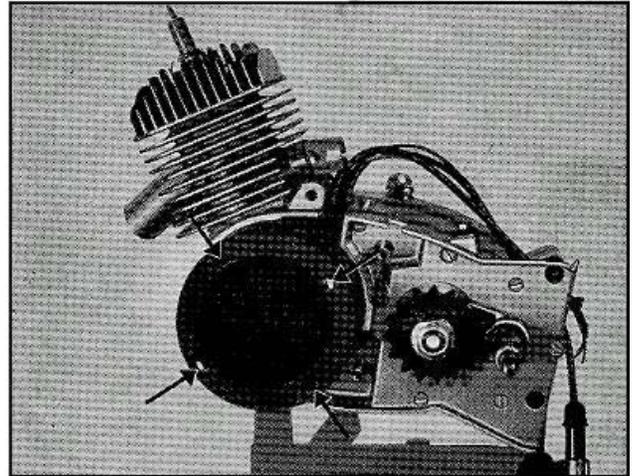


Fig. 6

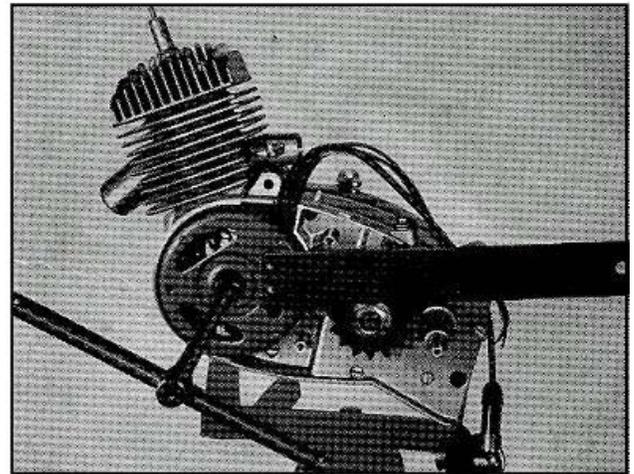


Fig. 7

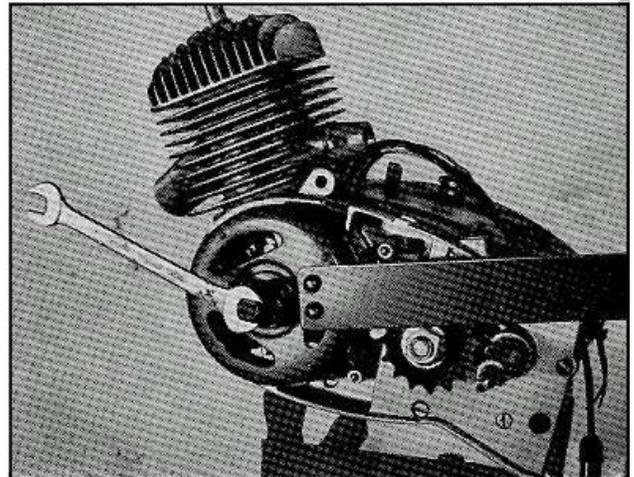


Fig. 8

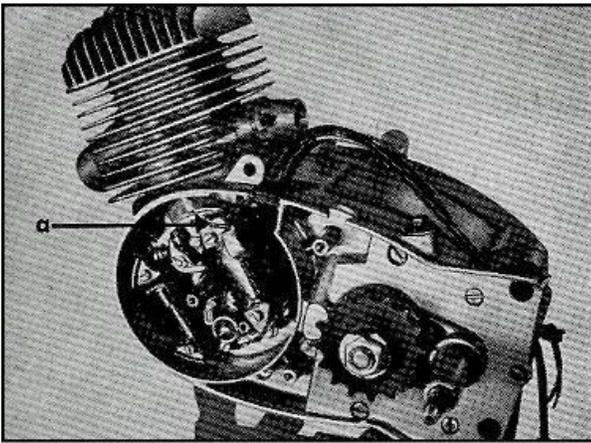


Fig. 9

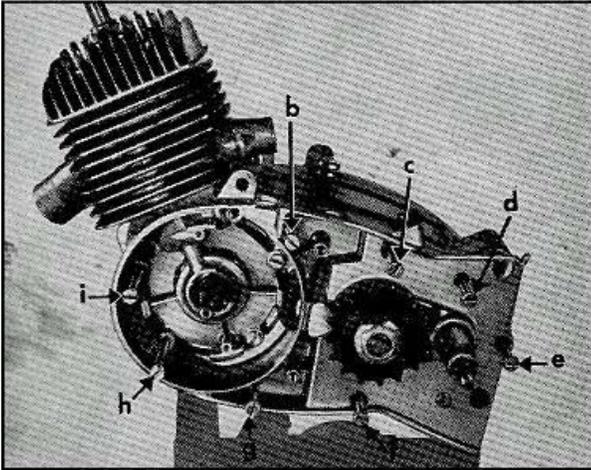


Fig. 10

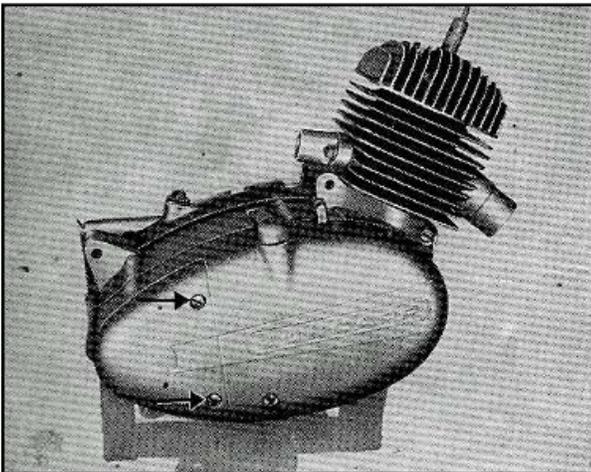


Fig. 11

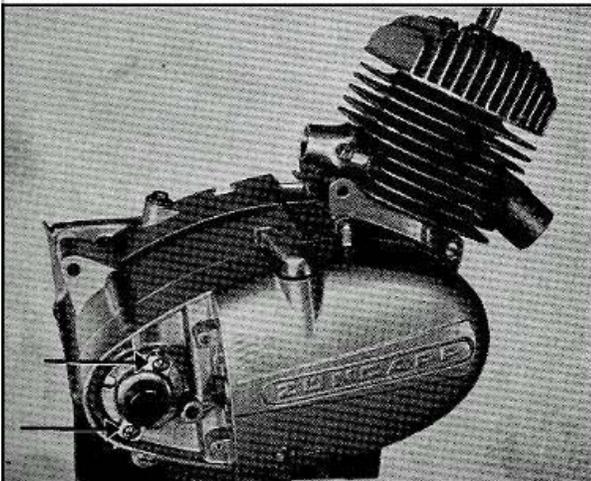


Fig. 12

If the work described in the following passages is confined to a repair of clutch and pedal gear change system, the baseplate can remain on the left casing. If the engine must be completely dismantled, take the plate off now, first removing the 2 cylindrical screws, M 4 x 15, and the casing screws, M 6 x 92, complete with cable clip (fig. 9).

On engine model 281, the baseplate is fixed with three screws, M 4 x 15.

d) Taking off Clutch Cover, Cover for Clutch and Gear Change Setting Controls.

Take the following screws off the left-hand casing cover:

	267	276	281
a)	M 6 x 92*	M 6 x 92*	M 6 x 92*
b)	M 6 x 98	M 6 x 98	M 6 x 98
c)	M 6 x 98	M 6 x 120	M 6 x 120
d)	M 6 x 120	M 6 x 120	M 6 x 120
e)	M 6 x 120	M 6 x 120	M 6 x 120
f)	M 6 x 120	M 6 x 120	M 6 x 120
g)	M 6 x 98	M 6 x 98	M 6 x 98
h)	M 6 x 98	M 6 x 98	M 6 x 98
i)	M 6 x 98	M 6 x 98	M 6 x 98

*) with cable clip (fig. 9)

Three screws remain on the casing, 2 at the magneto and 1 below the starter spindle (fig. 10).

On engines, type 281, additionally take off 1 screw, M 6 x 98, above screw (i).

Remove connector cover closing off the clutch re-setting and gear change setting controls for pedal gear change engines. The cover is fixed with two countersunk fillister-head screws, M 5 x 15, to the right-hand casing cover (fig. 11).

On engines with manual gear change, the setting dome for adjusting the gear change assembly is not provided.

Slacken 2 fixing screws, M 6 x 12, on the setting dome (fig. 12).

Take off setting dome, remove cylindrical screw, M 6 x 45, underneath starter spindle (fig. 13).

Operate the clutch lever to press off the clutch housing cover.

Located inside the clutch housing cover are:

- Clutch spindle with lever
- Clutch dog
- 2 leaf springs for clutch dog
- Ball-headed threaded pin for re-setting clutch dog
- Bush for starter spindle
- Gearbox oil level checking screw
- Guide pin for selector slide (pedal gear change engines only)

On engines of type 276 and 281, the third crankshaft bearing is needle bush 277-01.135; engine 267 has no third crankshaft bearing (fig. 14).

e) Taking off Pedal Gear Change Spindle and Selector Slide

Take off pedal gear change spindle and selector slide (fig. 15).

