SNO-JET

MODEL 810-811

ENGINE MANUAL

SERVICE
PARTS

Introduction

This service manual deals with the following two engines, Model Nos. 810 (338 cc) and 811 (396 cc).

The manufacturer is continually striving to further perfect the above models.

Therefore, improvements and modifications are inevitable. Information of any changes will be forwarded to your distributor as soon as they are available.

If for any reason, there is question regarding parts or service of the above units, contact your nearest distributor.

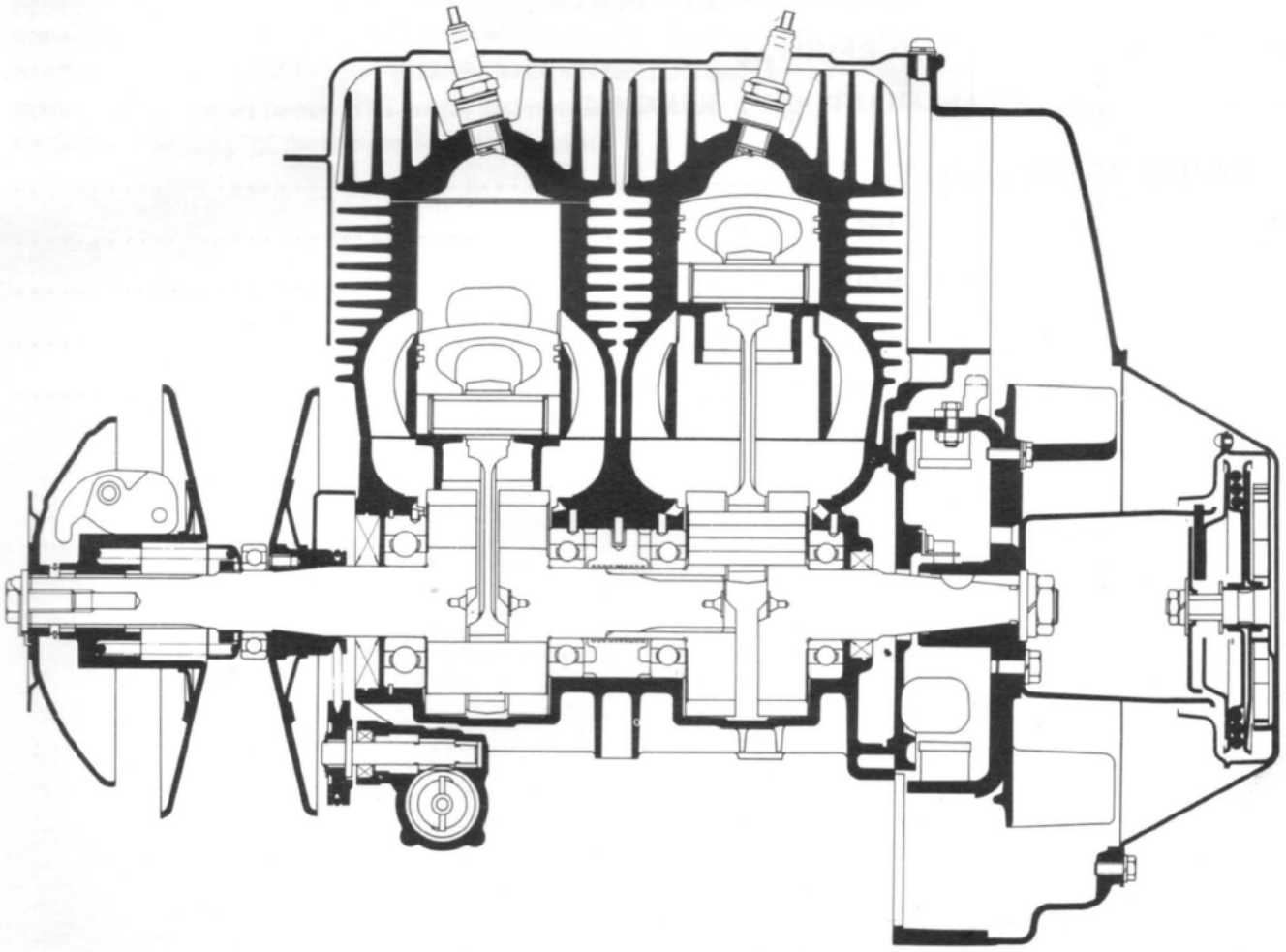

Fig. 1

YAMAHA SNOWMOBILE TABLE OF CONTENTS

CHAPTER 1 GENERAL

A. FOREWORD

Models 810 and 811 are two-cycle engines which have been developed by Yamaha to obtain maximum horsepower at moderate, average RPMs. The engines utilize fiveport induction principles and other, new, engineering techniques horsepower.

