



# SERVICE MANUAL

MORINI MO ENGINE  
MORINI MO 1 ENGINE  
MORINI MO 2 ENGINE



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# TECHNICAL SPECIFICATIONS

## ENGINE

Type: Single cylinder, air cooled, 2-cycle

Bore: 40.4mm

Stroke: 49mm

Engine Displacement: 49cc

Compression Ratio: 7.5:1

Carburetor: Dell'Orto SHA 14, 12

Piston: Flat head

Ignition: Flywheel magneto 6V - 25W

Ignition Point Gap: 0.35 - 0.40mm

Ignition Timing: 2.0 - 2.5mm B.T.D.C.

Spark Plug Gap: 0.5 - 0.6mm

Spark Plug Heat Range:  $225^{\circ}\text{C}$

Fuel Mixture: 4 oz. of high quality 2-cycle oil per 1 U.S. gallon of gasoline.

Transmission Type: Automatic, in oil bath.

Transmission Capacity: M0 - M01 - 12.5 ounces of H.S. SAE 20 Oil (NON-SYNTHETIC).

M02 - 1 pint of H.D. SAE 20 Oil (NON-SYNTHETIC).

## GEAR RATIO

MO (Single Speed)

Transmission (primary):  $Z.52/22 = 1:2.36$

Internal Gears:  $Z_{26}/10 = 1:2.6$

Overall Gear Ratio: 1:6.145

## MO.2 (Two Speed)

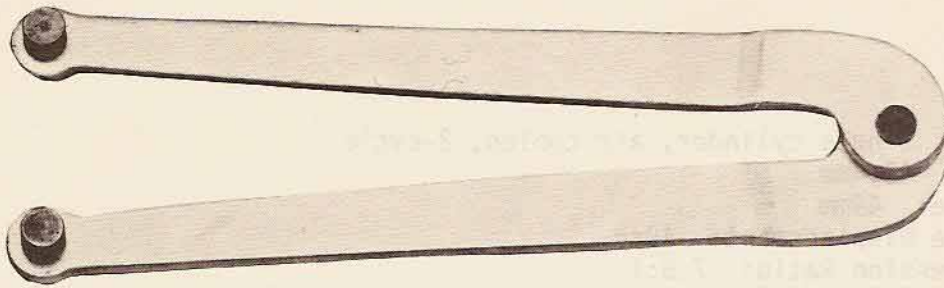
Transmission (primary) - 1st gear:  $Z_{15}/59 = 1:3.933$

- 2nd gear:  $7.22/52 = 1:2.36$

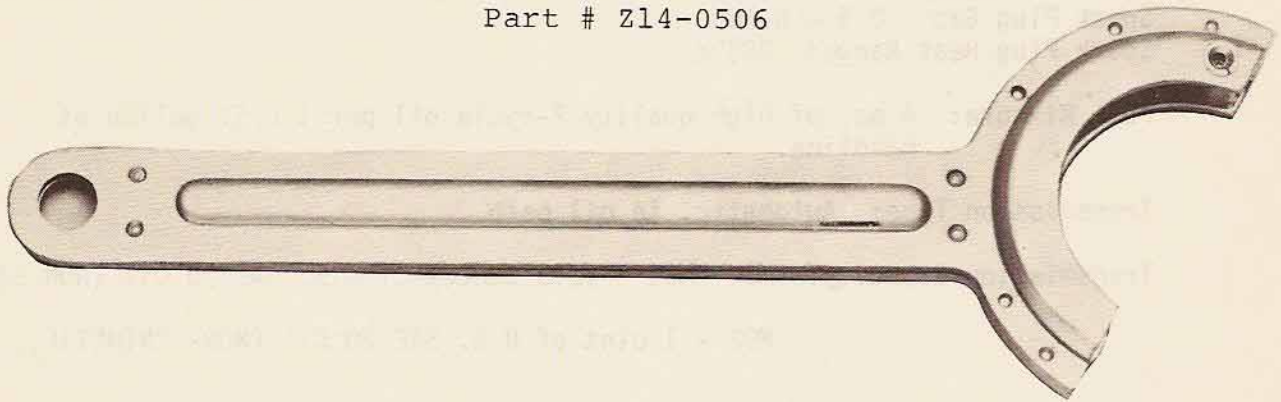
Internal Gears:  $Z_{26}/10 = 1.26$

Overall Gear Ratio: 1:6.145

SPECIAL SERVICE TOOLS



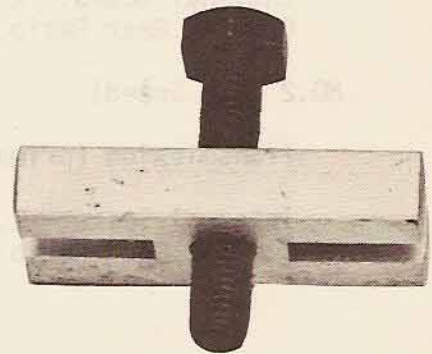
SPECIAL SPANNER WRENCH  
Part # Z14-0506



SPROCKET WRENCH  
Part # Z14-0507



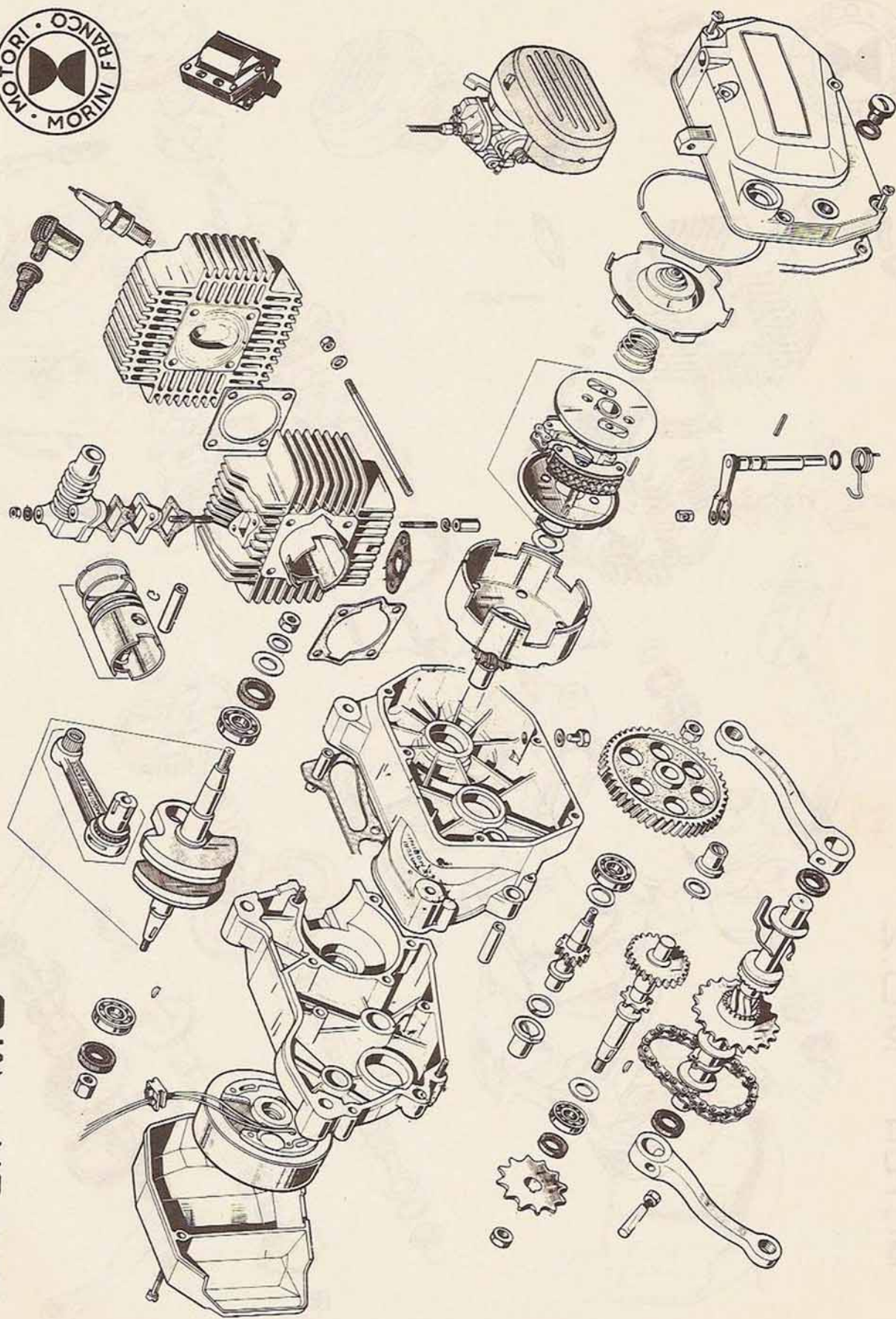
MAGNETO FLYWHEEL PULLER  
(Bosch - C.E.V. - Dansi)  
Part # Z14-0501



GEAR PULLER  
Part # Z14-0508

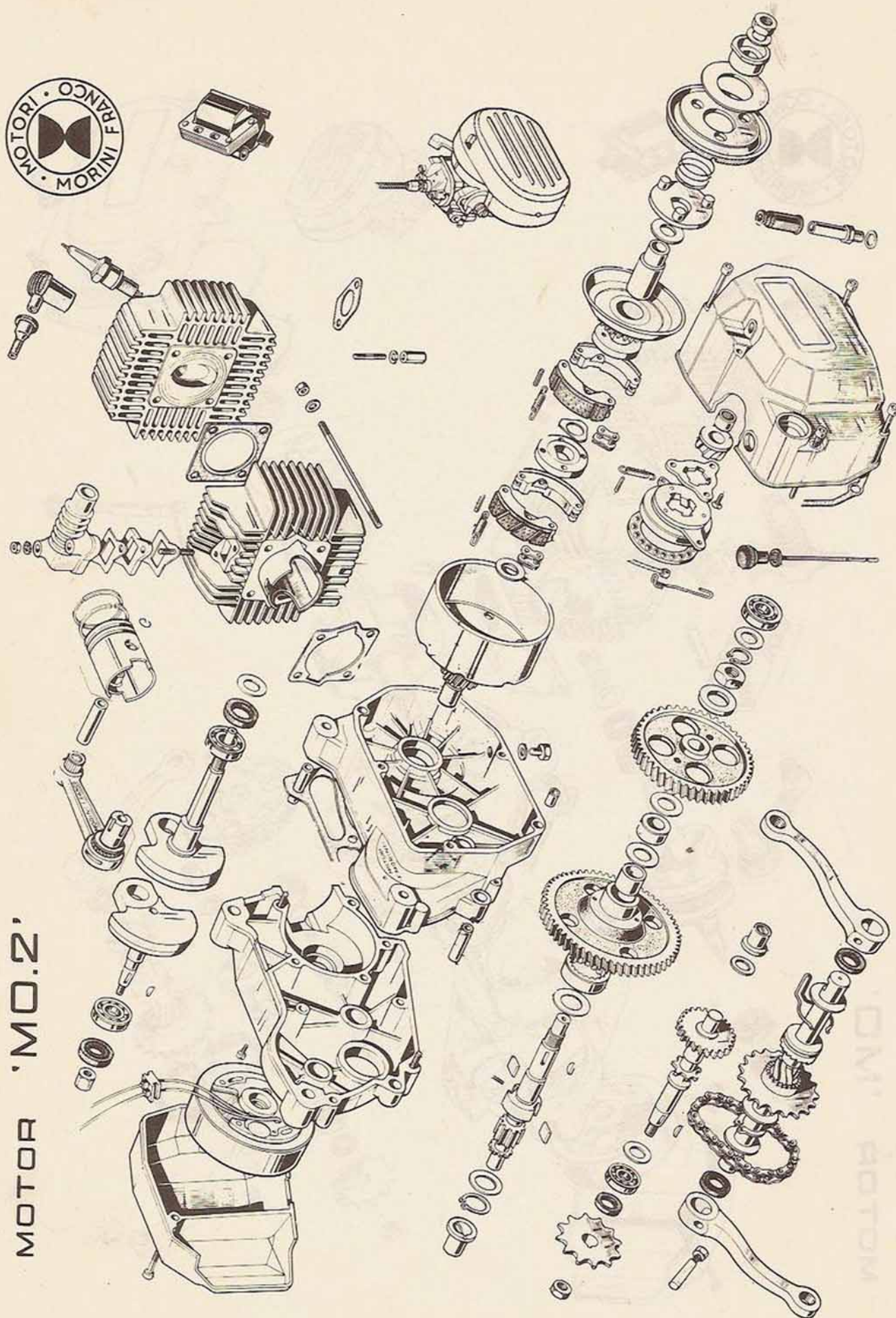


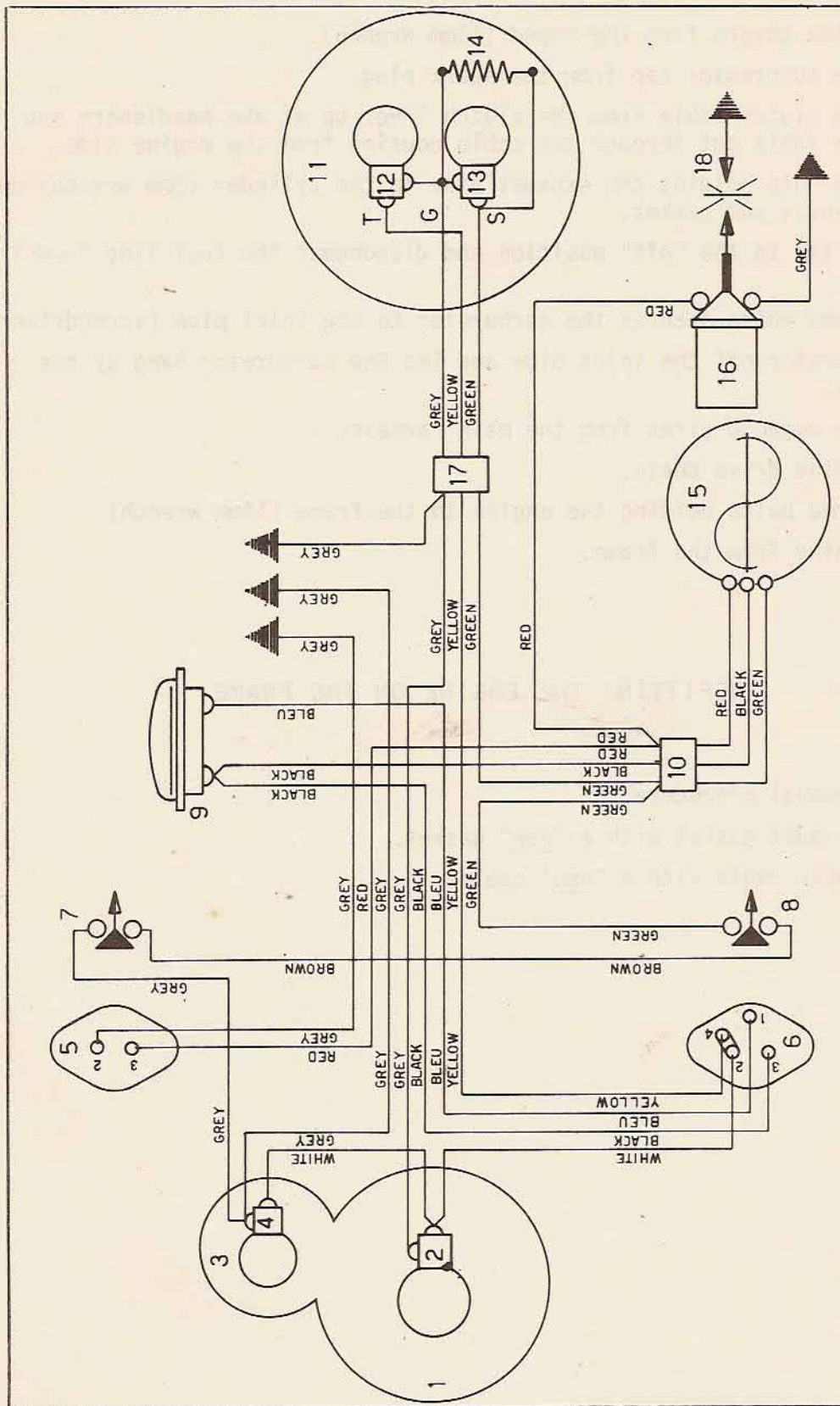
MOTOR 'MO'





MOTOR 'MO.2'





6V ELECTRICAL SYSTEM  
MOTOBECANE "SEBRING"

|    |                     |    |                       |    |                   |
|----|---------------------|----|-----------------------|----|-------------------|
| 16 | HIGH TENSION COIL   | 17 | REAR LIGHT CONNECTION | 18 | SPARK PLUG        |
| 13 | FLYWHEEL CONNECTION | 14 | REAR LIGHT            | 15 | FLYWHEEL          |
| 10 | REAR BRAKE SWITCH   | 11 | REAR LIGHT            | 12 | REAR BULB 6V - 5W |
| 7  | FRONT BRAKE SWITCH  | 8  | REAR BRAKE SWITCH     | 9  | HORN              |
| 4  | BULB 6V - 12W       | 5  | WILL SWITCH           | 6  | LIGHT SWITCH      |
| 1  | HEAD LAMP           | 2  | FRONT BULB 6V - 21W   | 3  | SPEEDO METER      |

## ENGINE REMOVAL

(MO - MO1 - MO2)

- Remove both side covers from the moped (10mm wrench).
- Disconnect the suppressor cap from the spark plug.
- Disconnect the clutch cable from the clutch lever up at the handlebars and pull the inner cable out through the cable housing from the engine side.
- Unbolt the two nuts holding the exhaust pipe to the cylinder (8mm wrench) and remove the exhaust and gasket.
- Turn the fuel tap to the "off" position and disconnect the fuel line from the carburetor.
- Loosen the clamp which secures the carburetor to the inlet pipe (screwdriver).
- Work the carburetor off the inlet pipe and let the carburetor hang by the throttle cable.
- Disconnect the magneto wires from the main harness.
- Remove the engine drive chain.
- Remove the three bolts holding the engine to the frame (14mm wrench).
- Remove the engine from the frame.