Only on engines with pedal gear change

f) Dismantling Clutch

Fit service tool SK-A 235 to clutch with 2 studbolts, SK-A 237, and 1 stud, SK-A 265. Take off 5 or 10 nuts, M 4, with the 7 mm socket key. Slacken the clamping bolt, and clutch thrust plate; springs and spring bushes can now be taken off. On engines of type 267, fit the clamp with 3 studs, SK-A.237 (fig. 16).

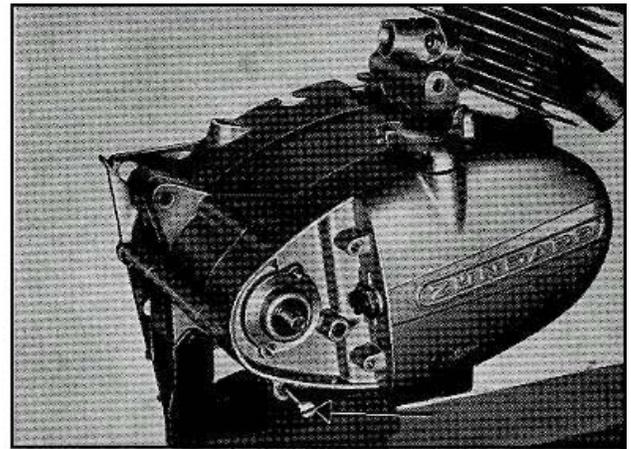


Fig. 13

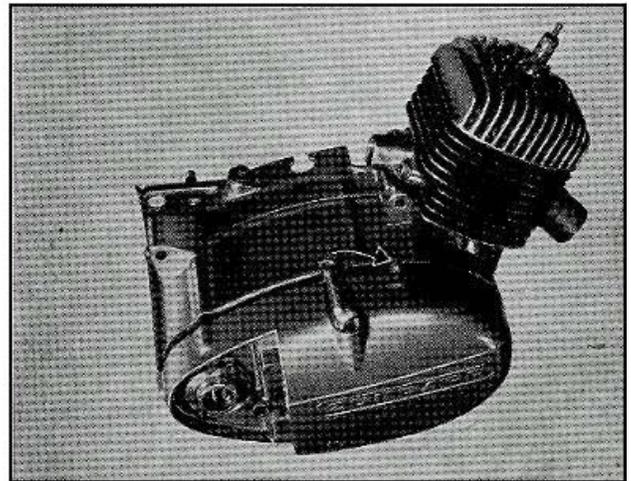


Fig. 14

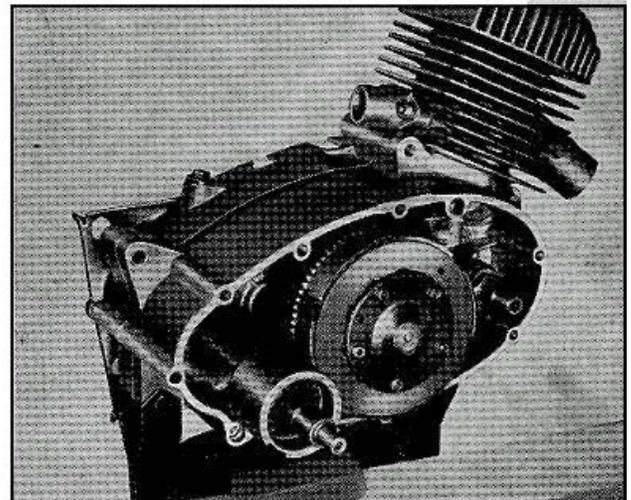


Fig. 15

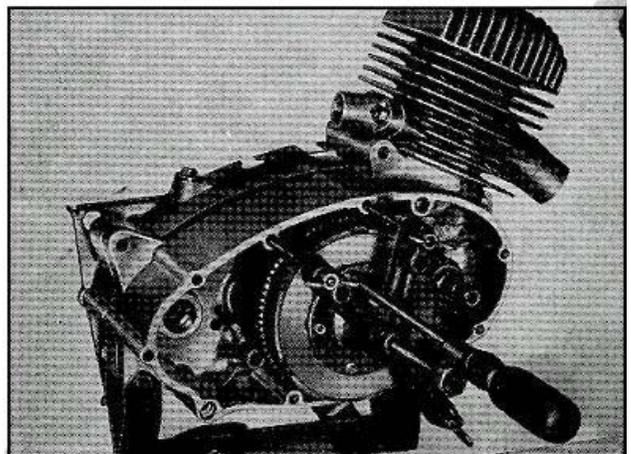


Fig. 16

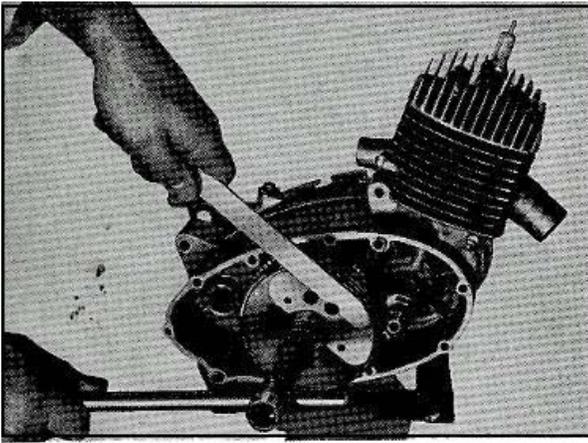


Fig. 17

Fit hold-down tool SK-A 279 to clutch thrust plate, then release clutch nut with the socket key (fig. 17).

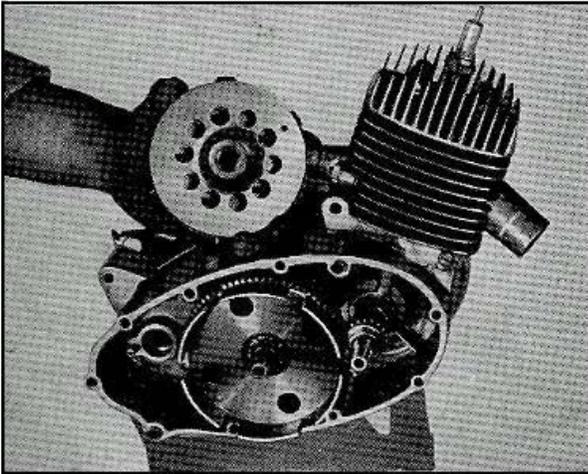


Fig. 18

Take off clutch complete with hub and the packing washers behind the hub (fig. 18).

The clutch gear remains inside the right-hand casing, held by a snap ring on the inside (gear-box).

On engines with pedal gear change, you can now draw out the steel-ball selector through one of the openings in the clutch. On engines with manual gear change, the steelball selector assembly can only be taken off after the engine has been completely dismantled.

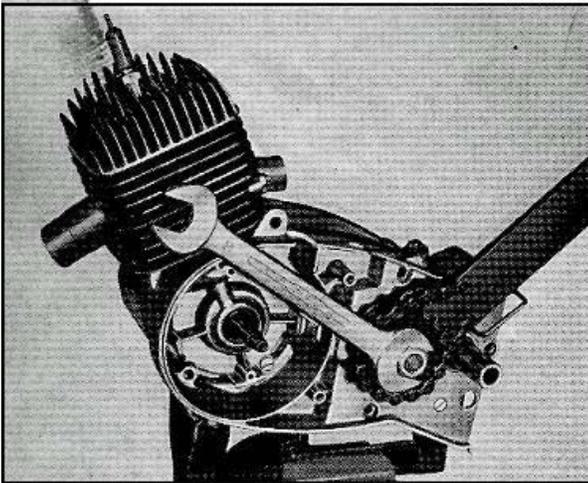


Fig. 19

g) Taking off Chain Sprocket

Bend open the locking tab washer and with an open-ended spanner take off the hexagon nut (if necessary, use a two-arm puller tool, fig. 19).

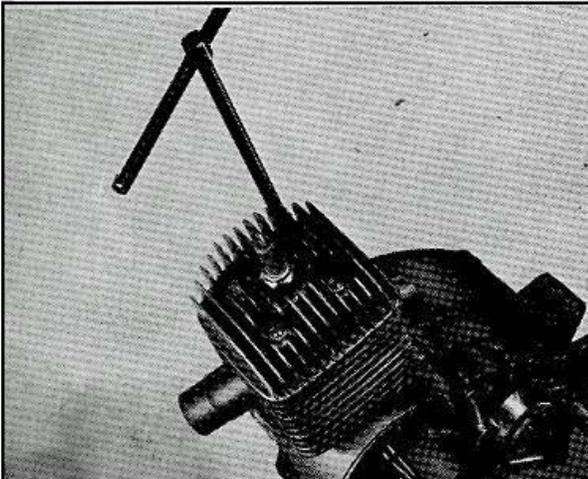


Fig. 20

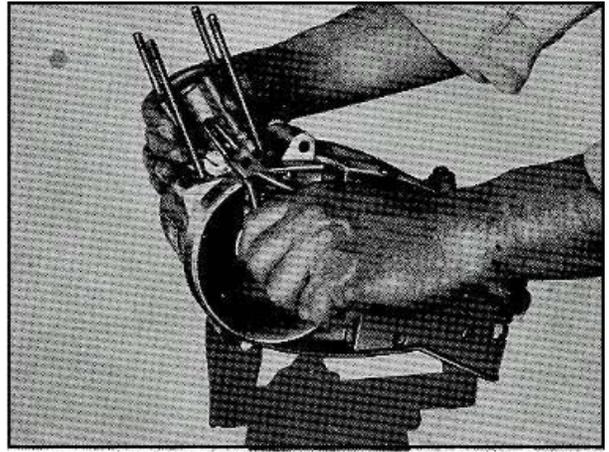
h) Taking off Cylinder and Piston

Take off cylinder head and cylinder. Remove the 4 nuts, M7, with the 11 mm socket key, take off the washers underneath, then lift away cylinder head, head gasket, cylinder and base gasket; take off piston rings (fig. 20).