The five-port cylinder induction system is similar to the Schnuerle loop scavenging system which, up to now, was the most commonly used induction system for two-stroke engines. In the Schnuerle system two streams of fresh fuel meet at the cylinder wall opposite the exhaust ports where they are deflected upward. The streams swirl up into the combustion chamber and across the crown of the piston forcing the burnt gases from the previous cycle through the open exhaust port.

The five-port system differs from the Schnuerle loop system due to the addition of two auxiliary transfer passages that run from the bottom of the cylinder up to the same height as the main transfer ports. As the piston approaches bottom dead center these two additional transfer passages are opened and fuel is pushed up from the crankcase to the combustion chamber through two holes in the piston.

In the conventional Schnuerle system of porting, a portion of the burnt gases cannot be completely cleared out of the cylinder, remaining in the center of the combustion chamber. The design of the five-port cylinder induction system has successfully eliminated such a disadvantage; the additional ports are designed to direct their fresh charge at the area containing the remaining burnt gases, completely forcing the exhaust gases out of the cylinder.

Another advantage of the five-port induction system is the additional piston cooling provided by the fresh streams of fuel passing over the piston crown. This greatly increases engine power in addition to the increase in power created through the better "breathing" of the five-port induction system.

B. SPECIFICATIONS

Model	810	811
Displacement	338 cc (20.6 cu.in.)	396 cc (24.2 cu.in.)
Bore	60.0 mm (2.34 in.)	65.0 mm (2.56 in.)
Stroke	59.6 mm (2.34 in.)	same as left
No. of cylinders	2	2
Compression ratio	7.0 : 1	6.4 : 1
Ignition	Magneto Ignition	same as left
Fuel oil ratio	20 : 1	20 : 1
Spark plug	B-7HZ	B-7HZ
Ignition timing (B.T.D.C.)	R . . 1.7 ± 0.1 mm (0.063 to 0.067 in.) B.T.D.C. L . . 1.9 ± 0.1 mm (0.071 to 0.079 in.) B.T.D.C.	
Point gap	0.3 – 0.4 mm	same as left
Maximum BHP	24 HP/5,500 r.p.m.	27 HP/5,500 r.p.m.
Maximum torque	2.95 kg-m/5,500 r.p.m. (21.3 ft.lbs.)	3.3 kg-m/5,500 r.p.m. (23.9 ft.lbs.)
Idling R.P.M.	1,500 r.p.m.	same as left
Carburetor	KEIHIN Diaphragm (1)	MIKUNI Diaphragm (1)

C. INSPECTION AND MAINTENANCE

	HOURLY PERIOD 20	40
INSPECTION:		
1. Brake Adjustment	×	
2. Cracks or Breakage	×	
3. Power Train Adjustments	×	
4. Controls	×	
MAINTENANCE:		
1. Set Ignition Timing		×
2. Tighten all fitting		×
3. Clean or replace sparkplug		×
4. Decarbonize (Remove heads, barrels, and pistons-clean out carbon)		×
LUBRICATION:		
1. Primary Sliding Sheave		×
2. Primary Sheave Complete		×

NOTE: Hourly Period indicates number of hours engine has been operated between checks. The above is reference guide only and if usage indicates, the intervals should be shortened but never lengthened.

D. LUBRICATION

ITEM	PERIOD			
	When Nec.	40 hours	80 hours	Seasonally
*Autolube	1			1
*Autolube Pump Control Box				2
Primary Sheave Shaft			3	
Primary Sheave Weight Pivot points			4	

1. (1) Use Yamahalube, or (2) a good 20 or 30 weight two-cycle oil for air-cooled engines, or (3) a quality, detergent automotive 10W–30 oil (in that order of preference). PLEASE SEE NOTE BELOW.
2. The factory recommends Aeroshell Grease #7 which is a synthetic aircraft lubricant having a useful temperature range to –100°F.
3. The factory recommends a molybdenum-disulfide grease. Shell Lithall MDS Grease and Aeroshell grease #17 conform roughly to these specifications.
4. 10W–30 detergent automotive motor oil.