## REFITTING THE ENGINE ON THE FRAME

- Reverse the removal procedure.
- Replace the exhaust gasket with a "new" gasket.
- Replace the choke cable with a "new" cable.

## REMOVING AND REINSTALLING THE CARBURETOR

(MO - MO1 - MO2)

### REMOVAL:

- Turn the fuel tap to the "off" position and disconnect the fuel line from the carburetor.
- Loosen the clamp which secures the carburetor to the inlet pipe (screwdriver).
- Work the carburetor off the inlet pipe.
- Remove the carburetor from the throttle cable by removing the two screws which hold the throttle slide cover to the carburetor body (screwdriver).
- Remove the throttle slide cover, spring and throttle slide as one assembly and let hang from the moped.

### REINSTALLING ON MACHINE:

- Check that the plastic bushing on the inlet pipe is in good condition. If necessary replace with a new bushing.
- Check that the nuts securing the inlet pipe to the cylinder are tightened securely (8mm wrench). If the inlet pipe was removed clean the gasket surfaces and install a "new" set of inlet pipe gaskets.
- Install the throttle slide cover, spring and throttle slide back into the carburetor. Install a new gasket in the throttle slide cover if necessary.
- Tighten the two screws which secure the carburetor slide cover to the carburetor body (screwdriver).
- Install the carburetor back onto the inlet pipe.
- Tighten the carburetor clamp while making certain that the carburetor is mounted straight on the inlet pipe (screwdriver).
- Reconnect the fuel line securely to the carburetor.

## DISASSEMBLING AND REASSEMBLING THE CARBURETOR

(MO - MO1 - MO2)

### DISASSEMBLING THE CARBURETOR: (Fig. 1)

Carburetor Model: Dell'Orto SHA 14 - 12

- Remove the air filter assembly by loosening the clamp (screwdriver).
- Remove the inner air filter element from the air filter assembly.
- Remove the air filter "cork" gasket from the carburetor body.
- Remove the fuel inlet (screwdriver).
- Remove the fuel filter by lifting up gently (screwdriver).
- Remove the float bowl by unscrewing the two screws (screwdriver).
- Remove the float bowl "o" ring gasket.
- Remove the fuel jet (screwdriver).
- Slide the small brass hinge pin out of the float and remove the float.
- "Carefully" remove the needle valve from the float chamber.

Clean all carburetor components thoroughly by soaking in a solvent bath and using compressed air.

### REASSEMBLING THE CARBURETOR: (Fig. 1)

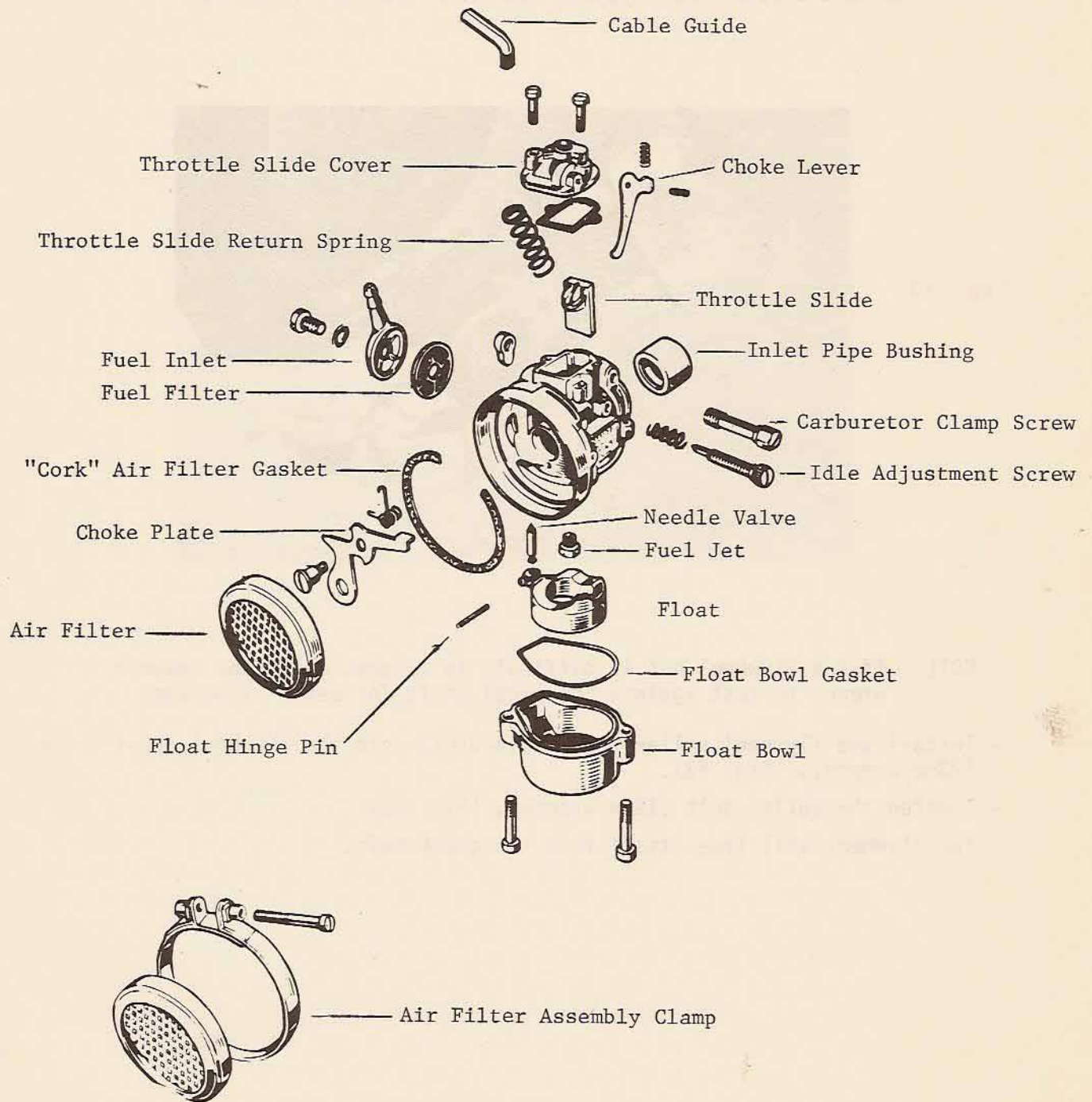
Carburetor Model: Dell'Orto SHA 14 - 12

- Reverse dismantling procedure and replace all filters and gaskets.

# DELL'ORTO CARBURETOR

SHA 14 - 12

Fig. #1



REMOVING AND REFITTING THE FLYWHEEL MAGNETO  
(MO - MO1 - MO2)

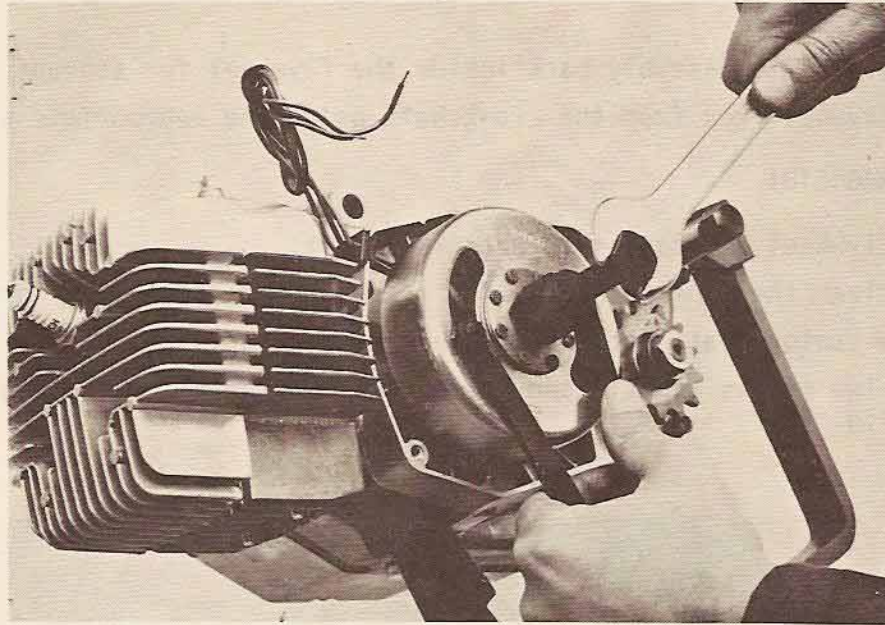


Fig. #3

- Unscrew the two screws holding the stator plate assembly to the engine (Phillip screwdriver), (Fig. #4).

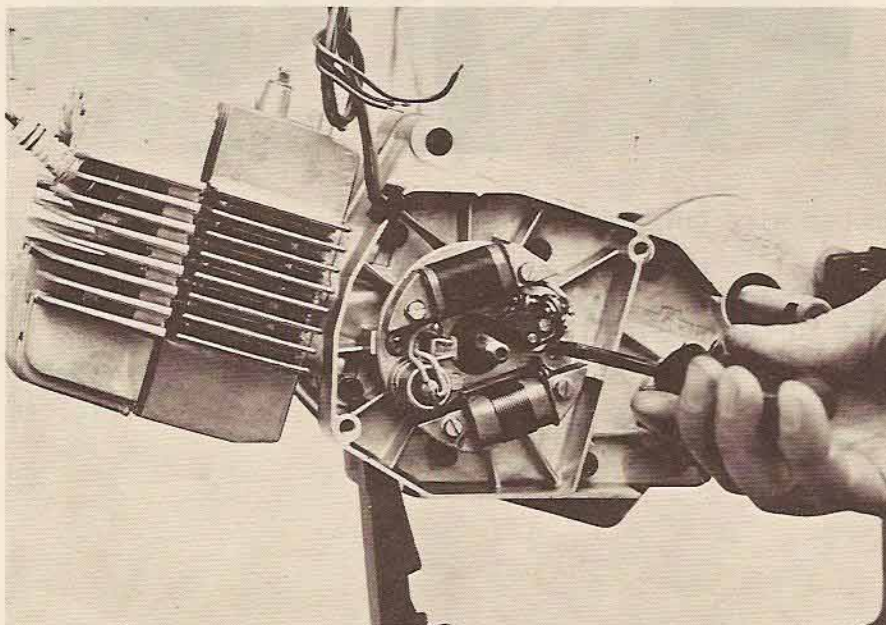


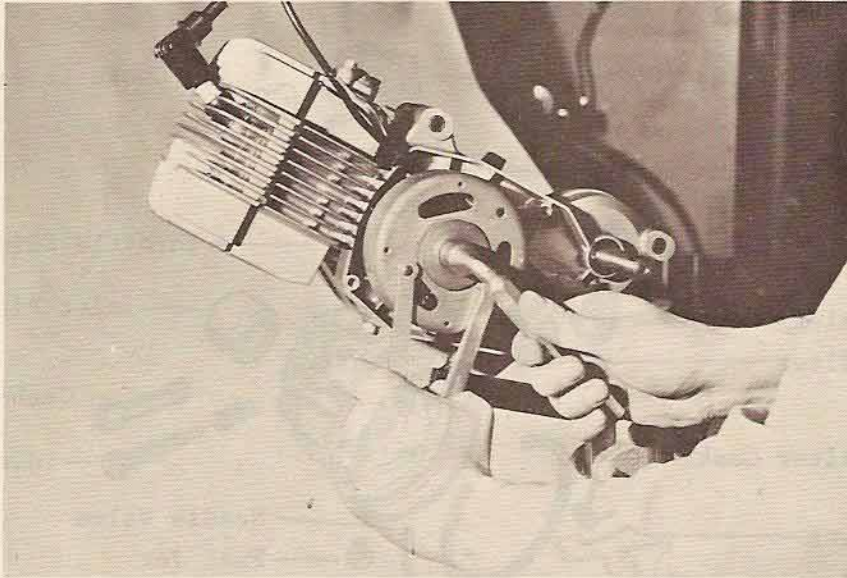
Fig. #4

## REMOVING AND REFITTING THE FLYWHEEL MAGNETO (MO - MO1 - MO2)

### REMOVING THE MAGNETO:

- Remove the two Allen head bolts securing the left engine cover to the engine (5mm Allen wrench).
- Insert the special spanner wrench (part #Z14-0506) into the slots of the flywheel and unscrew the flywheel nut (15mm wrench), (Fig. #2).

Fig. #2



NOTE: If the flywheel nut is difficult to loosen, allow the spanner wrench to rest against the pedal shaft for better leverage.

- Install the flywheel puller (part #Z14-0501) into the flywheel and tighten (22mm wrench), (Fig. #3).
- Tighten the puller bolt (19mm wrench), (Fig. #3).
- The flywheel will free itself from the crankshaft.

## REMOVING AND REFITTING THE FLYWHEEL MAGNETO (MO - MO1 - MO2)

- Slide the rubber wire guide off the engine case while removing the stator plate assembly.
- Put the stator plate assembly back inside the flywheel for storage.
- Remove the flywheel key from the crankshaft using the appropriate pliers.

### REFITTING THE MAGNETO:

- Insert the flywheel key back into the crankshaft.
- Thoroughly clean the tapered end of the crankshaft to remove any grease.
- Position the stator plate onto the engine case.
- Install the two screws and tighten so that the stator plate is secured at half slot (Fig. #5).

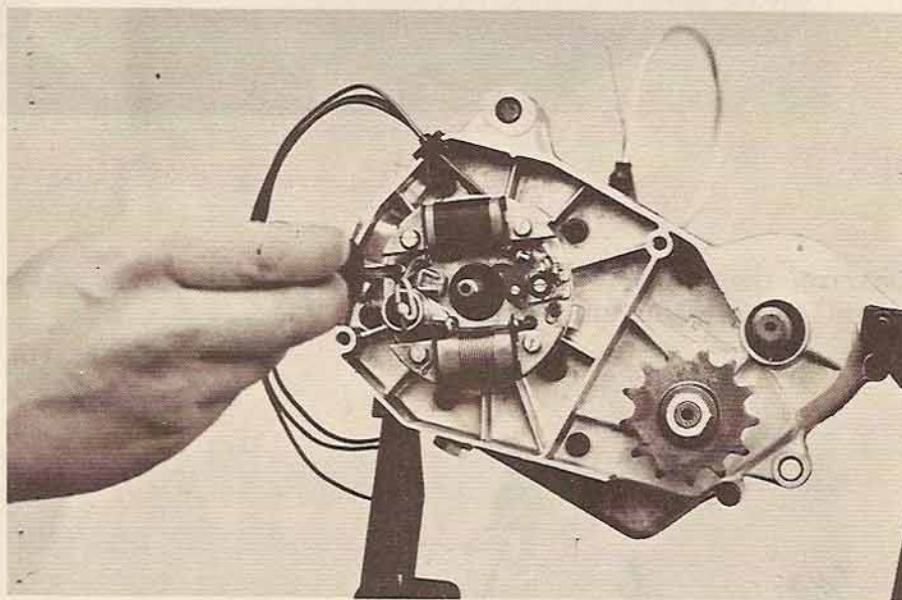


Fig. #5

- Install the rubber wire guide into the engine case.
- Install the flywheel to check the ignition point gap. Ignition point gap should be 0.35 to 0.40mm. If point gap is incorrect loosen the ignition point screw and adjust to correct opening.
- Tighten the rotor nut to a torque of 3.5 - 4Kgm, (26 - 29 Ft. lbs.), (15mm socket, special spanner wrench (part #Z-0506) and a torque wrench), (Fig. #6).