On engines, type 281, no head gasket is fitted as from engine No. 4600937.

Press off crank casing, then with pointed-nosed pliers draw off the retaining ring for the gudgeon pin (do not use a screw driver, fig. 21).

Fig. 21



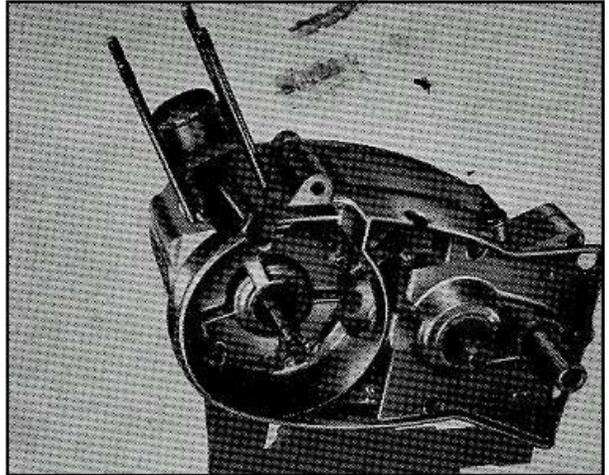
Fit gudgeon-pin press-off tool SK-A 64 and press off the gudgeon pin (fig. 22).

For engines of type 281, use press-off tool SK-A 268.

Note

Remove gudgeon pin needle bearing from connecting rod and put it away well protected from dust and dirt.

Fig. 22



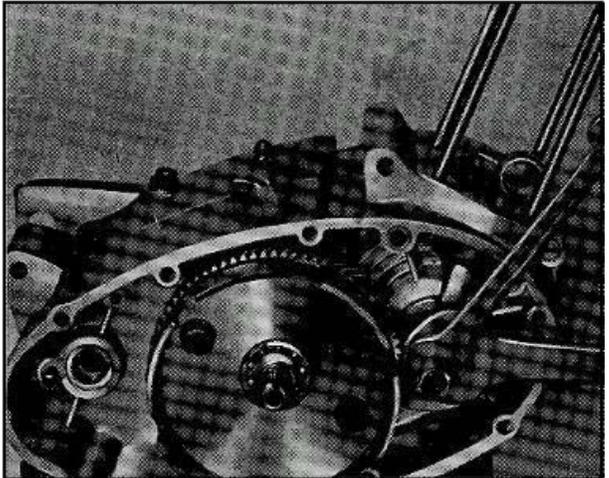
Taking off Crank Casing

To take the main clutch drive gear off the crankshaft, first bend up the locking tab washers. Hold assembly steady with the 11 mm spanner applied to the crankshaft flats, then with the 19 mm spanner take off the hexagon nut and pull off the wheel.

Note

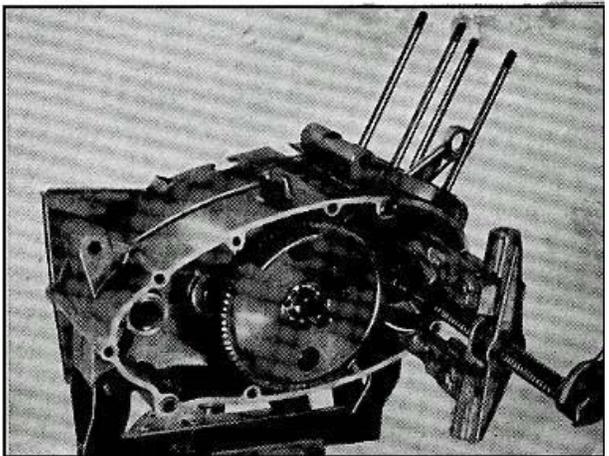
Take care not to loose the two 5 mm balls underneath the gear (fig. 23).

Fig. 23



If the drive gear cannot be pulled off by hand, use a standard two-arm puller tool (fig. 24).

Fig. 24



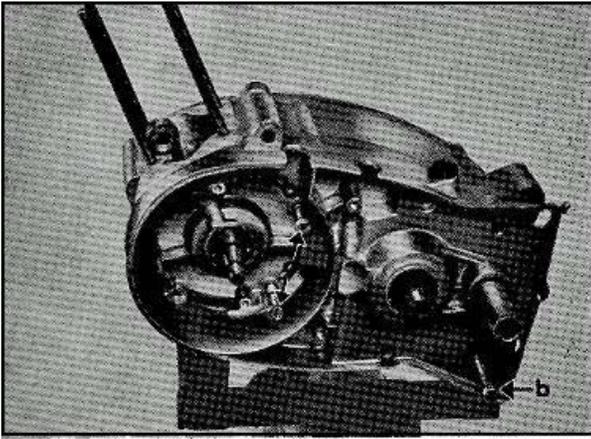


Fig. 25

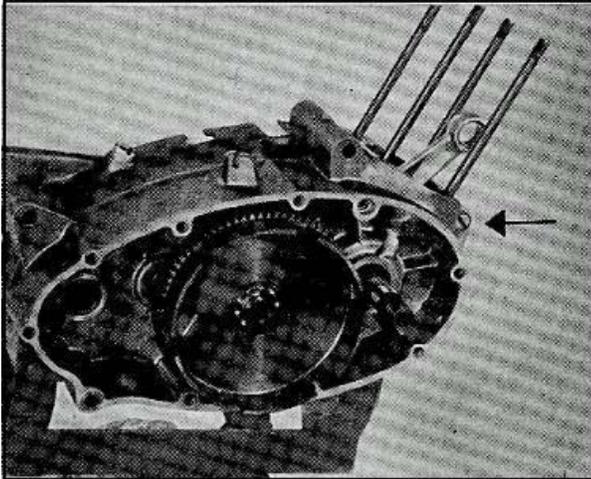


Fig. 26

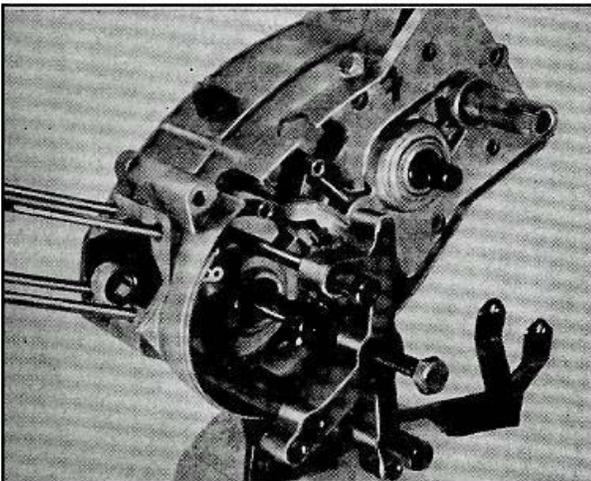


Fig. 27

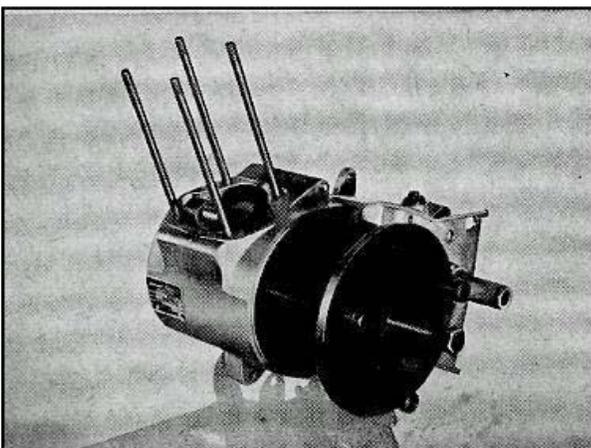


Fig. 28

Take the remaining screws from left-hand casing, 2 in magneto section, M 6 x 35 (a) and 1 under starter spindle, M 6 x 65 (b) (fig. 25).

On the right-hand side, take one screw, M 6 x 50, off the base of the cylinder (fig. 26).