***NOTE:**

THE AUTOLUBE SYSTEM IS AN OPTIONAL FEATURE. IF IT IS NOT EMPLOYED ON THE ENGINE, PREMIX FUEL AND OIL AT A RATIO OF 20 : 1. Recommendation # 1 still applies.

E. TOOLS

E–1. SPECIAL TOOLS

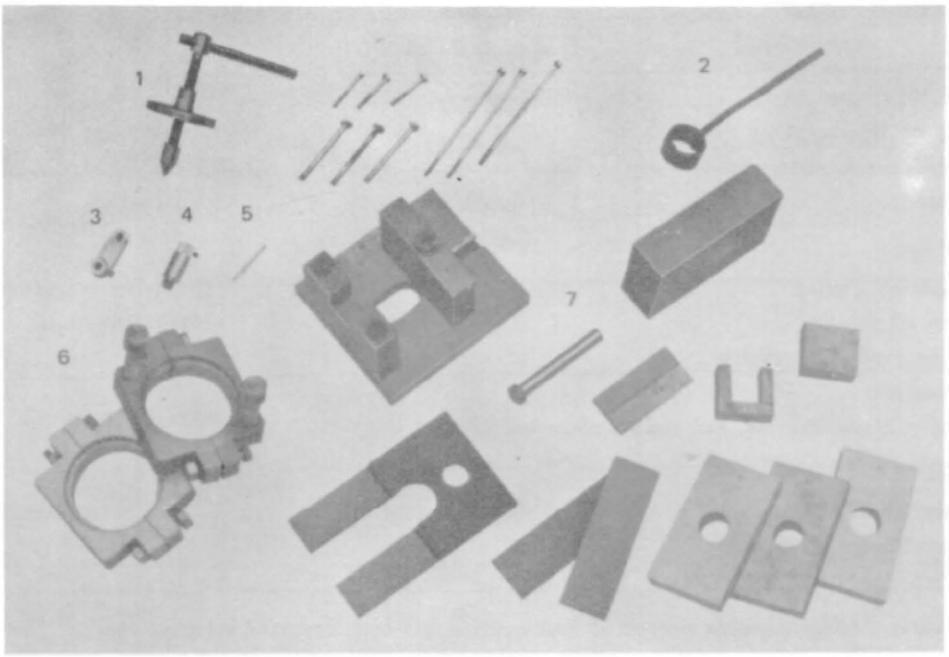

Fig. 2

1. Flywheel puller
2. Ring nut remover
3. Dial gauge stand No. 1
4. Dial gauge stand No. 2
5. Dial gauge adapter
6. Crank shaft ass'y seperator jig
7. Crank shaft ass'y disassembly and reassembly jigs