# REMOVING AND REFITTING THE FLYWHEEL MAGNETO (MO - MO1 - MO2)

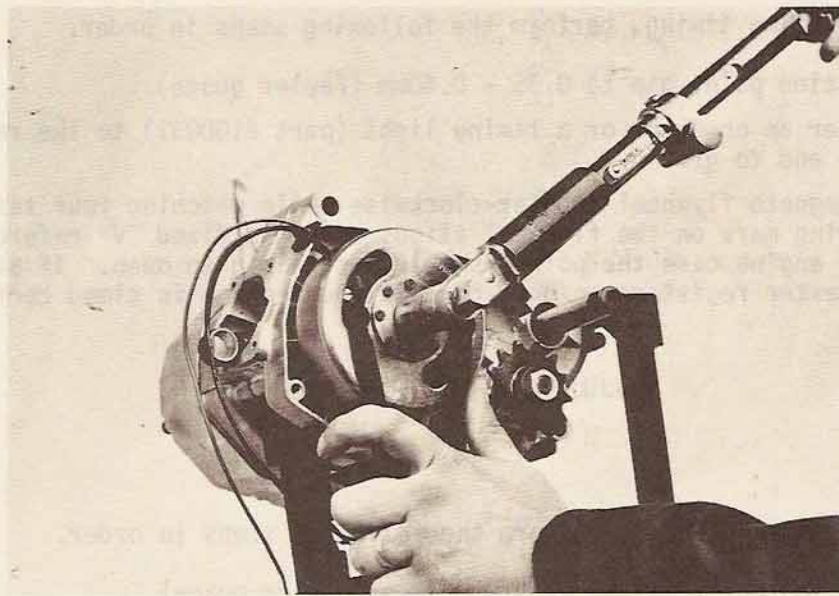


Fig. #6

## IGNITION TIMING

Viewing the engine from the magneto side the engine rotates counter-clockwise when running. The magneto flywheel has two reference lines.

The first reference line when rotating the flywheel counter-clockwise indicates the ignition firing mark (2.3 - 2.8mm B.T.D.C.).

The second reference line when rotating the flywheel counter-clockwise indicates piston top dead center (T.D.C.).

Both marks on the flywheel have a fixed reference point in the shape of a "V" which is located on the engine case (Fig. #7).

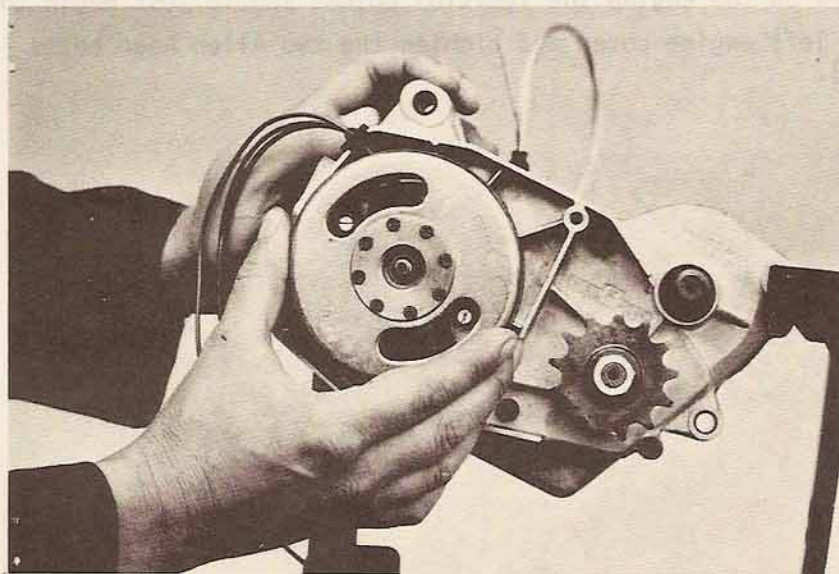


Fig. #7

## CHECKING IGNITION TIMING

(MO - MO1 - MO2)

To check the ignition timing, perform the following steps in order.

- Set the ignition point gap to 0.35 - 0.40mm (Feeler guage).
- Connect either an ohmmeter or a timing light (part #100031) to the red magneto wire and to ground.
- Rotate the magneto flywheel counter-clockwise while watching your tester. When the firing mark on the flywheel aligns with the fixed "V" reference point on the engine case the points should just begin to open. If at this point your tester registers an open circuit your engine is timed correctly.

## ADJUSTING IGNITION TIMING

(MO - MO1 - MO2)

To adjust the ignition timing, perform the following steps in order.

- Set the ignition point gap to 0.35 - 0.40mm (Feeler guage).
- Connect either an ohmmeter or a timing light (part #100031) to the red magneto wire and to ground.
- Align the flywheel firing mark with the fixed "V" reference point on the engine case.
- Loosen, but do not remove, the two screws holding the stator plate to the engine (Phillips screwdriver).
- Using your fingers reach through the flywheel and rotate the stator plate until your meter indicates the points are just opening while the firing mark and the fixed "V" reference mark are aligned.
- Tighten the two screws holding the stator plate to the engine taking care not to shift the stator plate while tightening.
- Recheck the engine timing by rotating the flywheel one full turn counter-clockwise. As the firing mark on the flywheel aligns with the fixed "V" reference mark on the engine the ignition points should just begin to open.
- Reinstal the left engine cover and tighten the two Allen head bolts (5mm Allen wrench).

SPARK PLUG  
(MO - MO1 - MO2)

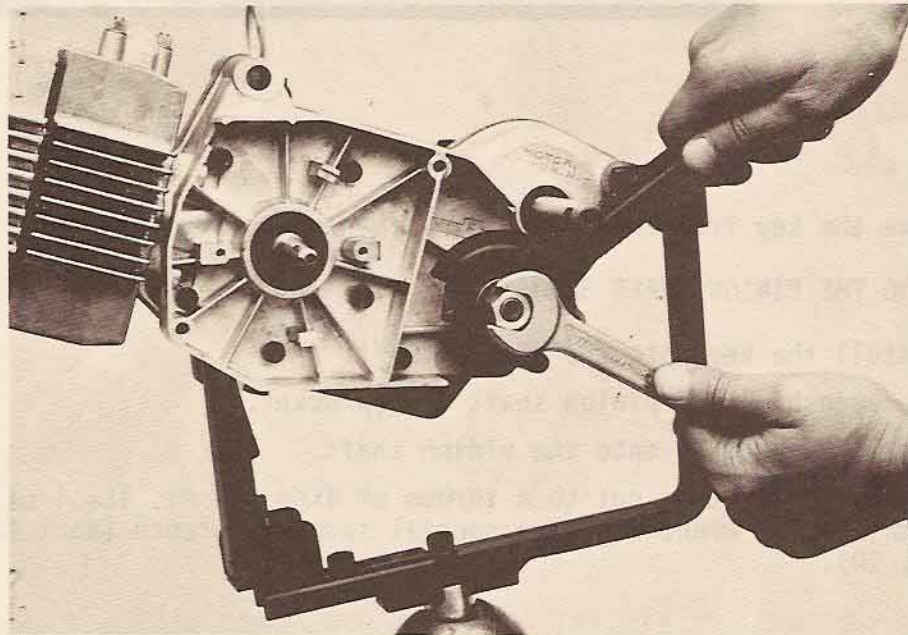
Spark Plug Gap: 0.5 - 0.6mm  
Spark Plug Heat Range: 225°C  
Spark Plug Type: Autolite: D175/14/3  
Champion: N-9Y  
Bosch: W7D

REMOVING AND REFITTING THE PINION SHAFT SPROCKET  
(MO - MO1 - MO2)

REMOVAL OF PINION SHAFT SPROCKET:

- Remove the sprocket nut using a 17mm wrench and the special sprocket wrench (part #Z14-0507), (Fig. #8).

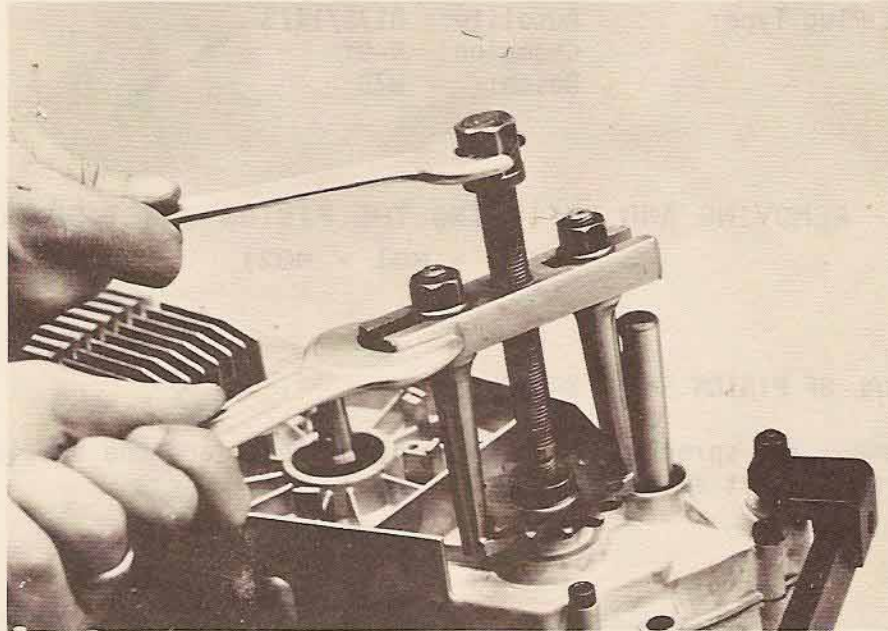
Fig. #8



- Remove the sprocket from the shaft using a typical universal gear puller as shown in figure #9.

REMOVING AND REFITTING THE PINION SHAFT SPROCKET  
(MO - MO1 - MO2)

Fig. #9



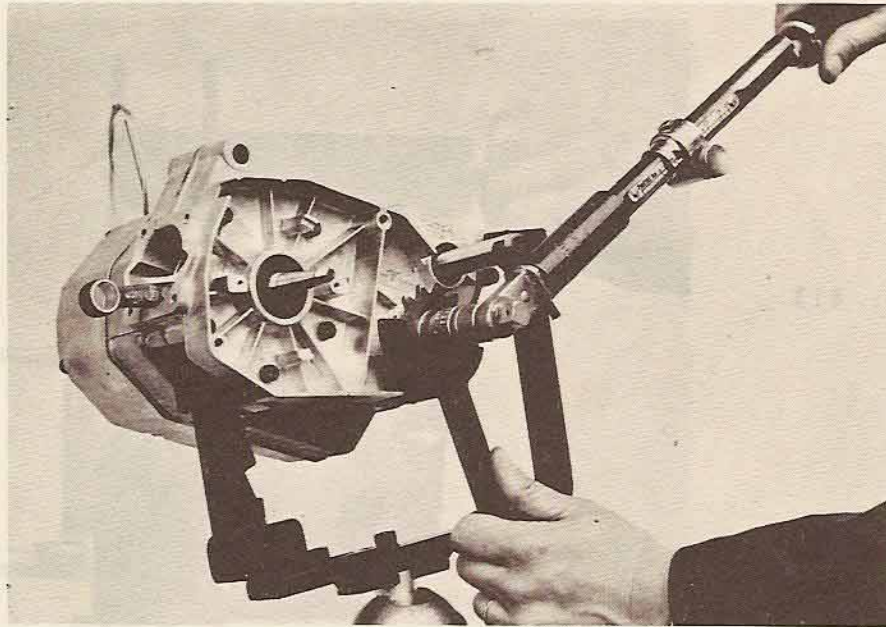
- Remove the key from the shaft using the appropriate pliers.

REFITTING THE PINION SHAFT SPROCKET:

- Reinstall the key onto the pinion shaft.
- Wipe clean both the pinion shaft and sprocket.
- Insert the sprocket onto the pinion shaft.
- Tighten the sprocket nut to a torque of 4Kgm (29 Ft. lbs.) using a torque wrench, a 17mm wrench and the special sprocket wrench (part #Z14-0507), (Fig. 10).

REMOVING AND REFITTING THE PINION SHAFT SPROCKET  
(MO - MO1 - MO2)

Fig. #10



CYLINDER HEAD, CYLINDER AND PISTON REMOVAL AND REFITTING  
(MO - MO1 - MO2)

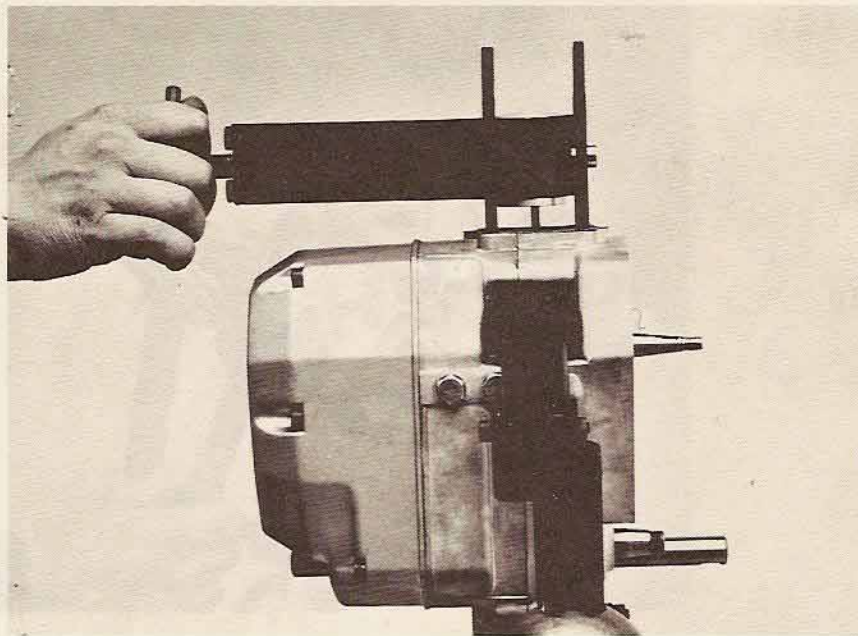
REMOVAL :

- Progressively loosen the four nuts securing the cylinder head to the cylinder (10mm wrench).
- Remove the flat washers from the cylinder head.
- Remove the cylinder head.
- Remove the cylinder head gasket.
- Remove the cylinder and cylinder base gasket.
- Remove the piston rings.
- Stuff a rag into the crankcase mouth around the connecting rod and remove the piston pin clips using the appropriate pliers.
- Remove the piston pin using the special piston pin extractor/installer tool (part #100025), (Fig. #11).

## CYLINDER HEAD, CYLINDER AND PISTON REMOVAL AND REFITTING

(MO - MO1 - MO2)

Fig. #11



- Remove the caged needle bearing from the connecting rod.

### PISTON CYLINDER MATCHING:

Piston and cylinder matching is very important!

Each cylinder and each piston has a color reference painted on it at the factory. The four colors in ascending size are green, neutral (no color), yellow and red. The difference in diameter between each color is .005mm. The best possible match between a cylinder and piston would be to have both the same color. However, piston and cylinders can be matched in the following manner.

| <u>PISTON COLOR</u>      | <u>"TO BE USED WITH"</u> | <u>CYLINDER COLOR</u> |
|--------------------------|--------------------------|-----------------------|
| Green or neutral         |                          | Green                 |
| Green, neutral or yellow |                          | Neutral               |
| Neutral, yellow or red   |                          | Yellow                |
| Yellow or red            |                          | Red                   |

IMPORTANT: Whichever piston cylinder assembly is finally chosen, the piston cylinder clearance must be:

Minimum: 0.055mm  
Maximum: 0.065mm

## CYLINDER HEAD, CYLINDER AND PISTON REMOVAL AND REFITTING (MO - MO1 - MO2)

### REFITTING:

- Smear the needle bearing with oil and insert it in the connecting rod.
- Insert the wrist pin in the connecting rod and bearing and check for excessive play.

NOTE: If excessive play is present the problem is one of the three components or a combination of the components are worn. (Eg. piston pin, bearing, connecting rod).

- Instal the piston so that the piston ring locating pins face the inlet port side of the cylinder.
- Instal the piston pin using the pin extractor/installer tool (part #100025), (Fig. 12).

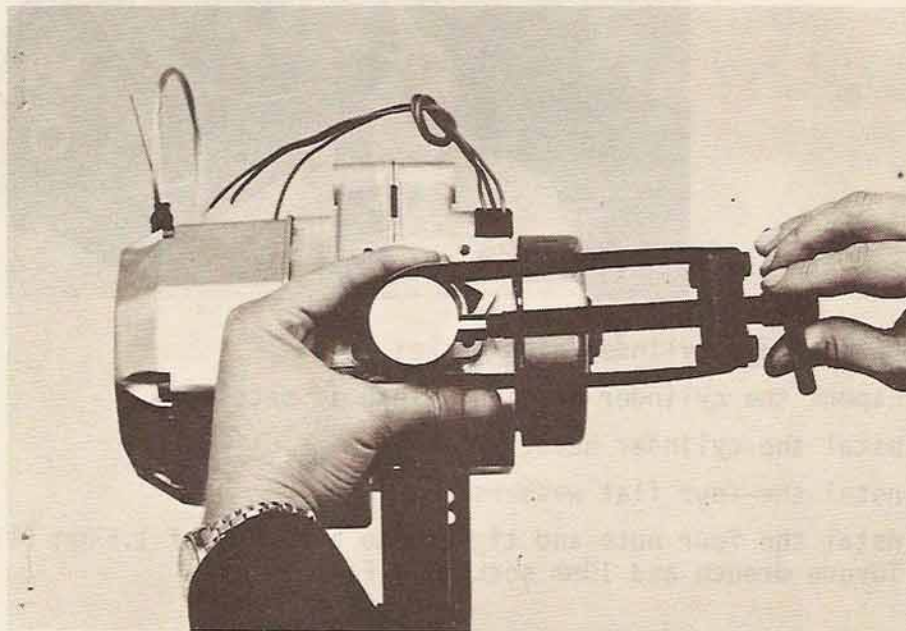


Fig. #12

- Instal a new set of piston pin clips using the appropriate pliers.
- Without the piston rings mounted on the piston, slide the cylinder down over the piston.