Engines 267 and 276

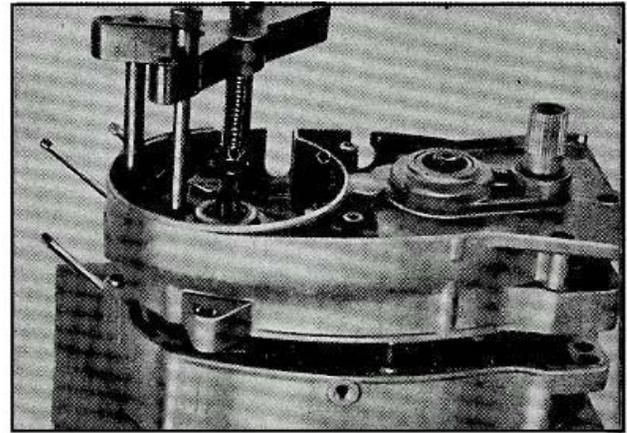
Fit service clamp SK-A 234 by 2 stud-bolts, M 8 (SK-A 246), and 1 locating bolt (SK-A 123) on the left-hand side above the magneto spindle (fig. 27).

For engines 281, make your own press-off fixture and secure it with three 8 mm screws SK-A 246 to the left-hand casing above the magneto spindle.

(The diameter should be 6 in. (150 mm), thickness 7 mm, bore 9 mm to take the 8 mm bolts, (see special tools, fig. 28.)

Take the gearbox block from its mounting frame and place it, right-hand side facing down, on two wooden blocks. Turn the press-off bolt and at the same time press on selector and starter shafts to prize the two gearbox halves apart. Then carefully lift off the top half (left) (fig. 29).

Fig. 29

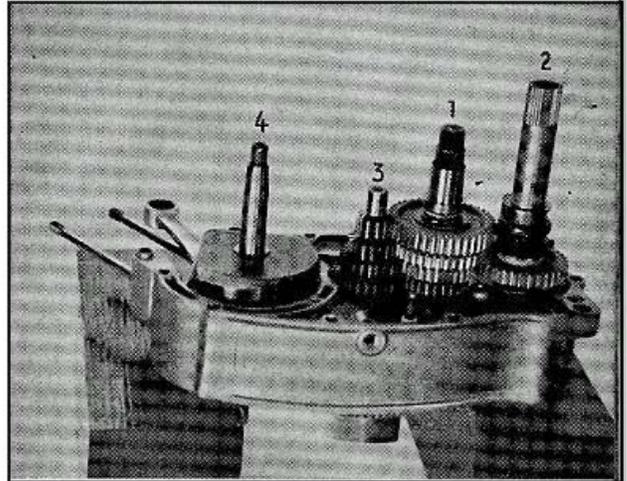


Before taking out the various shafts, note the position and number of washers and spacer rings fitted, as well as the correct meshing position of gears (and mark these with a reference line for preference). Careful attention to correct fit before starting to dismantle may save you considerable gauging and setting work when the engine is re-assembled.

Take out shafts in this sequence:

1. Gear selector shaft with selector gears and steel-ball assembly
2. Starter shaft
3. Main drive shaft
4. Crankshaft

Fig. 30

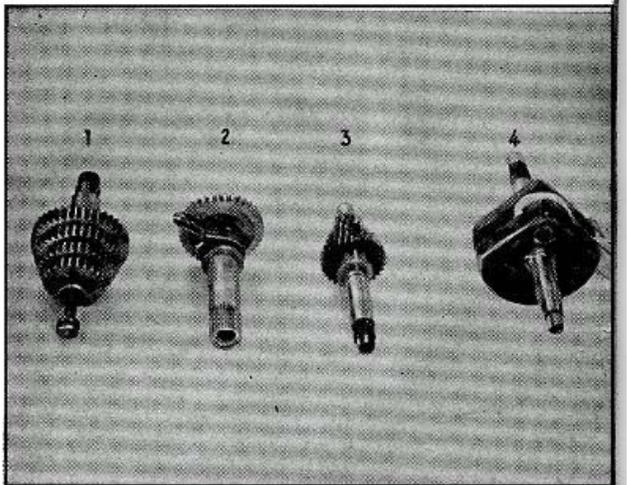


(fig. 30).

For engines with manual gear selection, the steel-ball selector remains in the selector fork on the right-hand casing.

Carefully inspect all shafts and gears for traces of wear and proper alignment as soon as you have taken them off (fig. 31).

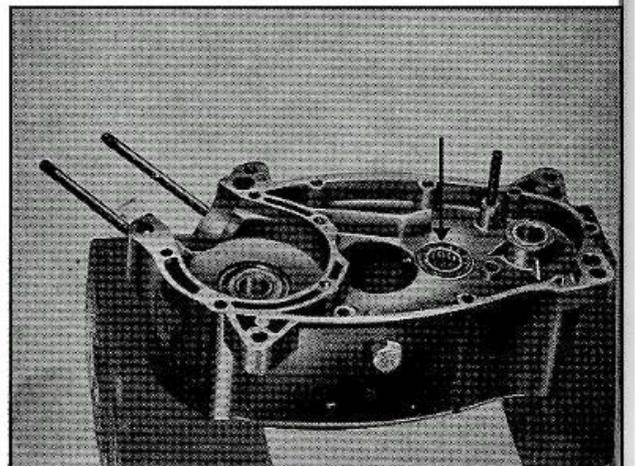
Fig. 31



k) Taking off Bearings, Bushes and Clutch Gear

On engines of type 281, the 19 rollers, 5x3.5 dia., can be taken out after removing spacer ring 281.05.110 (fig. 32).

Fig. 32



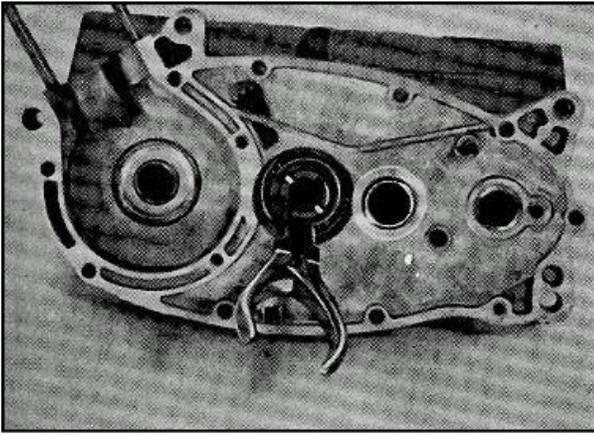


Fig. 33

The clutch gear can only be pressed off after taking the circlip in the casing behind the ball bearing from its seat with a pair of pointed pliers.

If clutch gear and both ball bearings are in perfect condition, they need not be taken off (fig. 33).

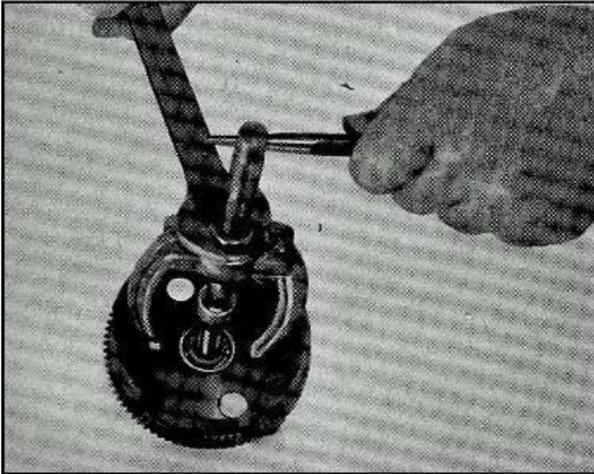


Fig. 34

If necessary, pull the ball bearing from the clutch gear with a standard bearing puller tool (fig. 34).

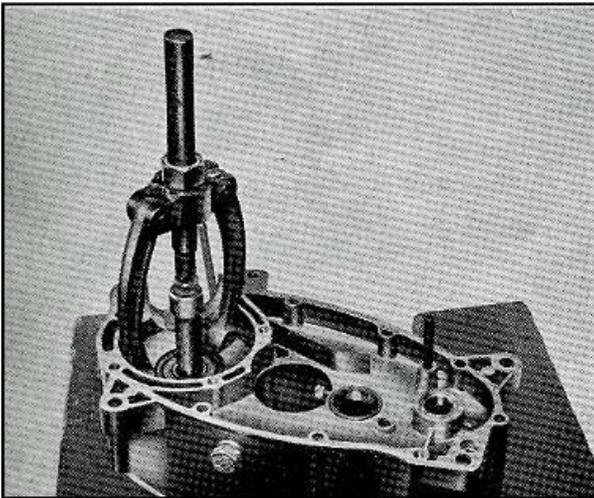


Fig. 35

Casings should be warmed first for easy withdrawal of ball bearings and bushes. Or use the puller tool to remove them (fig. 35).

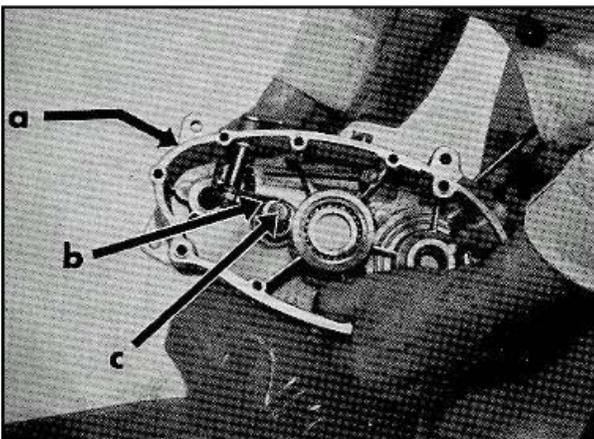


Fig. 36

l) Taking off Steel Ball Selector on engines with manual gear change

Bend up the tab of the washer securing the locknut of setscrew (a). Slacken nut, turn setscrew until selector fork (b) can be swung away and selector (c) can be taken out (fig. 36).