E–2. GAUGES

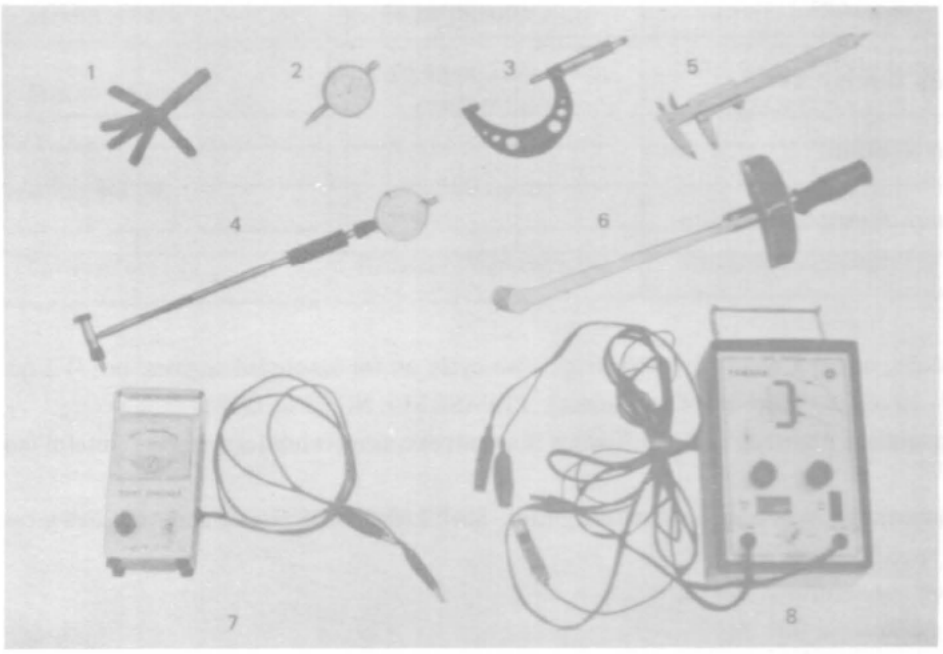

Fig. 3

1. Thickness gauge
2. Dial gauge
3. Micrometer
4. Cylinder gauge
5. Vernier caliper
6. Torque wrench
7. Point checker
8. Coil tester

E–3. GENERAL TOOLS

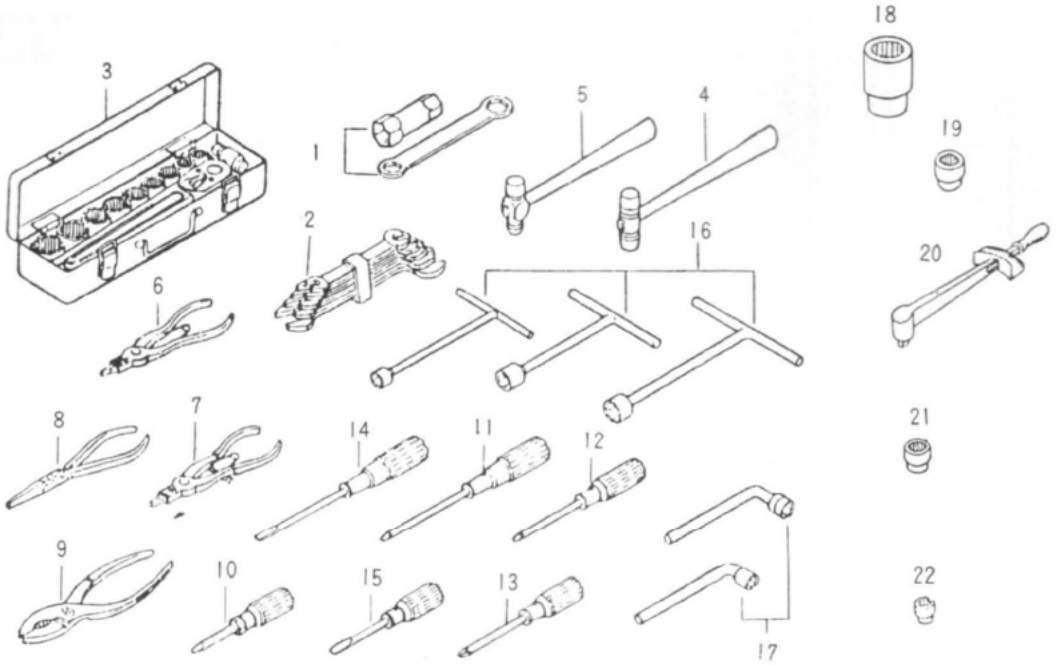

Fig. 4

1. Plug wrench
2. Open-end wrenches
3. Socket wrenches
4. Soft-faced hammer
5. Steel hammer
6. Circlip pliers (ST type)
7. Circlip pliers (RT type)
8. Needle nose pliers
9. Standard pliers
10. Phillips-head screw driver
11. Phillips-head screw driver (large)
12. Phillips-head screw driver (medium)
13. Phillips head screw driver (small)
14. Slot-head screw driver (medium)
15. Slot-head screw driver (small)
16. T-type socket wrench
17. L-type socket wrench
18. Socket wrench (29 mm)
19. 17 mm socket (for torque wrench)
20. Torque wrench
21. 13 mm socket (for torque wrench)
    14 mm socket (for torque wrench)
22. 10 mm socket (for torque wrench)

F. ENGINE OPERATING PROCEDURES

WARM UP AND BREAK-IN PROCEDURES

Each time the engine is started, it should be allowed to reach normal operating temperature before use, when the unit is new, excessively high RPM's or very low RPM's under every load should be avoided.

After a total of ten hours periodic operation, break-in is usually complate and the unit will run cooler and more efficiently.

At the end of the ten hour break-in period, check all nuts, bolts, and screws for tightness. Loose hardware can cause excessive vibration or improper maintenance settings and can lead to damage to the engine.