IMPORTANT: Check piston/cylinder clearance by using a feeler guage.

Minimum piston/cylinder clearance = .055mm

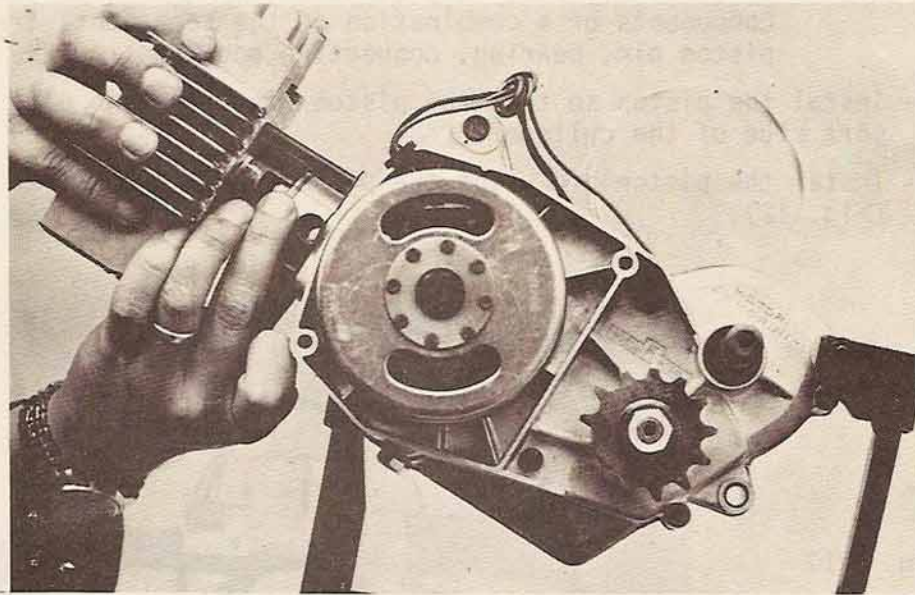
Maximum piston/cylinder clearance = .065mm

- Remove the cylinder and instal a new set of piston rings.
- Instal a new cylinder base gasket making certain that it is aligned correctly with the crankcase transfer ports.

## CYLINDER HEAD, CYLINDER AND PISTON REMOVAL AND REFITTING (M0 - M01 - M02)

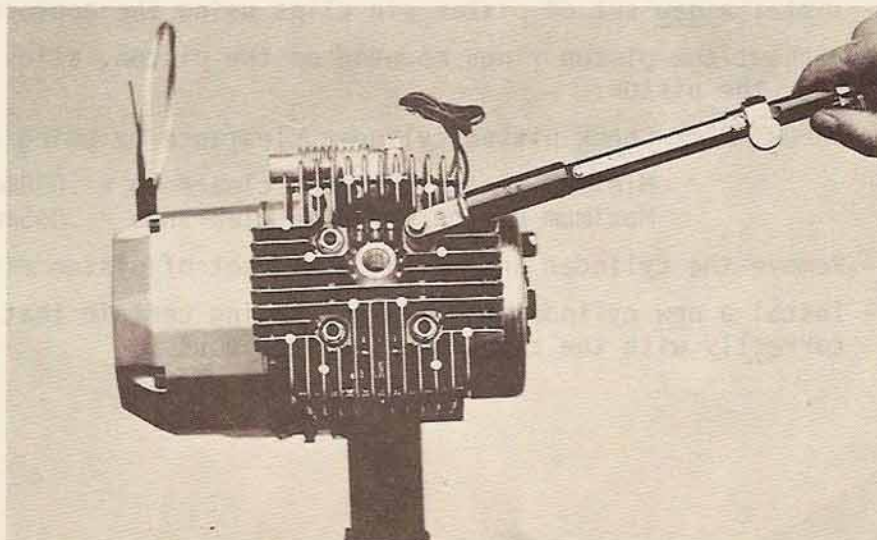
- Check that the cylinder wall is neither scuffed nor scored.
- Oil the cylinder base and instal the cylinder onto the piston taking care that the piston rings are properly aligned with their locating pins in the ring groove (Fig. 13).

Fig. #13



- Instal a new cylinder head gasket.
- Inspect the cylinder head and clean if necessary.
- Instal the cylinder head.
- Instal the four flat washers.
- Instal the four nuts and tighten to a torque of 1.5Kgm (11 Ft. lbs.), (Torque wrench and 10mm socket), (Fig. 14).

Fig. #14



## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)

- Drain the oil completely from the transmission by removing the two oil drain plugs at the bottom of the engine (13mm wrench).
- Remove the oil dipstick from the right engine cover.
- Remove the 6 allen head bolts securing the right engine cover (5mm allen wrench).
- Slide the right engine cover off while using a rubber hammer and tapping lightly on alternate sides of the cover.
- Remove the rubber seal from the engine cover by prying up gently on the seal using a screwdriver (refer to page MR 27).
- Remove the clutch housing gasket from the engine case.

#### REMOVING THE STARTING CLUTCH ENGAGEMENT DISC: (Fig. 15)

- Remove the spring from the mount pin using the appropriate pliers.
- The engagement disc can now be removed from the clutch dog.
- To remove the clutch dog or clutch shaft bearing, remove the three Phillips head screws (screwdriver).

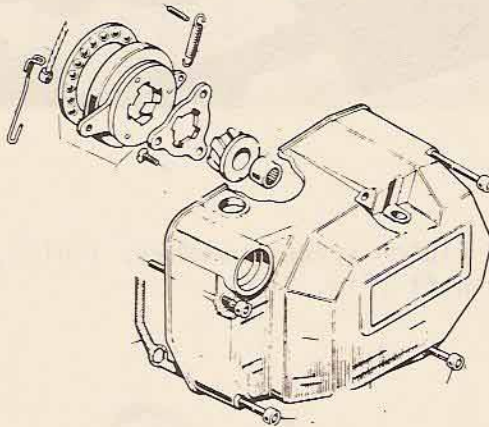


Fig. #15

#### REFITTING THE STARTING CLUTCH ENGAGEMENT DISC: (Fig. 15).

- Reverse the dismantling procedure.

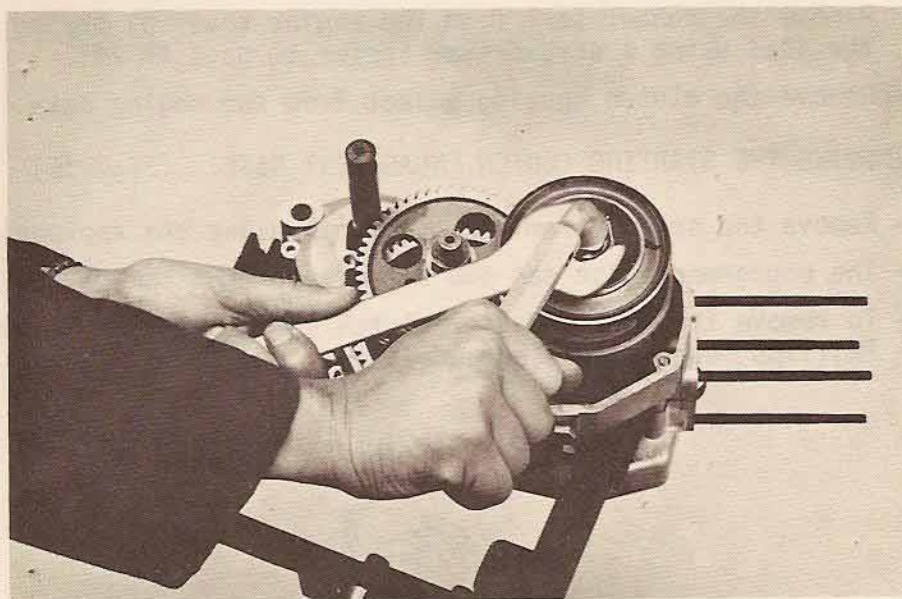
## SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE) -CONT'D.

### DISASSEMBLING THE CLUTCH AND TRANSMISSION:

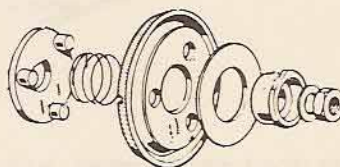
- Remove the clutch plate, retaining nut and washer (17 and 28mm wrench), (Fig. 16).

Fig. #16



- Remove the starting clutch spacer, washer, lining, spring and disc with pins from the crankshaft (Fig. 17).

Fig. #17

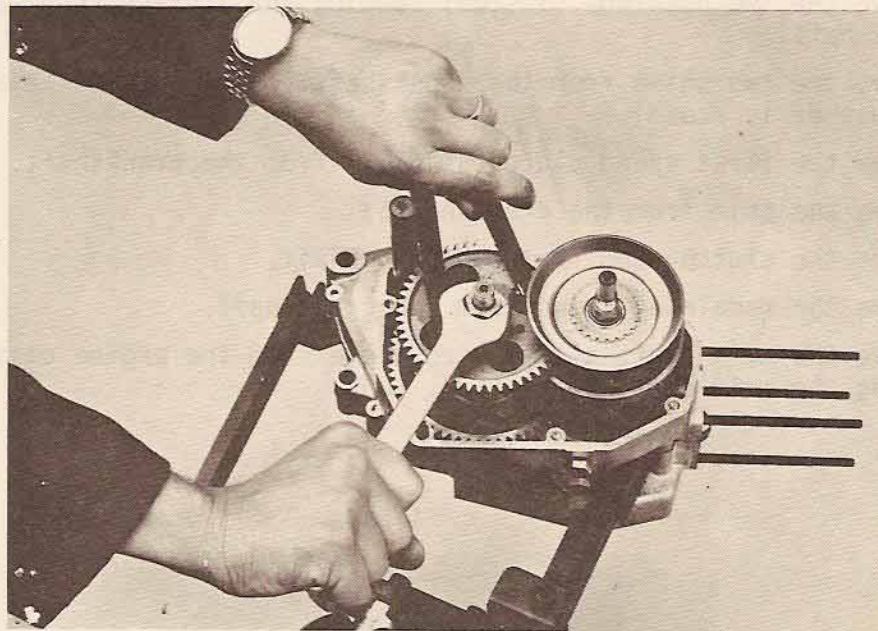


- Remove the washer and circlip from the mainshaft using the appropriate pliers.
- Remove the second speed gear nut and washer from the main shaft using a 19mm wrench and the special spanner wrench (part #Z14-0506), (Fig. 18).

## SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE)-CONT'D.

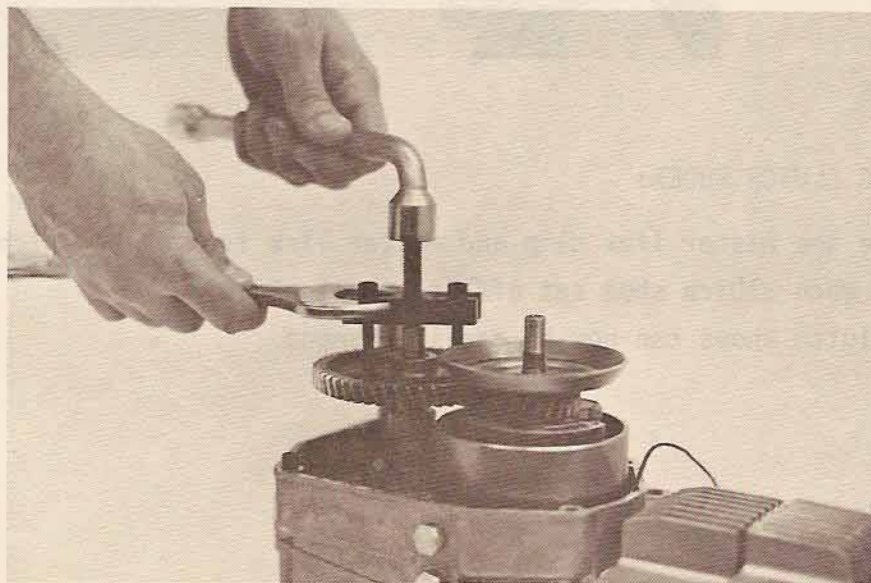
Fig. #18



- Remove the second speed gear from the main shaft while at the same time removing the second speed clutch assembly from the crankshaft.

**IMPORTANT:** If the second speed gear will not slide off the main shaft freely, use the special gear puller (part #Z14-0508) along with two of the clutch housing allen bolts to remove the second speed gear (Fig. #19).

Fig. #19

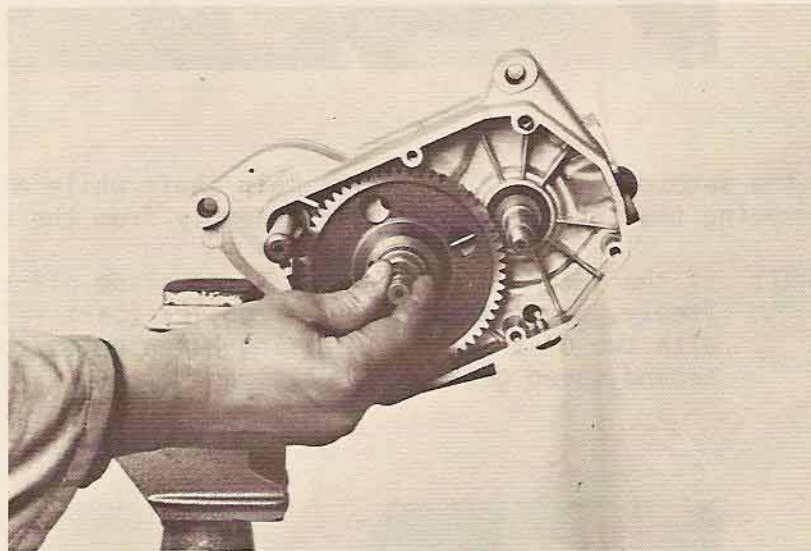


## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

- Remove the two bushings (1 steel bushing and 1 brass bushing) from the crankshaft.
- Remove the two shims from the crankshaft (1st washer is triangular, the 2nd washer is round).
- Remove the first speed clutch assembly from the crankshaft.
- Remove the shim from the crankshaft.
- Remove the clutch drum from the crankshaft.
- Remove the remaining shims from the crankshaft.
- Remove the main shaft assembly complete from the engine casing without taking the main shaft apart (Fig. #20).

Fig. #20



### REPLACING CLUTCH SHOES:

- Remove the master link clip and master link from each clutch shoe.
- Slide each clutch shoe set off its mount plate.
- The clutch shoes can now be easily changed.

## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

- IMPORTANT:
1. The first speed clutch shoes have "three" grooves cut into each of the clutch pads. The springs holding the two first speed clutch shoes together are 1.7mm thick and darker in color than the second speed clutch springs.
  2. The second speed clutch shoes have "two" grooves cut into each of the clutch pads. The springs holding the two second speed clutch shoes together are 1.6mm thick and lighter in color than the first speed clutch springs.

IF THE INCORRECT CLUTCH PADS OR CLUTCH SPRINGS ARE USED IN A CLUTCH ASSEMBLY, THE CLUTCH WILL NOT FUNCTION CORRECTLY.

#### DISASSEMBLY OF THE MAIN SHAFT:

If the disassembly of the main shaft is necessary, proceed in the following order.

- Remove the main shaft key using the appropriate pliers.
- Remove the washer, spacer and remaining two washers in order.
- Remove the first speed gear carefully so as not to loose the two retaining ears and springs.
- Remove the two remaining shims which were inside the 1st speed gear.

#### REASSEMBLY OF THE MAIN SHAFT:

- Reverse the dismantling procedure.

#### SPLITTING THE ENGINE CASES (MO - MO1 - MO2):

- Remove the nine allen head bolts from the magneto side of the engine case (5mm allen wrench).
- Separate the engine casings by using a plastic hammer and tapping gently on the crankshaft, pedal shaft and pinion shaft alternately from the magneto side. The left engine casing (magneto side) will slide off the three shafts previously mentioned (Fig. #21).