2. Engine Assembly

Before assembling the engine, first clean all parts thoroughly, remove the sealing compound from casing rim surfaces and check that all parts and sealing faces are in perfect condition. Replace defective or damaged parts with **Original ZUNDAPP Spare Parts**. Gaskets and sealing rings must always be replaced by new ones.

Make sure that all parts, such as spindles, shafts and bearings, are pressed home all the way to the stop in their locating bores, seats, etc. To fit a ball bearing, always heat its housing to approx. 85° C. Coat the sliding and stop faces of all moving parts with a generous film of oil, using only the grade and type specified by us.

Clean all metal filings off the magnetic plug in the right-hand casing.

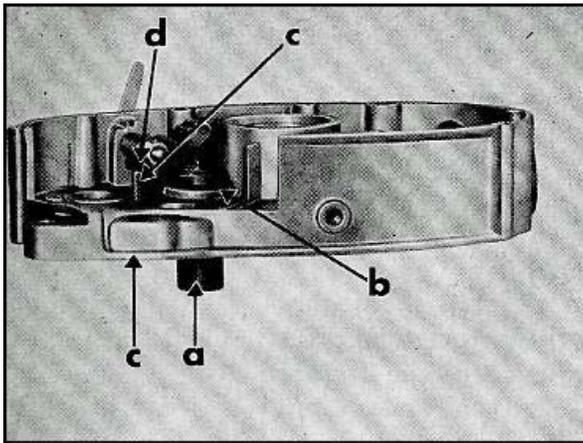


Fig. 37

a) Setting Steel Ball Selector on engines with manual gear change

On engines with manual gear change, set the steel ball selector with the setscrew so that the spherical part sits exactly in the centre of the selector shaft bore corresponding to the highest gear (3rd or 4th).

Use setting gauge SK-A 232 (3-speed /a) to carry out the adjustment, fitting it into the bearing bush of the right-hand casing in place of the selector shaft and securing it with locking washer SK-A 233 (b).

Now press the inner face of the selector at the selector lever guide against the end of the setting gauge. Turn in threaded pin (c) until all play in stop bracket (d) and thereby in the selector is reliably eliminated. Tighten locknut and secure setting with the tab washer. Slacken nut on gauge and take gauge off.

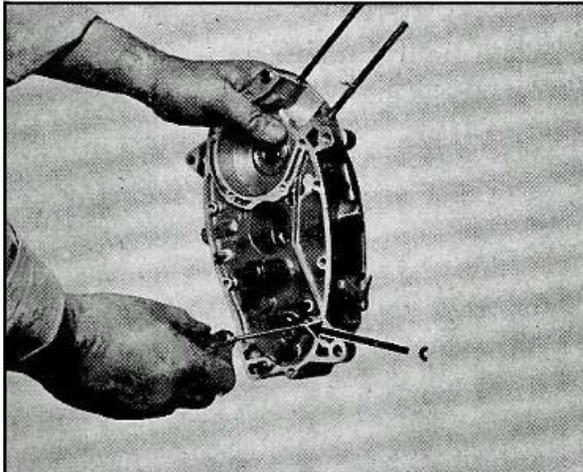


Fig. 38

On 4-speed manual gear change engines, first fit a bush of 11.5 mm length, 14 mm o. d. and 12 mm i. d. (made in your own workshop), then fit gauge SK-A 232 (figs. 37 and 38).

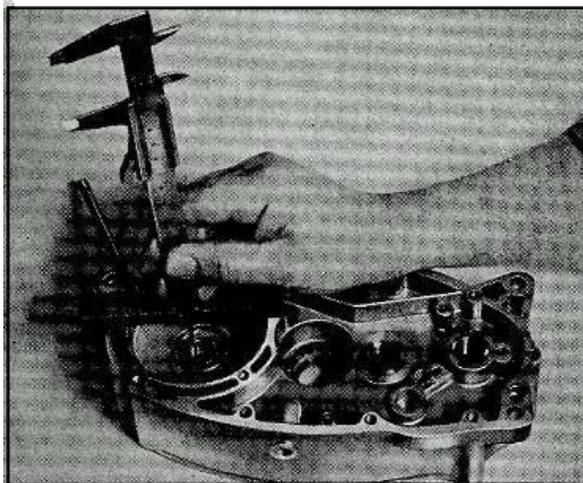


Fig. 39

b) Measuring Axial Play of Crankshaft

Permissible play is 0.1 mm. To measure it you need a gauging bar and a caliper gauge with depth scale. Measure from the contact face of the right-hand casing to the inner ball bearing race (fig. 39).

Then carry out the same check on the left-hand casing and add the two values obtained (fig. 40).

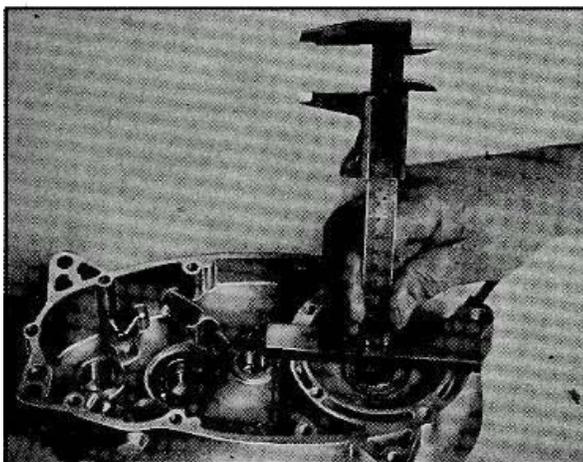


Fig. 40

Prepare crankshaft for gauging. Fit a washer with 2 mm bevel on to the crankshaft drive shaft (bevel facing crank web).

Fit a washer with 2 mm bevel on to the flywheel magneto shaft (bevel facing crank web, fig. 41).

Now measure crankshaft over both webs, including special bevelled washers (fig. 42), then deduct the value obtained from the sum obtained by the two gauging operations shown in fig. 39 and 40. Fit packing washers to eliminate all but the permissible play of 0.1 mm, as shown in the following example.

Example:

Left casing	18,4 mm
Right casing	24,5 mm
	<hr/>
	42,9 mm
Crankshaft	- 41,7 mm
	<hr/>
	1,2 mm
Axial play	- 0,1 mm
	<hr/>
	1,1 mm
Standard washer on drive shaft	- 0,5 mm
Remainder flywheel magneto shaft	0,6 mm

On engines of type 281, the standard washer is 0.2 mm thick.

c) Fitting Crankshaft into Right Casing

Heat up inner race of ball bearing with a hot mandrel, then fit crankshaft (fig. 43).

Fit sealing ring for crankshaft drive shaft, using special assembly sleeve MV 6-339 to prevent damage to the sealing lips by the drive shaft thread. Drive sealing ring home with light taps of hollow punch MV 6-347 (fig. 44).