PRE-OPERATIONAL CHECKS

Before operating the engine, make it a habit to check the following:

a. Fuel-Use fresh fuel to top off the tank.

b. Oil-Use fresh fuel in the gas tank. Mix one part oil to twenty parts gasoline. Always agitate the mixture in the gas tank prior to starting the engine as the oil will tend to separate. In addition, oil left in gasoline for any length of time will de-nature–for that reason it is necessary to mix a fresh batch of fuel if the engine has not been run for some time. The old mixture should be drained out of the gas tank prior to refilling with the new.

c. Controls–Make sure all controls are functioning properly.

G. ENGINE REMOVAL

NOTE: For engine removal only, it is not necessary to remove the magneto assembly or primary sheave assembly. However, crankshaft maintenance does require their removal. Maintenance of the magneto assembly and primary sheaves can be done with the engine in the frame.

G – 1

Disconnect the fuel line and spark plug high tension leads.

G – 2

Disconnect the carburetor throttle linkage.

G – 3

Remove the exhaust pipes from the cylinders.

G – 4

Remove the drive belt. This can be accomplished by gripping the drive belt in the middle and pulling up. This will provide sufficient slack in the belt to allow it to be slipped off.

G – 5

Remove the engine mounting bolts.

G – 6

The engine can now be removed from the frame.

A. STARTER AND MAGNETO ASSEMBLY

A – 1

Remove the four bolts that hold the manual starter assembly to the engine. The manual starter assembly will now slide off.