NOTE: Motobecane America, Ltd., also offers a special case splitter tool (part #Z14-0511) for separating the crankcase halves (Fig. #22).

- Remove as one assembly from the right engine casing, the pinion shaft and pedal shaft paying strict attention to the position of the shims present.
- Remove the engine case gasket.
- Remove the crankshaft from the engine casing by tapping lightly on the clutch side of the crankshaft with a plastic hammer.

# SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE)-CONT'D.

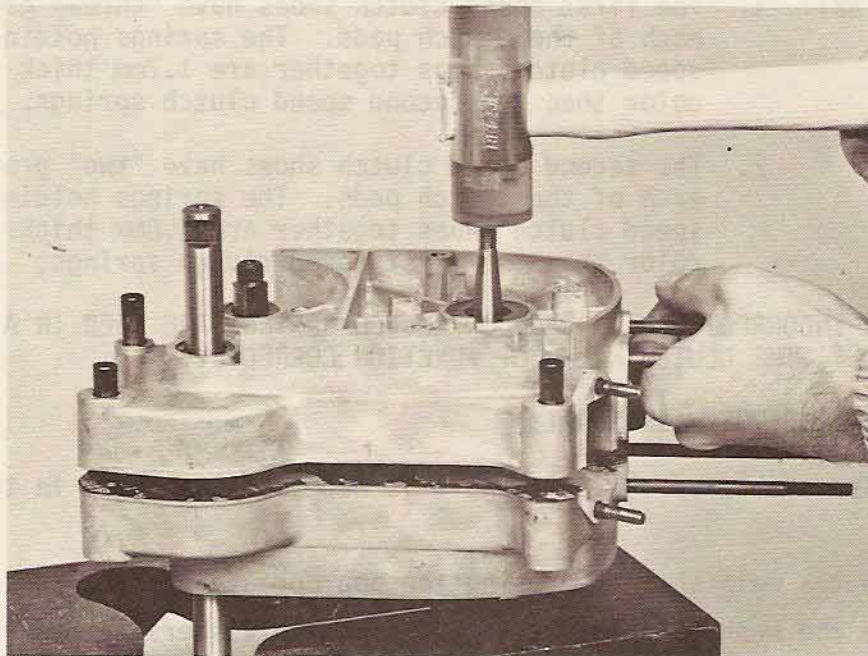


Fig. #21

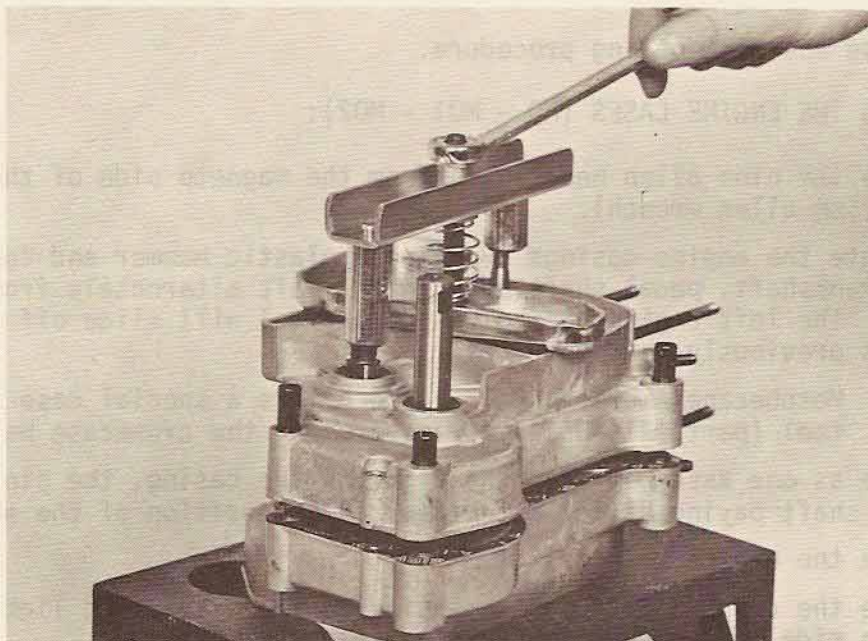


Fig. #22

## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

#### DISASSEMBLY OF THE PEDAL AND PINION SHAFT (MO - MO1 - MO2):

- Remove the chain from the pinion shaft. The two shafts are now separated.
- The chain gear on the pedal shaft is removed by sliding the shaft claw coupling off the right side of the pedal shaft and then by removing the respective washers and circlip off the left side of the shaft.

#### REASSEMBLY OF THE PEDAL AND PINION SHAFT (MO - MO1 - MO2):

- Reverse the dismantling procedure.
- Take special care in the positioning of the shims and replace the chain if necessary.

#### REMOVAL AND INSTALLATION OF THE ENGINE CASE BUSHINGS (MO - MO1 - MO2):

- To remove the brass bushings from the engine cases, use a 14mm tap and pull the bushing out of the case.
- To instal new brass bushings into the engine cases, lubricate the new bushings and tap in place using a plastic hammer.

#### ENGINE OIL SEAL REMOVAL AND INSTALLATION (MO - MO1 - MO2):

- Removal: Using a screw driver, gently pry the oil seal from the engine case or side cover, (Fig. #23).

Fig. #23



## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

Installation: To install a new engine oil seal, lightly lubricate the seal and position in the engine case or side cover. Using a tube lightly tap the oil seal into the case. (Fig. #24)



Fig. #24

### ENGINE BEARING REMOVAL AND INSTALLATION (MO - MO1 - MO2):

- Lightly heat the engine case around the bearing to be extracted. Once the engine case begins to heat up the bearing can be driven out quite easily (propane torch).
- To install an engine case bearing, lightly heat the engine case around the bearing seat and install the bearing by tapping lightly with a plastic hammer.

## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

#### REASSEMBLING THE ENGINE CASES (MO - MO1 - MO2):

**IMPORTANT:** Before assembling the engine, make certain that the bearings and bronze bushings are in perfect condition. All engine gaskets and seals must be replaced with new parts everytime the engine is overhauled.

- Assembly of the engine case must start from the clutch side.
- Install the oil drain plugs with their washers (replace washers if necessary), (13mm wrench).
- Install the crankshaft by placing a tube (part #100014) over the magneto side of the crankshaft and tap lightly with a plastic hammer.
- Install the pedal shaft and the pinion shaft with the relevant shims into their respective seats keeping the two shafts mated with the chain (Fig. #25).

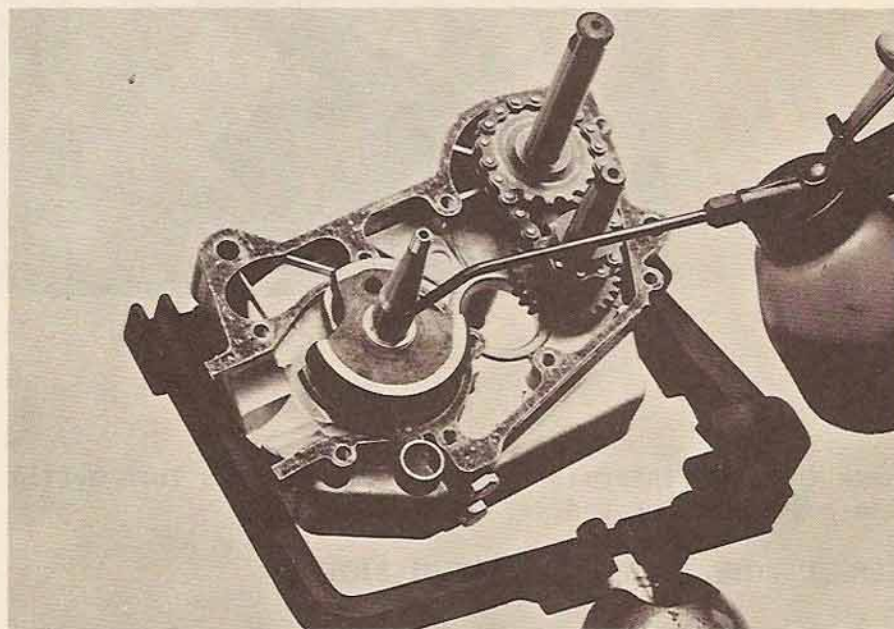


Fig. #25

**NOTE:** Make certain the pedal shaft coupling spring is properly located in the engine case.

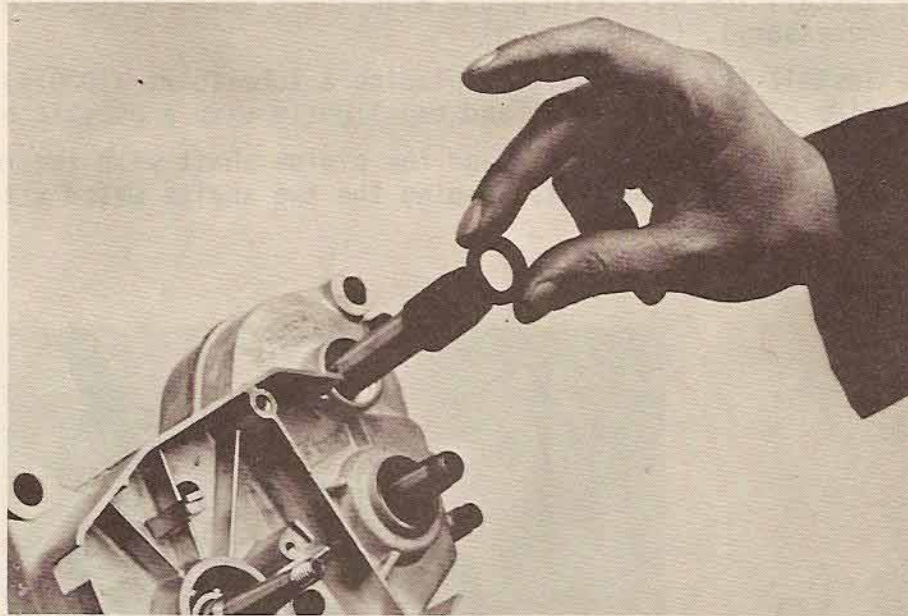
- Oil all internal parts and install a new engine case gasket.
- Join the two engine cases together by tapping lightly with a plastic hammer.
- Insert the dowel pins into their seats and install the nine allen head bolts (5mm allen wrench).

## SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE)-CONT'D.

- Torque the nine allen head bolts to 1 - 1.2Kgm. (7.5 - 8.5 Ft. lbs.).
- Install the oil seals carefully into the engine cases (Fig. #26), also refer back to page MR 28.

Fig. #26



- Check that all internal rotating engine parts turn easily once the engine case bolts are torqued.

### REASSEMBLING THE CLUTCH AND TRANSMISSION:

- Inspect the 1st speed gear set and check to see that it is working properly. Also check the free wheel between the ring gear and the main shaft for proper function.
- Insert the main shaft in through the right engine casing. Seat the shaft into the bronze bushing in the left engine casing (Fig. 27 and 28).

# SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE)-CONT'D.

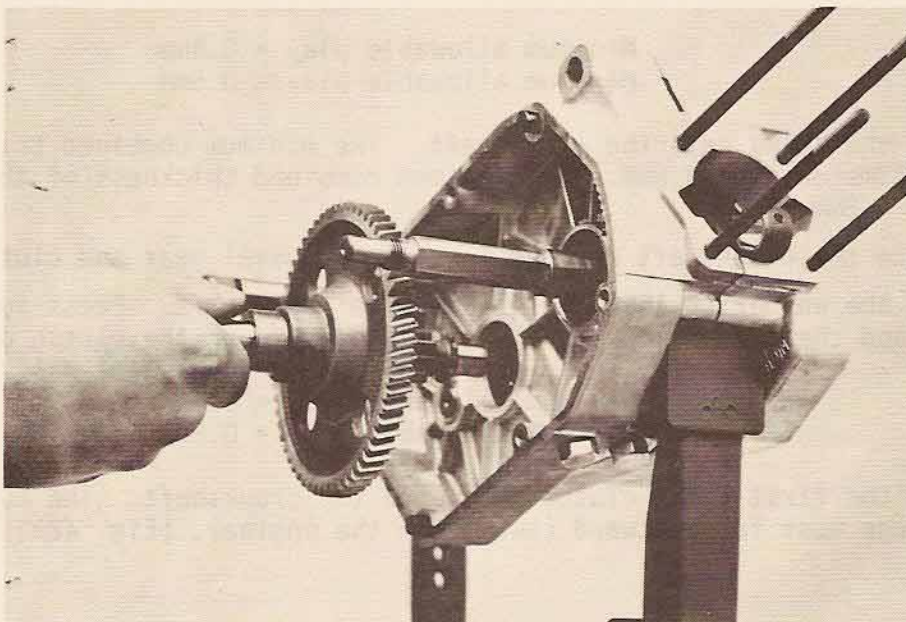


Fig. #27

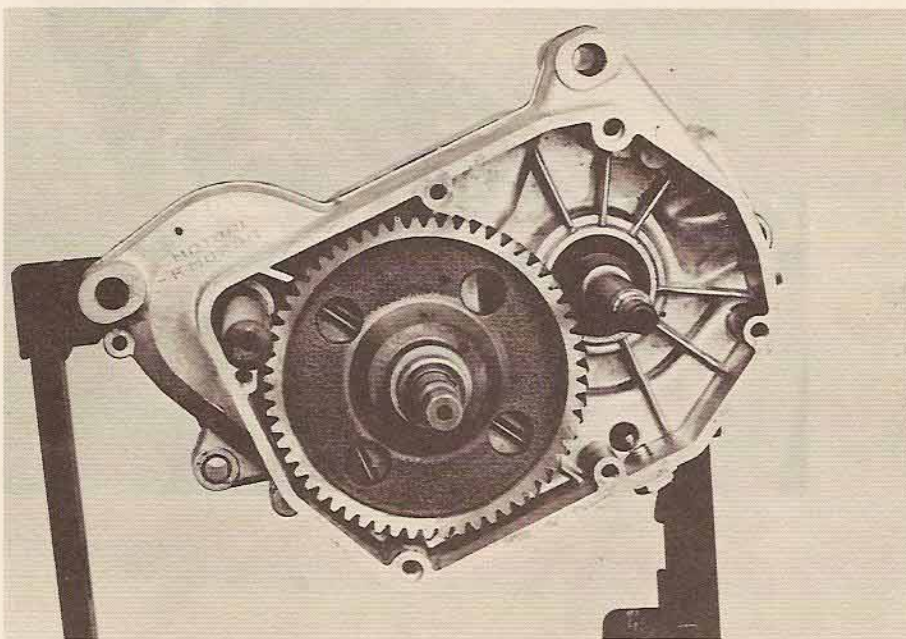


Fig. #28

## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

- Check the lateral play between the first speed gear and the main gear spacer by pushing against the main gear spacer and using a feeler guage.

Minimum allowable play = 0.4mm

Maximum allowable play = 0.5mm

- Install the shims onto the crankshaft. The minimum combined thickness of these shims must be 0.6mm. The maximum combined thickness of these shims must be 0.8mm.
- Lubricate the crankshaft end and install the bevel gear and clutch drum.
- Install the washer ( $\varnothing$  15mm x 0.4) onto the crankshaft. Press against the washer and check the amount of lateral play between the clutch drum and washer.

Minimum allowable play = 0.1mm

Maximum allowable play = 0.2mm

- Install the first speed clutch unit onto the crankshaft. The longer clutch hub flange must face outward (away from the engine), (Fig. #29).