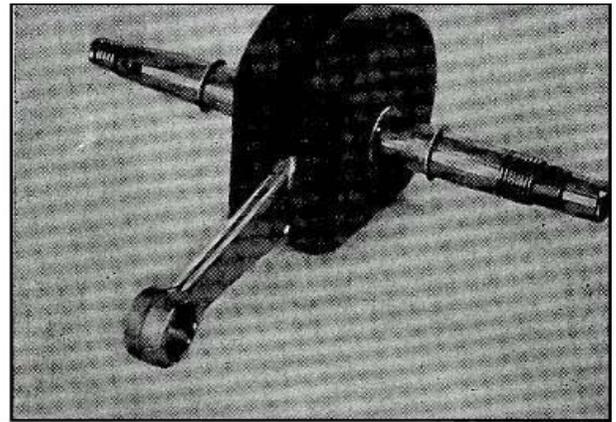


Fig. 41

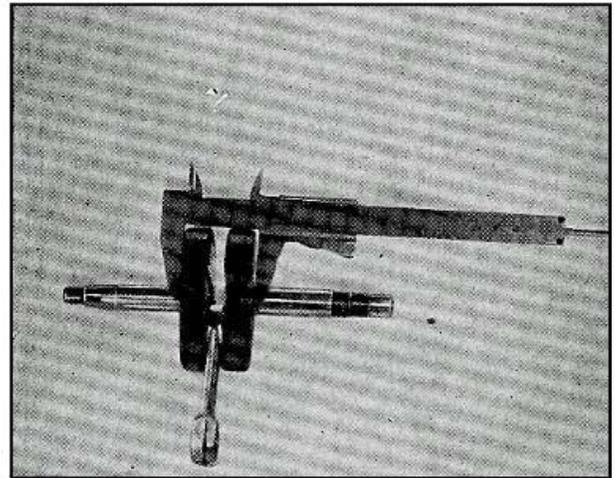


Fig. 42

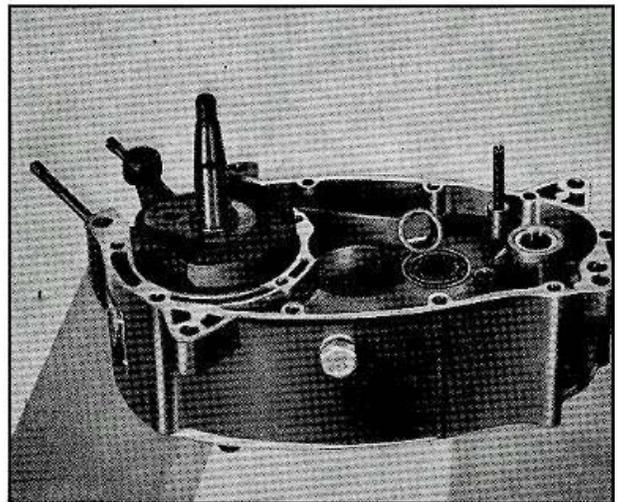


Fig. 43

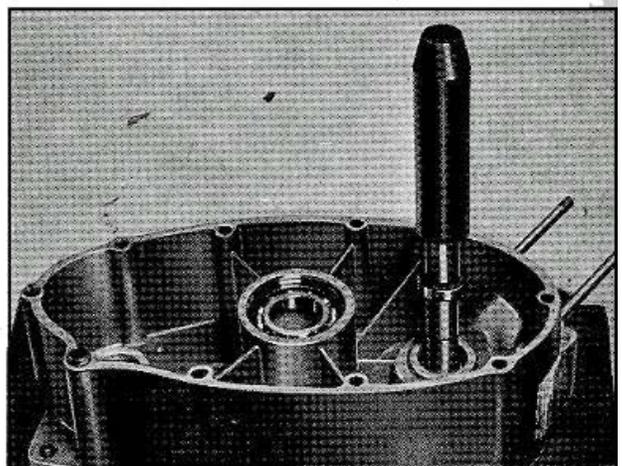


Fig. 44

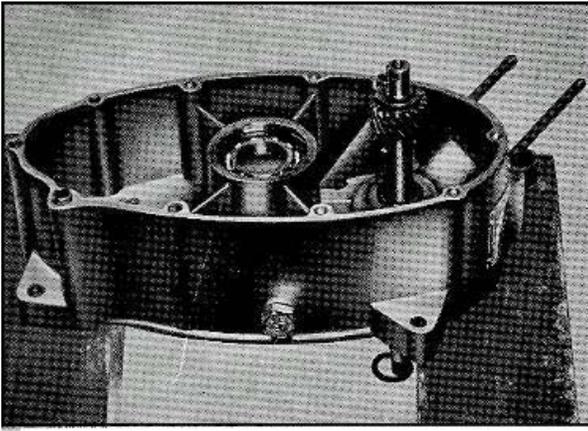


Fig. 45

For engines of type 281, use assembly sleeve SK-A 217, first expanding the bore to 13.5 mm.

Fit two 5-mm steel balls with a little grease into the ball seats of the drive shaft (crankshaft) then slide on the primary drive gear. Finally, secure assembly with locking washer and hexagon nut (fig. 45).

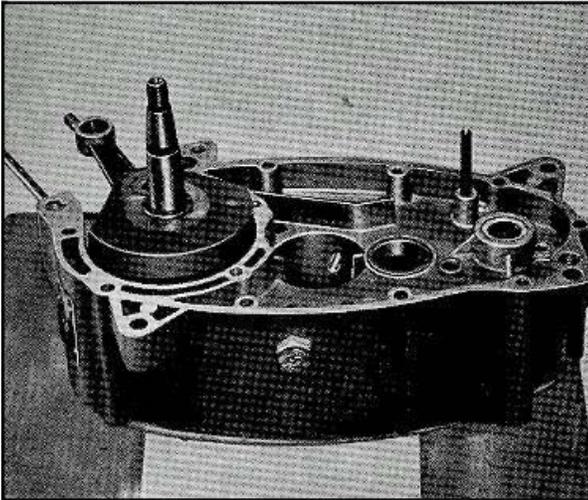


Fig. 46

Remember to secure the nut

On engines, type 281, stick 19 rollers, 5 x 3.5 dia., with a generous grease coating into the bearing race of the right casing, then slide spacer ring 281-05.110 on to the roller assembly (fig. 46).

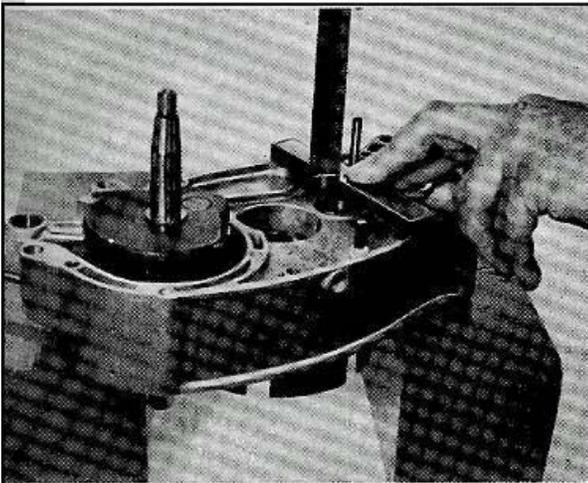


Fig. 47

d) Measuring Axial Play of Selector Shaft

Place gauging bar or the yoke over the right-hand casing, so that you can measure with the depth scale right to the stop face for the selector shaft inside the casing. Note the value measured, remembering to allow for the thickness of the scale bar (fig. 47).

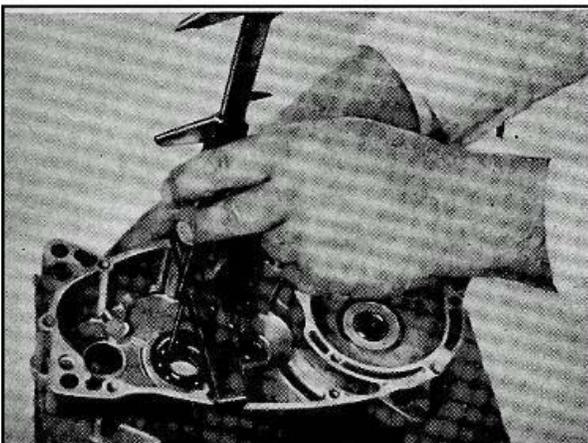


Fig. 48

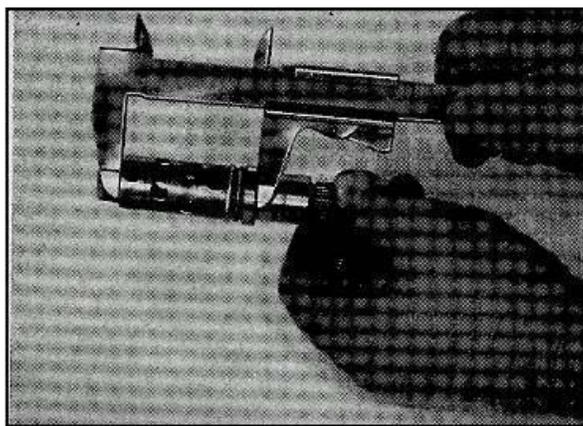
Place the bar on the contact face of the left casing and measure distance to the ball bearing inner race (stop face for selector shaft, fig. 48). Add the value read off to the one already noted.

Note: Remember to allow for thickness of bar.

Now measure selector shaft between the two stop faces (fig. 49). This value will always be smaller than the sum of the two obtained to fig. 47 and 48.

Fit washers on the shaft between ball bearing and speedometer drive until only a play of 0.1 mm remains (for swinging fork machines).

Fig. 49



Example:

Measurement obtained to fig. 47	22,7 mm
Measurement obtained to fig. 48	+ 34,9 mm
Sum	<u>57,6 mm</u>
Dimensions, fig. 37	- 56,9 mm
	<u>0,7 mm</u>
Axial play	- 0,1 mm
Packing washers required	<u>0,6 mm</u>

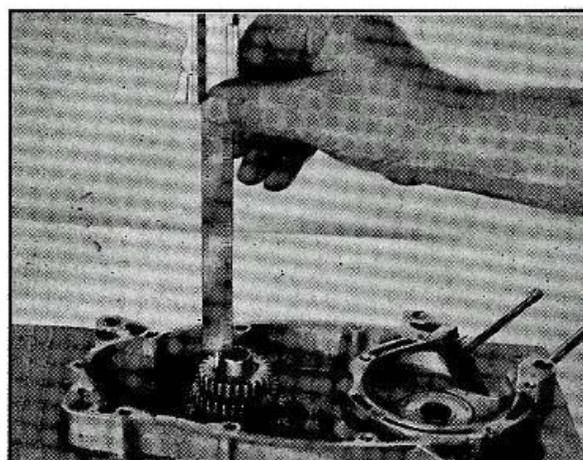
For engines of machines with telescopic fork, a spacer bush is fitted to the collar of the selector shaft, since the speedometer drive is taken from the front hub.

e) Measuring Selector Gears

Fit the selector shaft with the number of packing washers calculated into the left casing, then fit selector gears in sequence in such a way that the larger collar faces down, i. e. towards the larger gear. Gears are correctly fitted if only one oil groove lies between each two gears, and the arrow at the side points to the next larger gear.