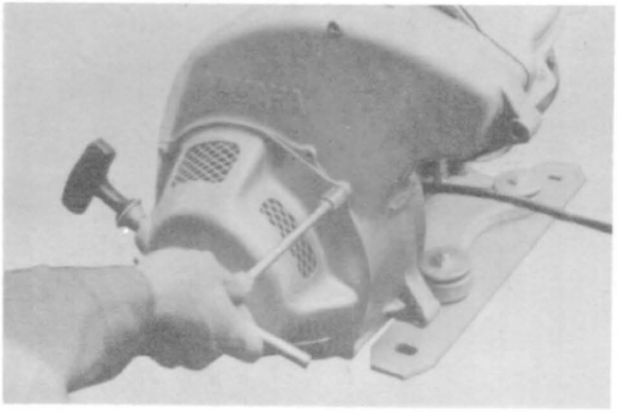

Fig. 5

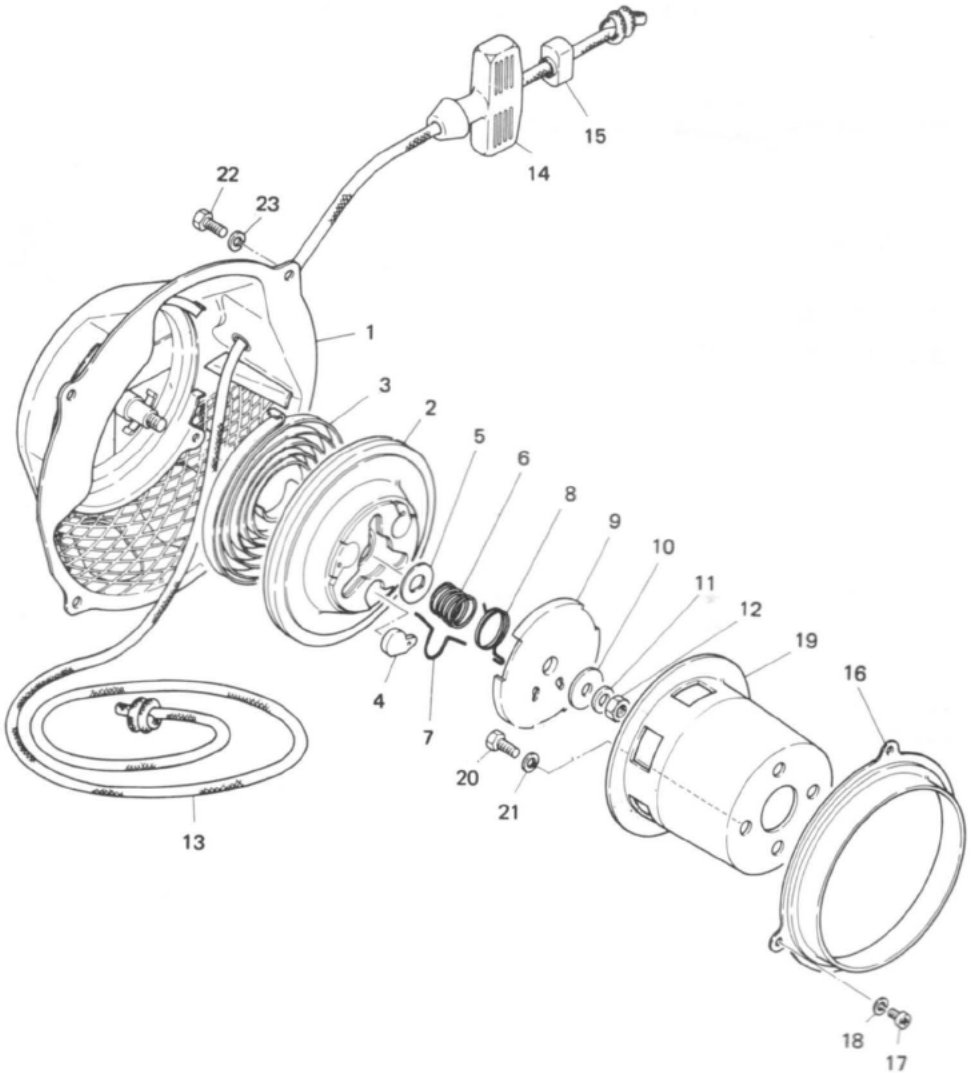

Fig. 6

STARTER

Ref. No.	Description	Parts No. (810,811)	Q ty
	STARTER ASS'Y	811-15710-00	1
1	CASE, starter	811-15711-00	1
2	DRUM, sheave	811-15714-00	1
3	SPRING, starter	811-15713-00	1
4	PAWL, drive	811-15741-00	3
5	WASHER, thrust	811-15719-00	1
6	SPRING, drive plate	807-15715-00	1
7	SPRING, return	811-15734-00	3
8	SPRING, return	807-15734-00	1
9	PLATE, drive	811-15716-00	1
10	WASHER, flat	807-15726-01	1
11	WASHER, spring	92901-08100	1
12	NUT	98801-08300	1
13	ROPE	807-15751-00	1
14	HANDLE, starter	807-15755-00	1
15	CONNECTOR	619-15756-00	1
16	COVER, sheave	811-15782-00	1
17	SCREW, pan head	98501-05008	3
18	WASHER, spring	92901-05100	3
19	PULLEY, starter	811-15723-00	1
20	BOLT	97201-08015	3
21	WASHER, spring	92901-08100	3
22	BOLT	91201-06015	4
23	WASHER, spring	92901-60100	4

A – 2

This illustration shows the inside of the starter assembly before it is disassembled. Removal of the nut and washers located in the middle marks it possible to dismantle the rest of the starter assembly parts.

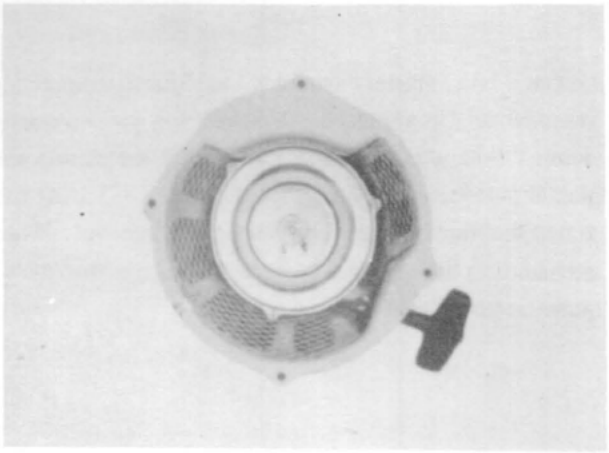

Fig. 7

A – 3

Figure 8 shows the nut and washers and drive plate removed for inspection. It should not be necessary to completely dismantle the starter assembly. This step would only be followed if replacement of the starter rope or main return spring was required.