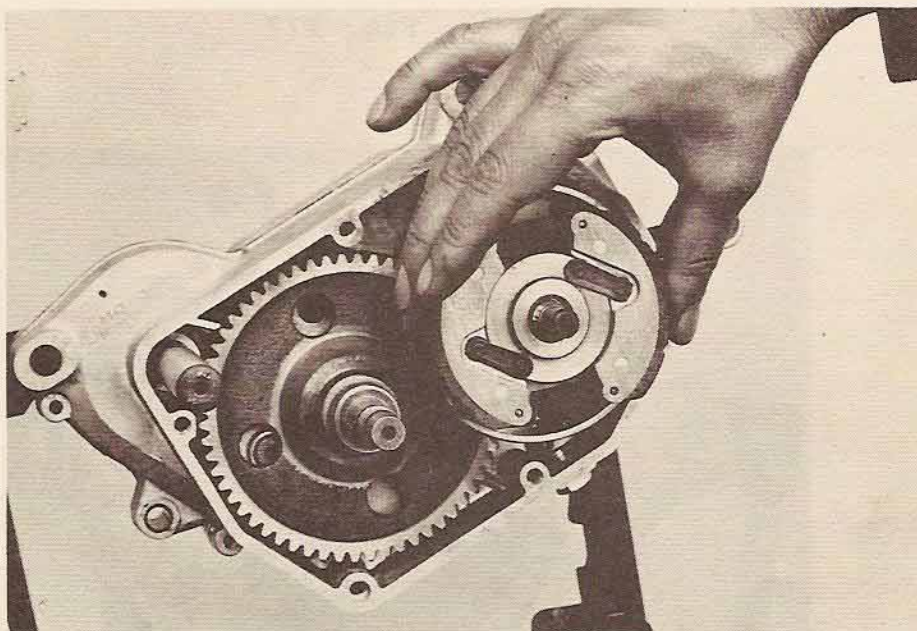


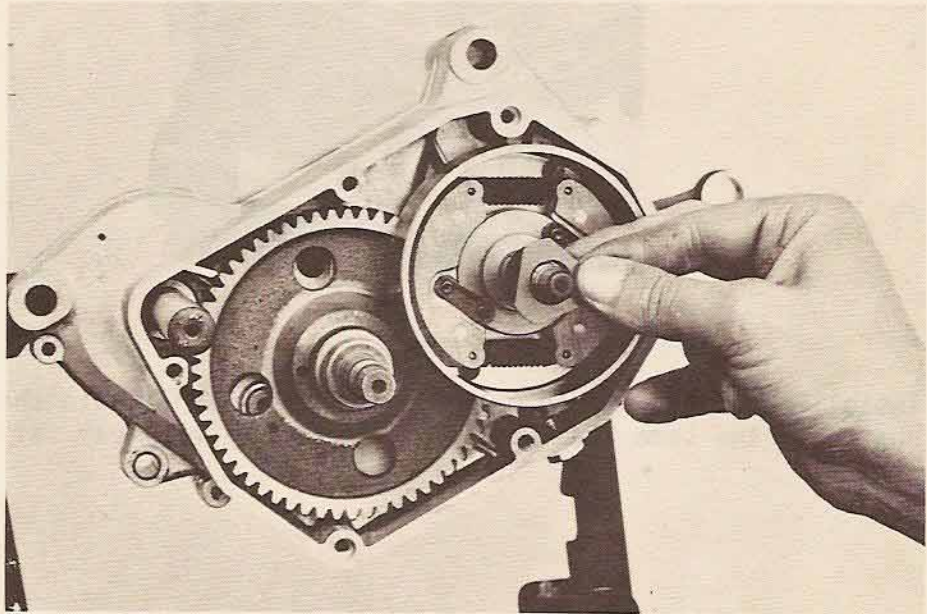
Fig. #29

## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

- Check to see that the pinion shaft and the first speed gear rotate smoothly. When the pinion shaft is rotated the first speed clutch pads should not turn with the clutch drum. If the clutch pads do turn check the clutch drum for out of round and check the shims for correct positioning.
- Insert the round washer (15mm x 0.4) and the triangular washer (Fig. #30).

Fig. #30

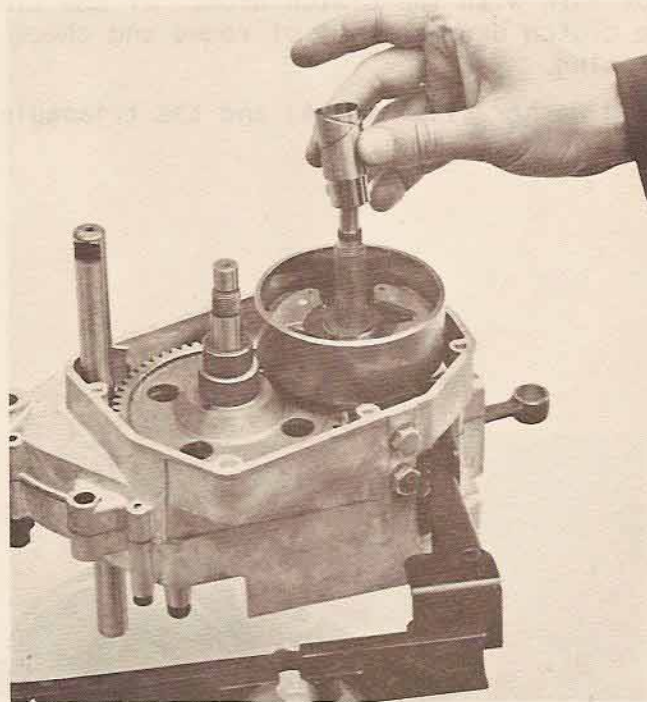


- Check the smoothness and fit of the bronze bushing, second speed clutch assembly and the steel bushing. Lubricate the bushing surfaces and mount the steel and bronze bushing onto the crankshaft (Fig. #31).

## SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE)- CONT'D.

Fig. #31



- Install the second speed gear set and clutch unit onto their respective shafts at the same time keeping the second speed gear set mated (Fig. #32).

Fig. #32

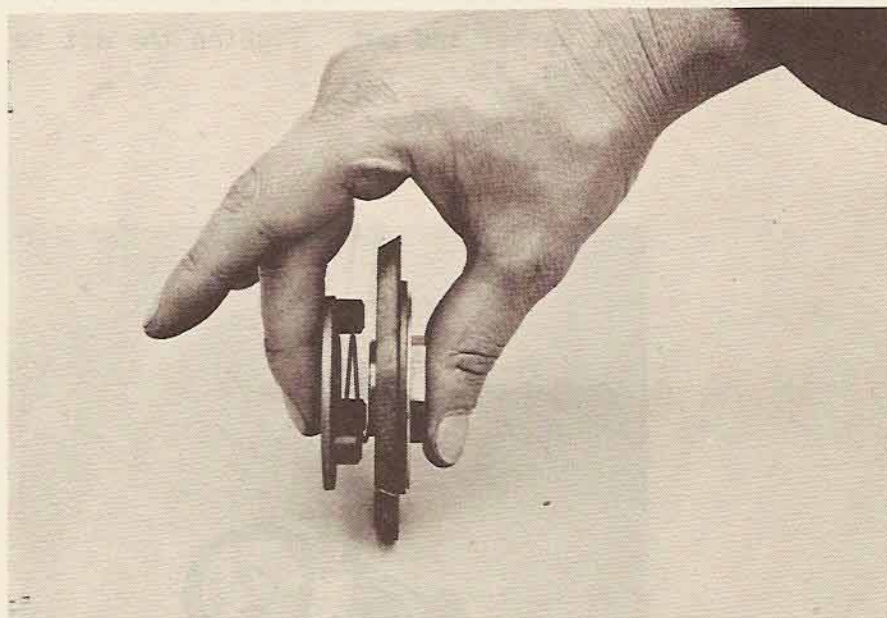


## SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE)-CONT'D.

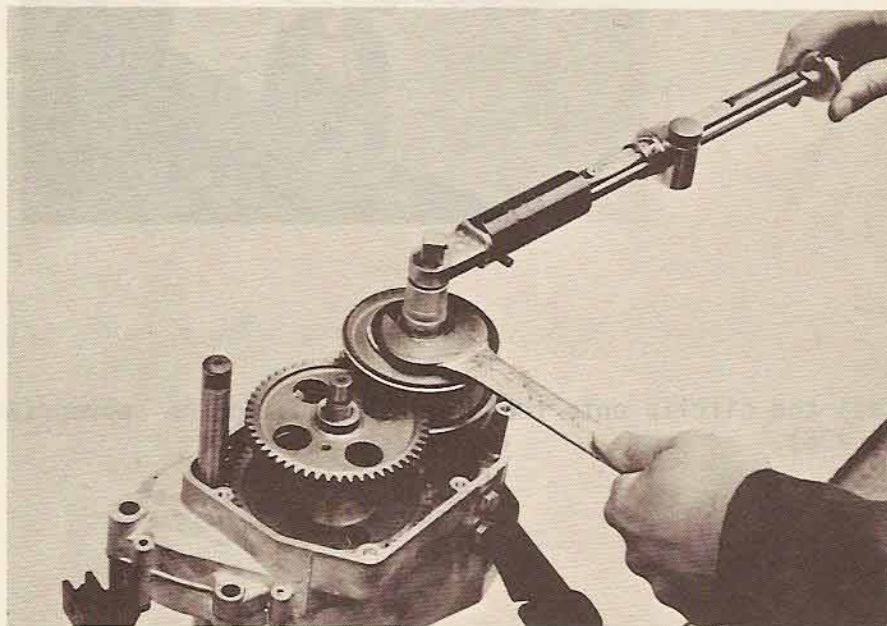
- Check the smoothness of the starting clutch mating surfaces (Fig. #33).

Fig. #33



- Insert the two washers (15mm x 0.5) onto the crankshaft and install the starting clutch disc with pins.
- Install the starting clutch spring and lining and tighten the nut to 4Kgm (29 Ft. lbs.), (Fig. #34).

Fig. #34

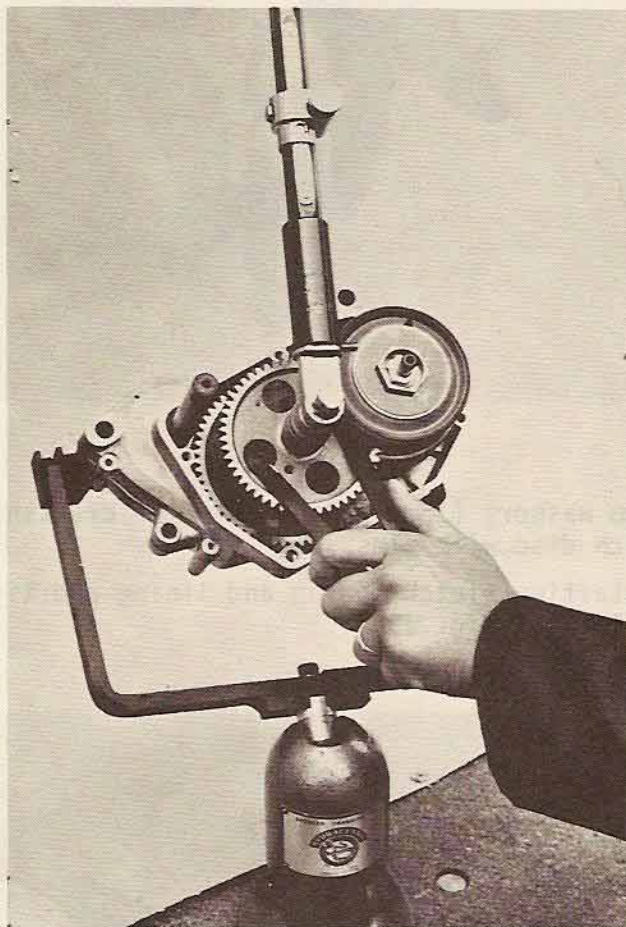


## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

- Check to see that the starting clutch lining springs back on its own when pushed in.
- Check the smoothness of the second speed clutch assembly.
- Install the main shaft washer and nut. Tighten the nut to a torque of 4Kgm. (29 Ft. lbs.), (Fig. #35).

Fig. #35

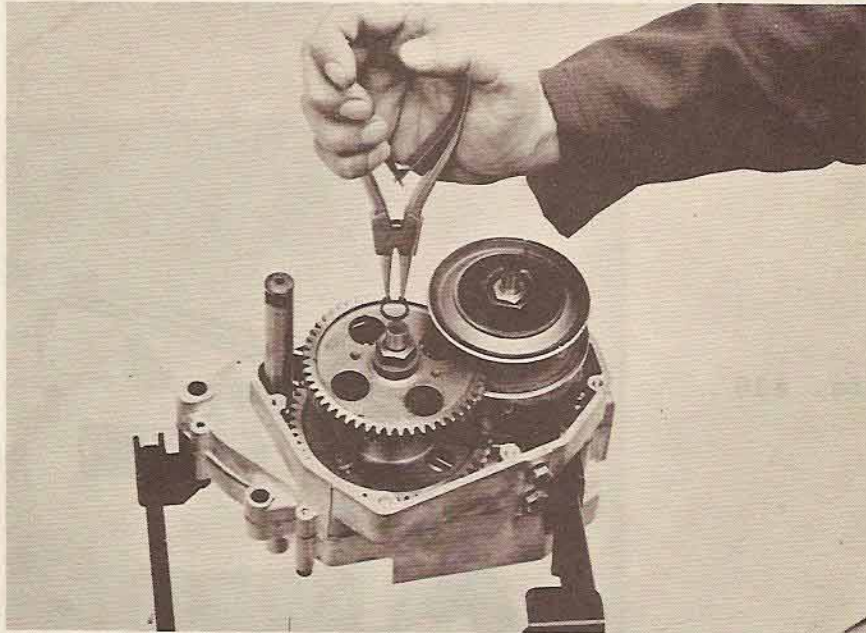


- Install the circlip onto the main shaft using the appropriate pliers (Fig. #36).

## SERVICING THE CLUTCH AND TRANSMISSION

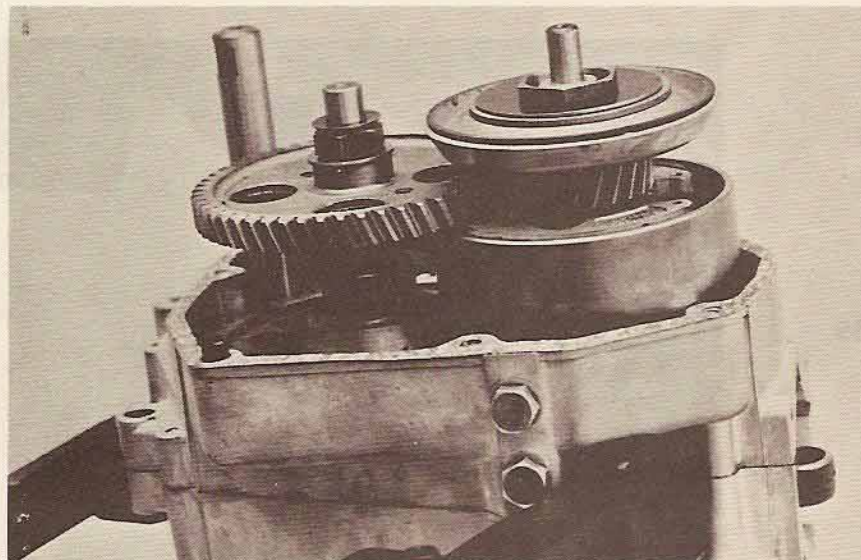
MO2 (2 SPEED ENGINE)-CONT'D.

Fig. #36



- Install the remaining washer (12 x 0.6 to 0.8mm) onto the main shaft (Fig. #37).

Fig. #37



## SERVICING THE CLUTCH AND TRANSMISSION

MO2 (2 SPEED ENGINE) -CONT'D.

- Install the clutch cover using a new clutch cover gasket. Tighten the allen head bolts to a torque of 1 to 1.2Kgm. (7.5 - 8.5 Ft. lbs.), (Fig. #38).

Fig. #38



- Install a new pedal shaft oil seal into the clutch cover (refer to page MR 28).
- Check that the pedal shaft turns smoothly and that while turning the pedal shaft the crankshaft does not rotate (Fig. #39).

Fig. #39



## SERVICING THE CLUTCH AND TRANSMISSION

### MO2 (2 SPEED ENGINE)-CONT'D.

- Install the clutch cable into the wire hook protruding out of the clutch cover.
- Install the washer and screw the cable guide into the clutch cover.

#### CHANGING/REFILLING THE TRANSMISSION OIL:

- Unscrew the two oil drain bolts at the bottom of the engine (13mm wrench).
- With the moped on its center stand allow the two crankcase compartments to drain completely.
- Reinstall the two oil drain bolts with gaskets and secure tightly.
- Refill the engine crankcase through the oil dipstick hole using 1 pint of a quality H.D. S.A.E. 20 NON-SYNTHETIC OIL.
- Check that the oil level is at the upper graduation on the dipstick.
- Reinstall the dipstick cap and start the engine.
- Allow the engine to warm up and then stop the engine.
- Recheck the oil level on the dipstick one more time. The oil level should now be at the lower graduation.

**IMPORTANT:** To obtain the best performance from your engine, the oil level must be maintained at the lower graduation on the dipstick. The engine transmission oil must be changed after the first 600 miles accumulated and then at 2,000 mile intervals.

## SERVICING THE CLUTCH AND TRANSMISSION

MO - MO1 (1 SPEED ENGINE)

### DISASSEMBLING THE CLUTCH AND TRANSMISSION:

- Drain the oil from the clutch and transmission by removing the drain plug and gasket at the bottom of the engine (13mm wrench).
- Remove the clutch cover by unscrewing the six allen head bolts (5mm allen wrench).
- Push the starting clutch disc towards the clutch assembly and remove the steel retaining ring (screwdriver), (Fig. #40).