Next, with the depth gauge, measure distance from end face of selector shaft to stop face of selector gear (fig. 50).

Fig. 50



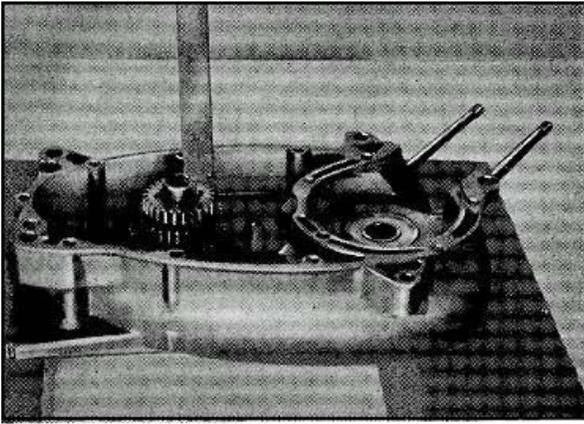


Fig. 51

Then measure from the same point to the stop collar of selector shaft (fig. 51).

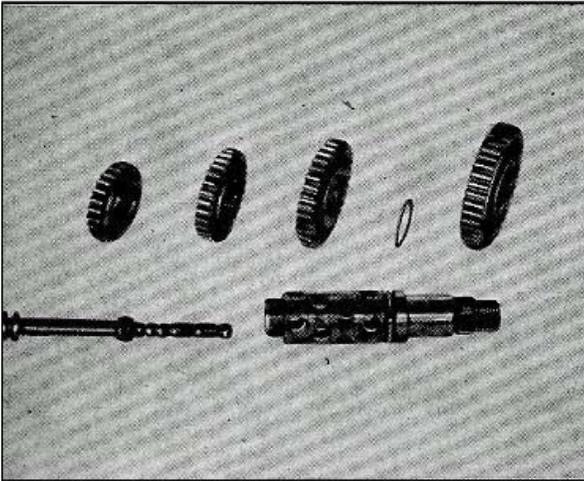


Fig. 52

The distance must not be larger than the value obtained to fig. 50. Correct any backlash in gears by fitting packing washers between 1st and 2nd speed gear; play must be eliminated to 0 (fig. 52).

Note: The balls for the selector gears should be coated with oil, not with grease, to stick them into position. Before fitting selector shaft, check that stop pins of selector shaft are correctly mounted, complete with their annular springs.

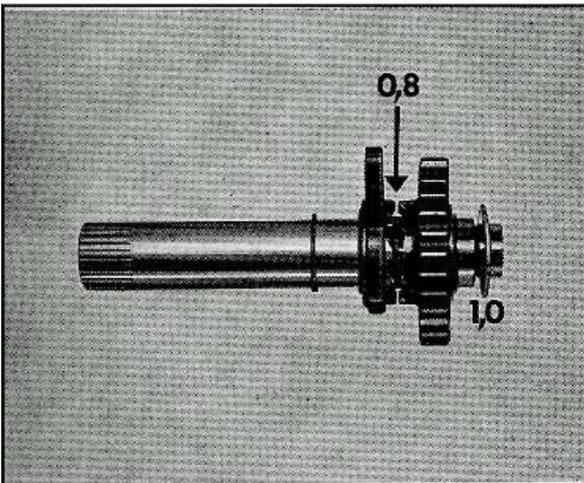


Fig. 53

f) Measuring Starter Spindle

Check distance of opposing teeth between driver and kickstarter gear on kickstarter spindle. This should not exceed 0.8 mm. If it does, fit packing washers between shap ring and driver. A washer of 1 mm is fitted to the short shaft stub as standard (fig. 53).

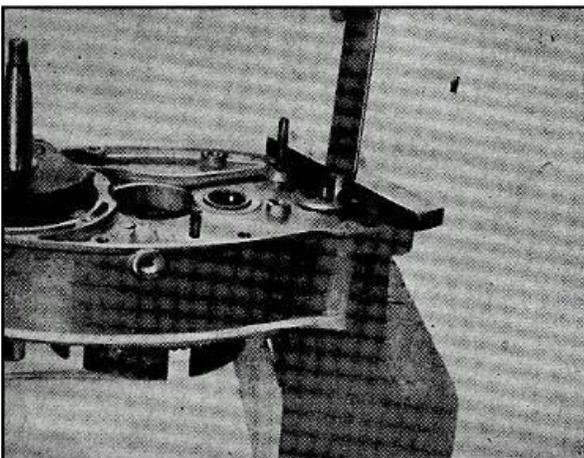


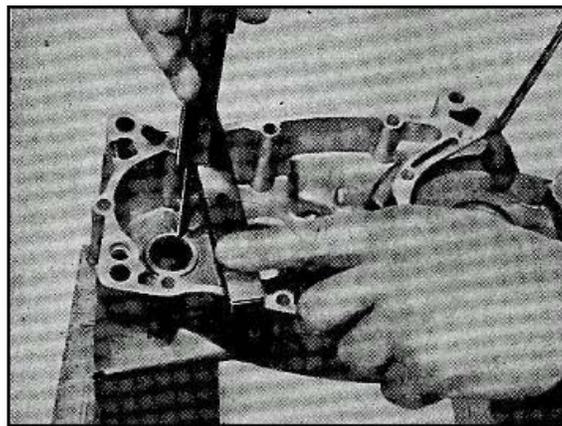
Fig. 54

With gauging bar and depth gauge, measure distance between contact face of right casing and stop collar for starter spindle (fig. 54). Note down the reading.

On the left casing measure the same distance with the same instruments (fig. 55).

Next, measure distance between the two stop faces on the starter spindle (fig. 56), then make up the difference from the sum of the two measurements just described by fitting packing washers, until only a play of maximum 0.3 mm remains.

Fig. 55

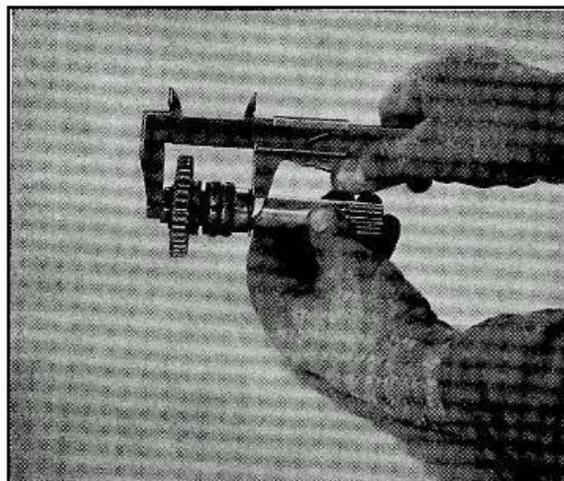


g) Assembling Engine Block

Fit selector shaft and kickstarter spindle together with the packing washers determined by gauging, and the main gearbox drive shaft with a standard 1 mm washer into the left casing. Set brake spring so that when the two casing halves are fitted together, the stop pin in the right casing can be introduced into the spring. Locating stop on starter spindle must face bore marked x on housing (fig. 57).

The assembly notes on the locating stop of the starter spindle apply only up to the engine numbers listed below:

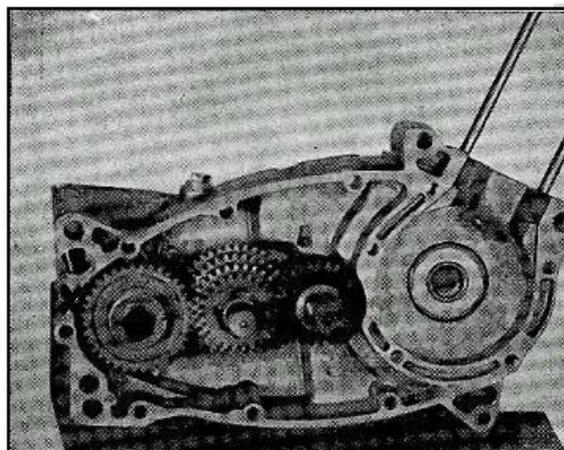
Fig. 56



Typ 267	Nr. 3525493
Typ 267 (R 50)	Nr. 8000639
Typ 276 (KS 50 Super)	Nr. 4056928
Typ 281 (KS 100)	Nr. 4601353

As from the succeeding engine numbers of the types listed and on all RS 50 models right from the start, the kickstarter stop has been transferred to the outside and is now located in the left casing cover. Consequently, the assembly notes accompanying figs. 93—95 apply.