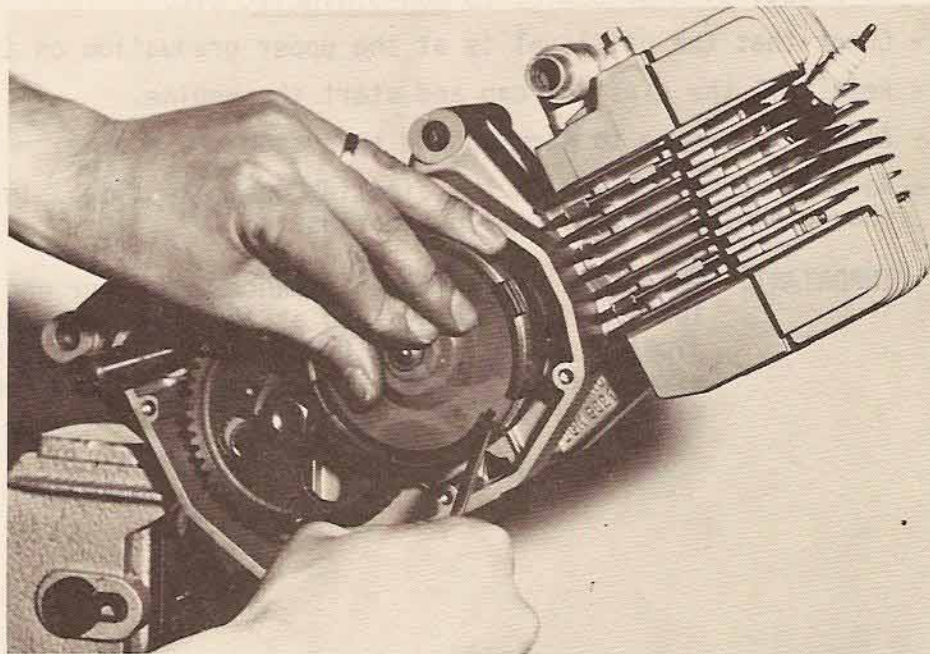


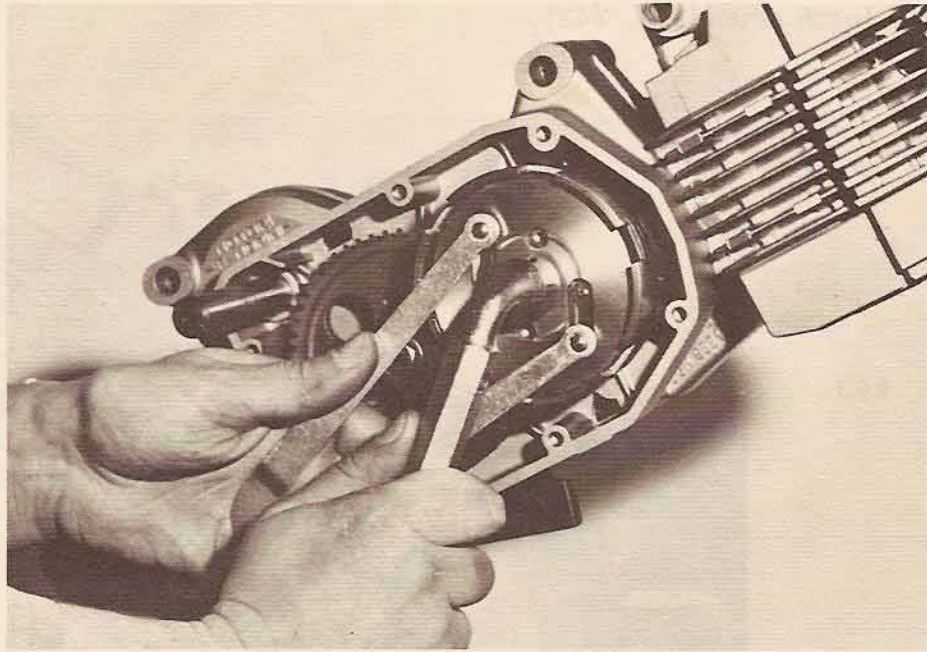
Fig. #40

- Remove the clutch starting disc and spring.
- Hold the clutch assembly using the special spanner wrench (part #Z14-0506) and unscrew the clutch retaining nut and washer (17mm wrench), (Fig. #41).

## SERVICING THE CLUTCH AND TRANSMISSION

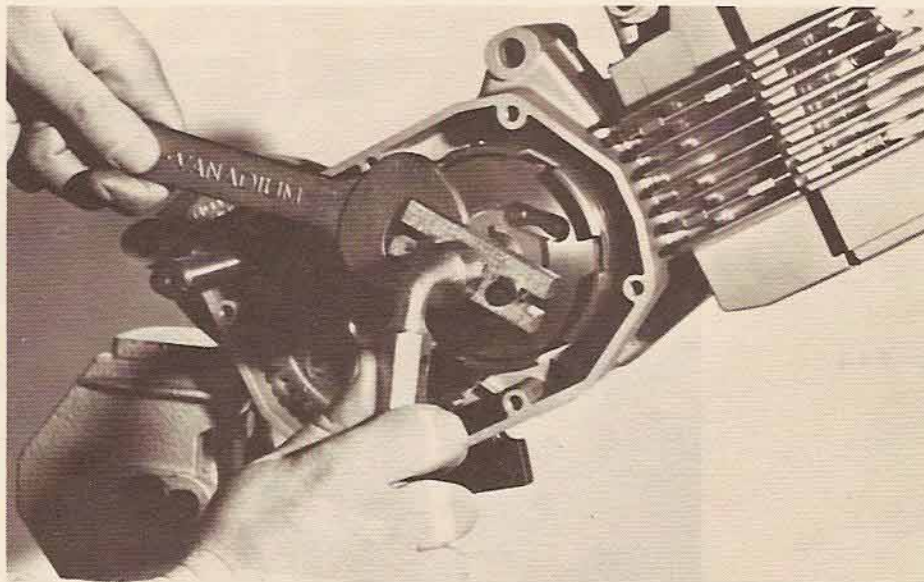
MO - MO1 (1 SPEED ENGINE)-CONT'D.

Fig. #41



- Install the special gear puller (part #Z14-0508) using two clutch cover allen head bolts and remove the clutch assembly (Fig. #42).

Fig. #42

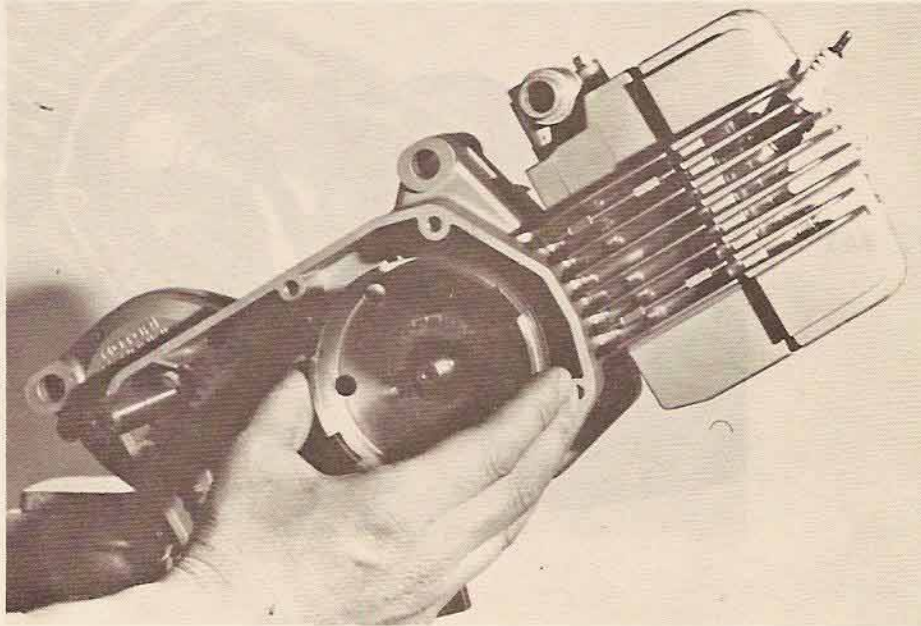


## SERVICING THE CLUTCH AND TRANSMISSION

MO - MO1 (1 SPEED ENGINE)-CONT'D.

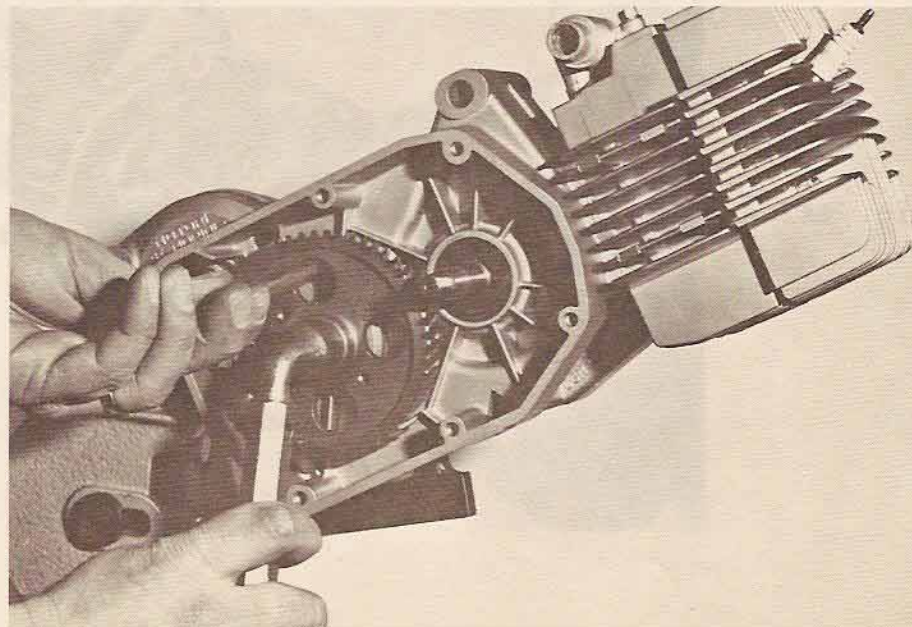
- Remove the clutch drum by hand along with the washers inside and behind the clutch drum (Fig. #43).

Fig. #43



- Hold the transmission gear by inserting a screwdriver through the gear and into the engine case or by holding the gear with the special spanner wrench (part #Z14-0506). Unscrew the transmission gear nut and remove the washer (17mm wrench), (Fig. #44).

Fig. #44

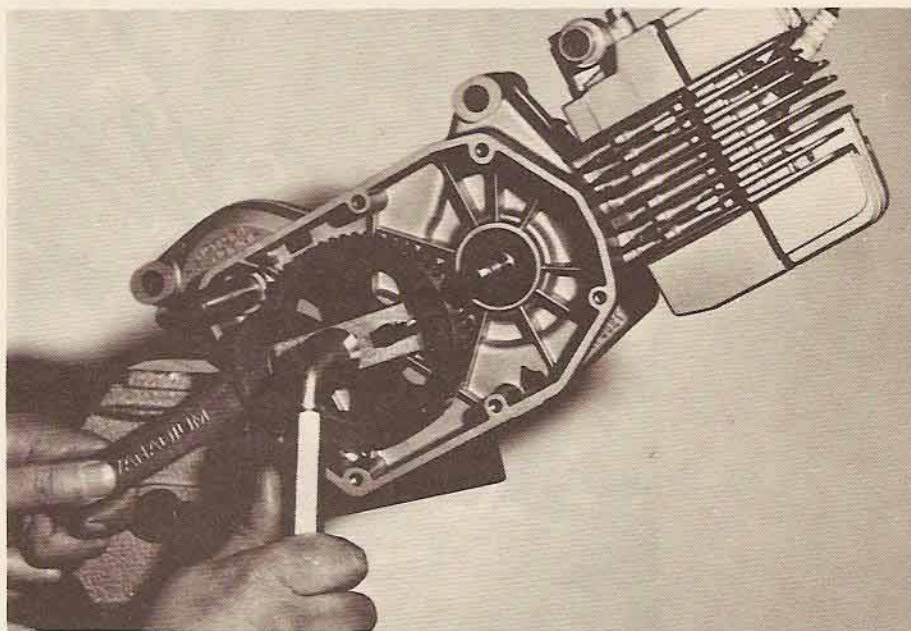


## SERVICING THE CLUTCH AND TRANSMISSION

MO - M01 (1 SPEED ENGINE)-CONT'D.

- Install the special gear puller (part #Z14-0508) using two of the clutch cover allen head bolts and remove the transmission gear (Fig. #45).

Fig. #45



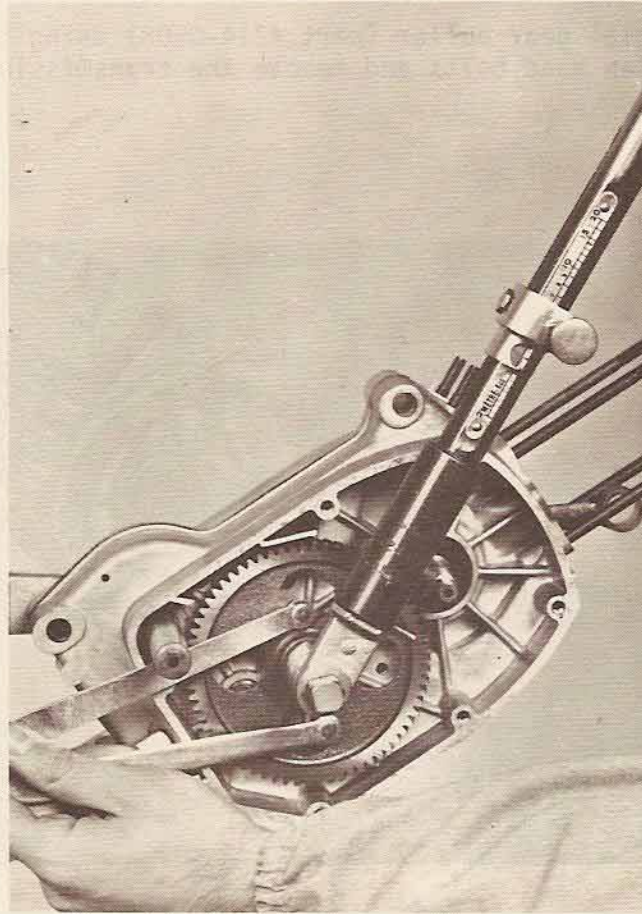
### REASSEMBLING THE CLUTCH AND TRANSMISSION:

- Reinstall the transmission gear onto the main shaft. Install the washer and tighten the nut to 3.5 - 4Kgm. (25.5 - 29.0 Ft. lbs.), (special spanner wrench #Z14-0506 and torque wrench), (Fig. #46).

# SERVICING THE CLUTCH AND TRANSMISSION

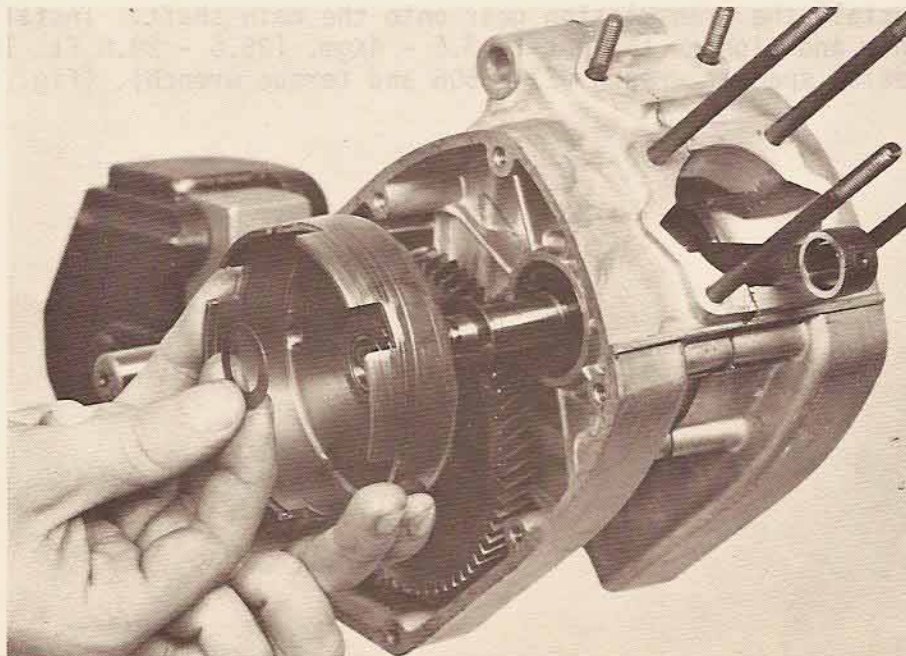
MO - MO1 (1 SPEED ENGINE)-CONT'D.

Fig. #46



- Reinstall the washer onto the crankshaft then the clutch drum and the remaining washer (Fig. #47).

Fig. #47

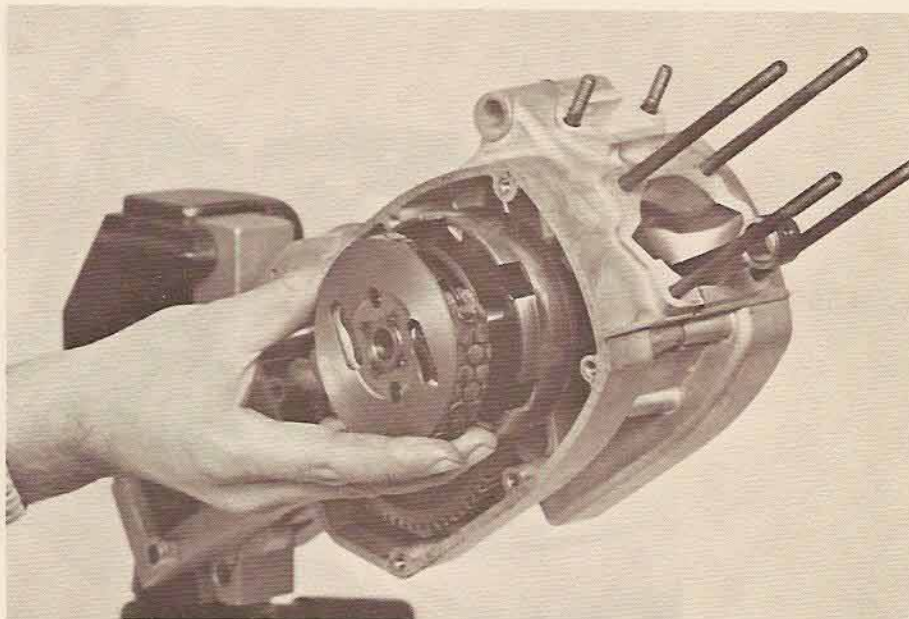


## SERVICING THE CLUTCH AND TRANSMISSION

MO - MO1 (1 SPEED ENGINE)-CONT'D.

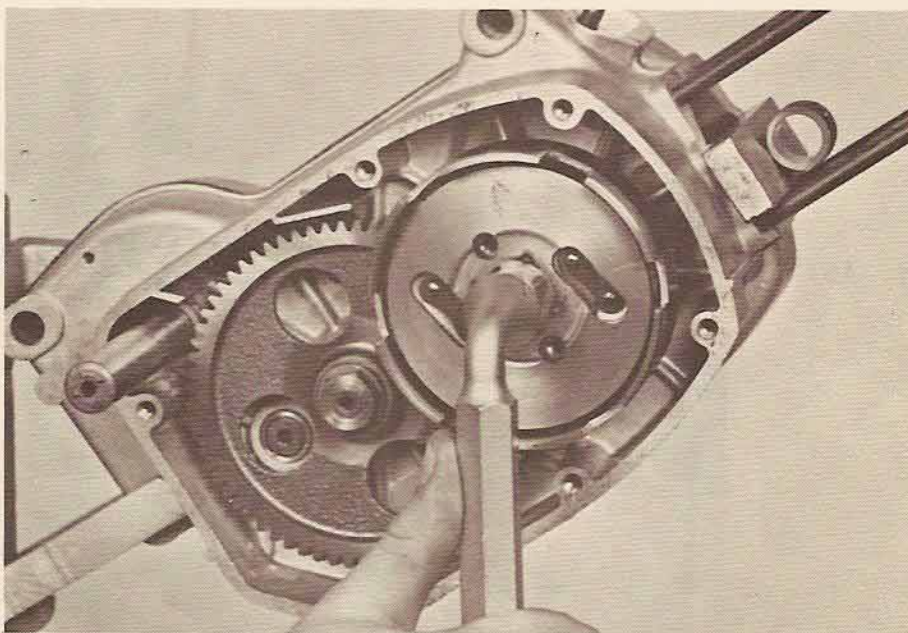
- Reinstall the clutch assembly onto the crankshaft (Fig. #48).

Fig. #48



- Reinstall the retaining washer and nut and tighten the clutch nut to a torque of 3.5Kgm. (25 Ft. lbs.), (torque wrench), (Fig. #49).

Fig. #49

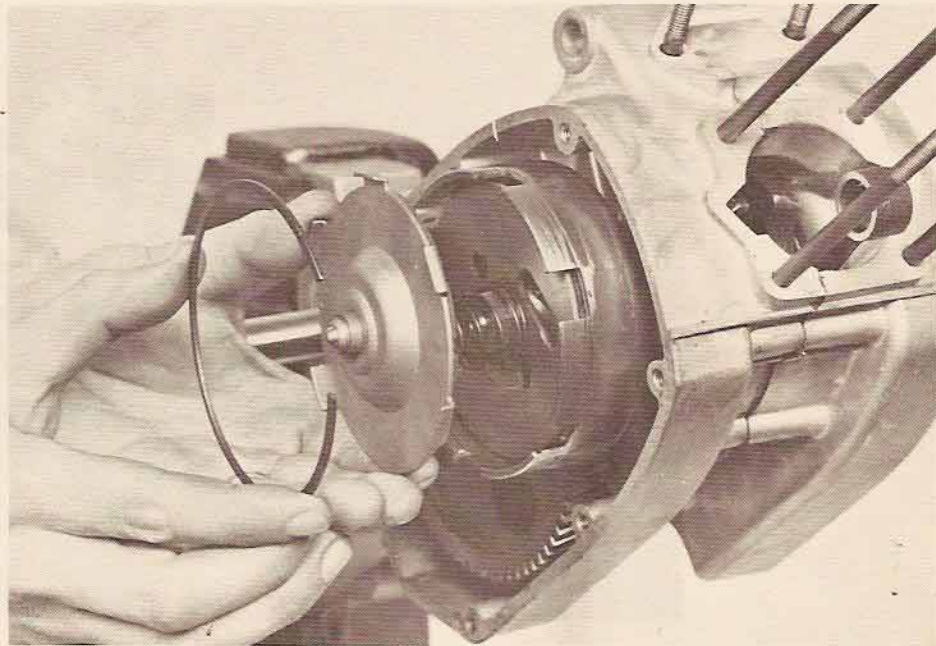


## SERVICING THE CLUTCH AND TRANSMISSION

MO - MO1 (1 SPEED ENGINE)-CONT'D.

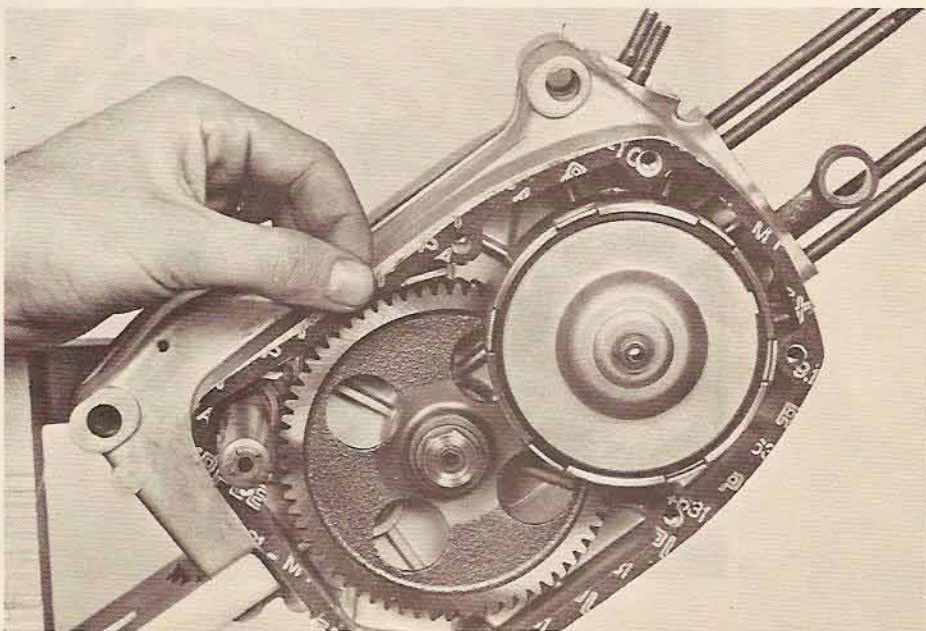
- Reinstall the clutch spring, starting disc and steel retaining ring (screwdriver), (Fig. #50).

Fig. #50



- Install a new clutch housing gasket (Fig. #51).

Fig. #51

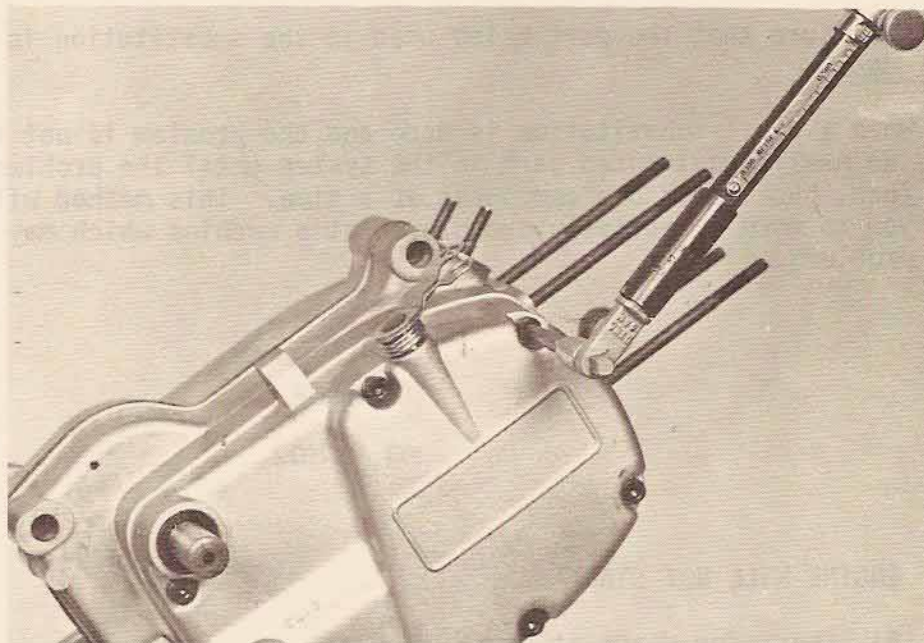


## SERVICING THE CLUTCH AND TRANSMISSION

MO - MO1 (1 SPEED ENGINE)-CONT'D.

- Reinstall the clutch and transmission housing and torque the six allen head bolts to 1.1 - 1.3Kgm. (8 - 9.5 Ft. lbs.), (Fig. #52).

Fig. #52



- Reinstall the transmission drain plug with gasket (13mm wrench).

### CHANGING/REFILLING THE TRANSMISSION OIL (MO - MO1):

- Unscrew the oil drain bolt at the bottom of the engine (13mm wrench).
- With the moped on its center stand allow the engine compartment to drain completely.
- Reinstall the oil drain bolt with its gasket and secure tightly (13mm wrench).
- Refill the engine transmission through the oil plug in the side of the clutch cover using 12.5 ounces of a quality H.D. S.A.E. 20 NON-SYNTHETIC OIL.
- Reinstall the oil cap with its gasket and secure tightly.

**IMPORTANT:** To obtain the best performance from your engine, the engine transmission oil must be changed after the first 600 miles accumulated and then at 2,000 mile intervals.

## TROUBLE SHOOTING GUIDE

MO - MO2

### HELPFUL HINTS:

When trouble shooting electrical components, the quickest and easiest method is substitution.

- A) Make sure that the part being used in the substitution is known to be good.
- B) When a parts substitution is made and the problem is not solved, leave the newly substituted part in the system until the problem is found. Then, back track one component at a time. This method will enable you to more effectively trouble shoot a machine which may have multiple problems.

## ENGINE

MO - MO2

### I. ENGINE WILL NOT START

- A) Check for spark at spark plug.
- B) Check for flow restrictions in the fuel system.
- C) Check engine compression with the spark plug installed.
- D) Check to see if the engine stop switch is in the "run" position.

### II. NO SPARK

- A) Faulty spark plug.
- B) Faulty radio suppressor (spark plug cover).
- C) Faulty high tension coil.
- D) Faulty ignition points and condenser.
- E) Ignition points not opening.
- F) Grounding wire inside the magneto.
- G) Magneto wiring harness burnt or broken behind the engine.
- H) Poor magnetism present in rotor.
- I) Faulty exciter coil inside magneto.

### III. GOOD IGNITION SPARK, BUT THE ENGINE WILL NOT START

- A) Restriction of fuel flow (Ex. fuel tap, fuel tank, fuel line, carburetor).
- B) Faulty head gasket.
- C) Ignition timing incorrectly set.
- D) Faulty inlet pipe gasket.
- E) Exhaust port and exhaust pipe clogged.

## TROUBLE SHOOTING GUIDE

MO - MO2 (ENGINE)-CONT'D.

### IV. ENGINE RUNS, BUT HAS A HIGH SPEED MISS

- A) Faulty or worn spark plug.
- B) Improper ignition timing.
- C) Faulty radio suppressor.
- D) Faulty high tension coil.
- E) Faulty or worn ignition points and condenser.
- F) Faulty head gasket.
- G) Air leak between inlet pipe and cylinder.
- H) Exhaust system clogged.

### V. ENGINE RUNS, BUT HAS LOW SPEED MISS

- A) Improper spark plug.
- B) Improper ignition timing.
- C) Faulty or worn out ignition points and condenser.
- D) Faulty radio suppressor (spark plug cover).
- E) Magneto rotor rubbing on internal coils.

### VI. ENGINE POPS AND BACKFIRES WHEN TRYING TO START

- A) Ignition timing improperly set.
- B) Faulty cylinder head gasket.
- C) Faulty ignition points or condenser.

### VII. DIFFICULT TO START WHEN COLD

- A) Carburetor choke valve not functioning sufficiently.
- B) Improper ignition timing.

### VIII. DIFFICULT TO START WHEN WARM

- A) Improper ignition timing.
- B) Worn out spark plug.
- C) Exhaust system clogged.
- D) Faulty ignition points and condenser.

### IX. EXCESSIVE FUEL CONSUMPTION

- A) Engine is not broken in (600 miles).
- B) Carburetor choke valve stuck in closed position.
- C) Carburetor flooding (sticky float).
- D) Leakage in fuel line.

## TROUBLE SHOOTING GUIDE

MO - MO2 (ENGINE)-CONT'D.

### X. ENGINE HAS NO POWER

- A) Improper ignition timing.
- B) Clogged exhaust port or pipe.
- C) Fuel restriction.
- D) Worn out piston rings or engine seals.
- E) Engine partially seized.
- F) Moped chain adjusted too tight.
- G) Brakes adjusted too tight.

### XI. THE ENGINE WILL RUN ONLY IF THE CHOKE IS USED

- A) Clogged fuel jet in carburetor.
- B) Clogged fuel line.
- C) Clogged fuel filter in carburetor or gas tank.
- D) Clogged filler cap vent hole.
- E) Loose or cracked inlet pipe and gasket.
- F) Loose carburetor.

### XII. ENGINE WILL RUN BUT WON'T IDLE

- A) Idle circuit in carburetor clogged.
- B) Idle screw not adjusted correctly.
- C) Air leak at carburetor or inlet pipe mounts.

### XIII. ENGINE SEIZED OR STARTS KNOCKING

- A) Insufficient oil in fuel mixture.
- B) Connecting rod looseness on crankshaft.
- C) Loose magnet in flywheel.
- D) Piston seized to cylinder.

## POOR ENGINE PERFORMANCE

MO - MO2

Very often poor engine performance may not be related to the engine itself, but to one or several frequently unsuspected secondary causes.

In such a case, we suggest the following:

1. Check that the throttle slide opens fully. Quite often the control is badly adjusted and the engine is starved even at full throttle position.

## TROUBLE SHOOTING GUIDE

### MO - MO2 (POOR ENGINE PERFORMANCE)-CONT'D.

2. Check that there is no braking action due to chain being too tight. Tension adjustment must be performed in the running position, the machine loaded with a rider weighing about 165 lbs.
3. Make sure the brakes are not adjusted too tightly.
4. Check that the fuel cap vent hole is not clogged as this may bring about poor fuel supply.
5. Check that the spark plug is in accordance with the manufacturer's specifications.
6. Check that the exhaust is neither partially blocked nor blocked. If this is the case, clean out the complete exhaust system.
7. Very important note: Quite often poor engine performance may be caused by overtightening the cylinder head nuts and thereby distorting the cylinder.

## LIGHTING CIRCUIT

### MO - MO2

#### I. NO LIGHTS AT ALL

- A) Faulty headlamp switch.
- B) Faulty lighting coil or coil ground.
- C) Magneto harness burnt or grounding behind engine.
- D) Wiring harness connector disconnected.
- E) Improper wire connections.
- F) Blown bulbs.

#### II. NO BRAKE LIGHTS

- A) Faulty brake light switch.
- B) Faulty ground at rear fender.
- C) Blown bulb.

#### III. DIM LIGHTS AND NO HORN WHEN HEADLAMP SWITCH IS ON

- A) Faulty lighting coil.
- B) Incorrect bulbs.

## TROUBLE SHOOTING GUIDE

MO - MO2 (LIGHTING CIRCUIT)-CONT'D.

### IV. EXCESSIVE LIGHT CAUSING LAMP BURNOUT

- A) Incorrect bulbs.

### V. NO HORN

- A) Faulty horn unit.
- B) Faulty horn switch.
- C) Faulty horn wires or connections.