Fig. 57



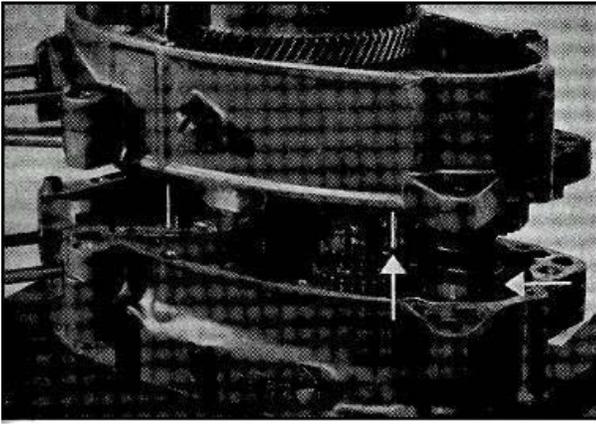


Fig. 58

Press clutch gear (if earlier taken off) into right casing, then secure it from inside with the snap ring (see fig. 33); the pre-assembled right casing is shown in figs. 24 and 26.

Mount two press-fit bushes, coat casing contact faces with compound, such as Teroson Atmosit, oil shafts and bearings, then carefully fit both casings together, taking care to position the brake spring correctly. It is advisable to lift the starter spindle up from underneath until the stop pin engages with the brake spring, so that the spring cannot shift out of position as the two casing halves are fitted together (fig. 58).

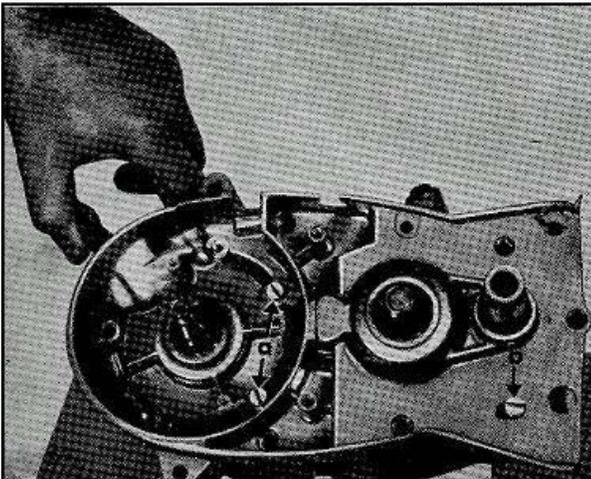


Fig. 59

Bolt casing halves together on the left with 2 bolts, M 6 x 35, at the fly-wheel magneto side (a) and below the starter spindle (b, fig. 59).

On the right hand, fit 1 bolt, M 6x50, at the cylinder base (shown by arrow on fig. 26).

h) Fitting Selector Shaft to Bearing on Left Casing

Fit 1 ring (made in your shop) of the following dimensions:

Height 6 mm
Outer dia. 36 mm
Inner dia. 31 mm

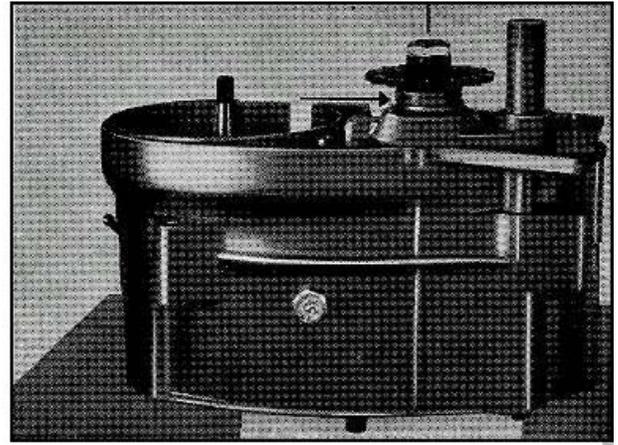
on to selector shaft, flush against the casing. Fit chain gear and tighten gear nut to shift shaft upwards bringing its collar all the way against the inner race of the ball bearing.

Take off nut, chain gear and ring again (fig. 60).

On engines of type 267, use spacer ring SK-A 138 for driver in place of the ring just mentioned. Having fitted the ring, fit and run down chain gear nut only.

Check that all shafts move smoothly.

Fig. 60



i) Mounting Sealing Rings

Fit engine into service fixture SK-A 126 and clamp the whole assembly into the vice.

Fit sealing ring to left casing; fit sealing ring for crankshaft with punch MV 6-961.

Fit sealing ring for selector shaft with assembly socket sleeve SK-A 217 and drive it home by tapping with punch MV 6-734.

On engines of type 267 (manual and pedal gear change), use socket sleeve MV 6-960 together with punch MV 6-961.

Fit sealing ring for kickstarter spindle with hollow punch MV 6-734, noting that chamfered side of ring must face casing (fig. 61).

Fig. 61

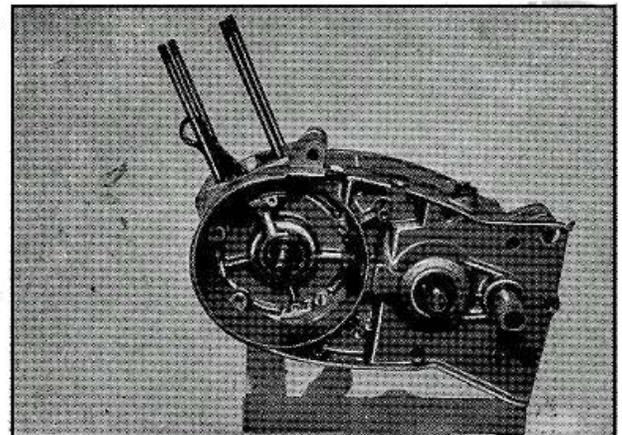




Fig. 62

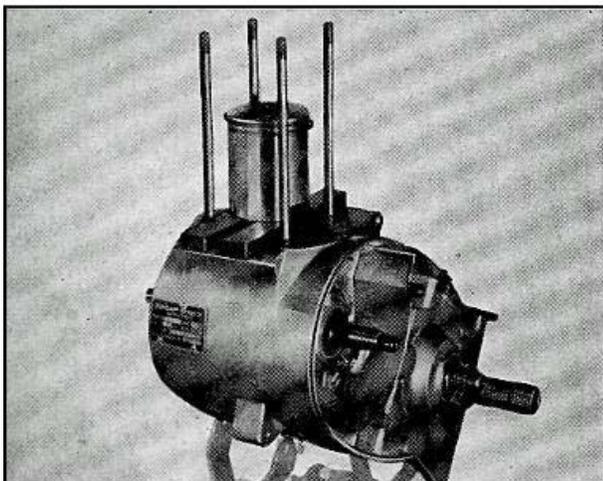


Fig. 63

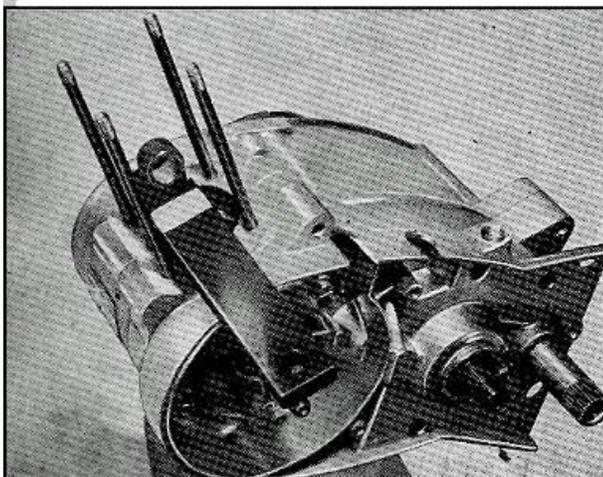


Fig. 64

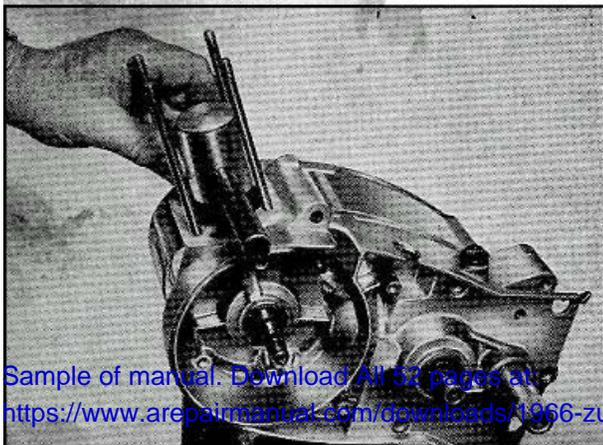


Fig. 65

k) Inspecting Connecting Rod

Fit gauging ring SK-A 125, needle bearing and gudgeon pin into connecting rod. Turn crankshaft down until gudgeon pin lies against gauging ring. Check that it contacts flush on both sides (fig. 62).

Gauge in turned-over position and compare results.

Adjust connecting rod as shown in fig. 64.

On engines of type 281, place two gauging bars SK-A 161 on both sides of the connecting rod on the casing face accommodating the cylinder base gasket. Turn the crankshaft until the piston rod edge lies against the bars. Then repeat the gauging in the opposite position. Adjust the connecting rod as shown in fig. 63.

Carry out final connecting rod setting with the setting bar MV 6-116 (fig. 64).

l) Assembling Piston and Cylinder

Fit the piston; the mark "Auslass" (exhaust port) must face towards the exhaust. Introduce gudgeon pin with service tool SK-A 163, fit crankshaft cover, then fit retaining rings. Position cylinder base gasket, but without sealing compound (fig. 65).

On engines of type 281, use tool SK-A 272 to fit the gudgeon pin.