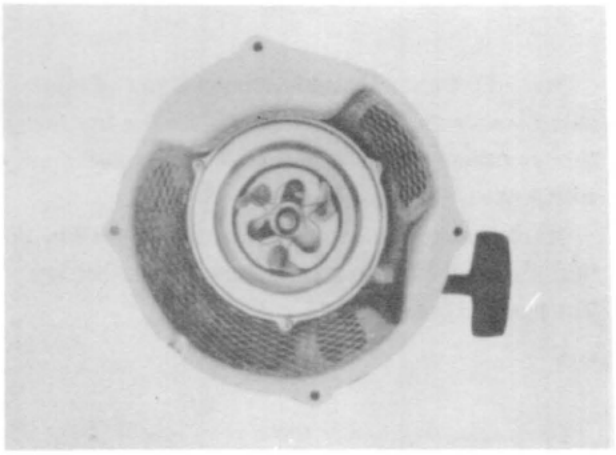

Fig. 8

A – 4

It is important when reassembling the main return spring, that the spring be installed in the correct position and coiled in the proper direction. Notice in the picture that the spring is hooked to the center shaft and wound outward in a clockwise direction. The spring must be wound in the correct direction or the entire starter assembly will not function. It would then be necessary to completely disassemble the starter assembly to correct the mistake, preroad the return spring 1/3 turn for positive return on the starter rope.

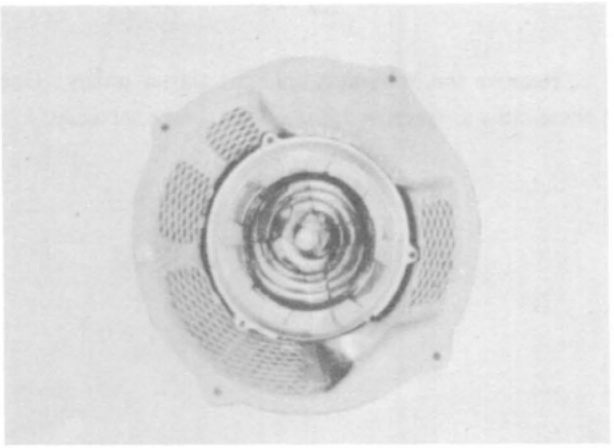

Fig. 9

A – 5

Once the starter assembly has been completely reassembled, it should be checked for proper starter action. Follow the example as shown in the picture and pull the starter rope out approximately 3″ ~ 5″. At this time, the three starter pawls should come out. When attached to the engine this would engage the starter pulley, causing the engine to turn.

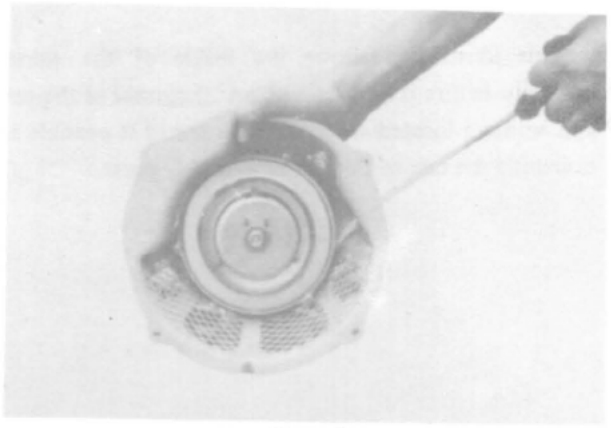

Fig. 10

A – 6

With the starter assembly removed you will now be able to remove the magneto assembly. The first step in this procedure is remove the flywheel securing nut a socket wrench (26 mm).

(In this case, to loosen or tighten the flywheel, the "bar" should be inserted into the hole in the pulley. The flywheel can be locked.)

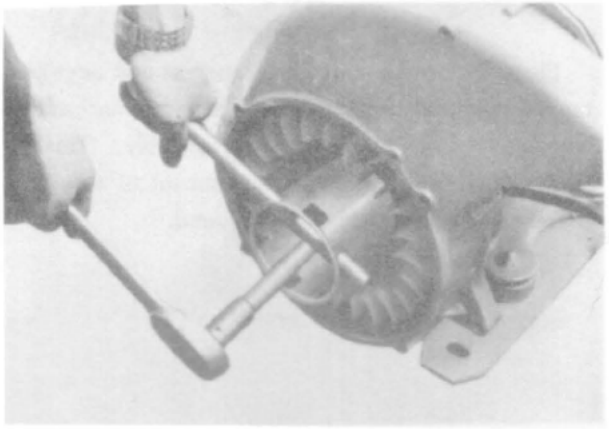

Fig. 11

A – 7

Remove the bolts that hold the starter pulley. Once these bolts are removed, the pulley can be set aside.

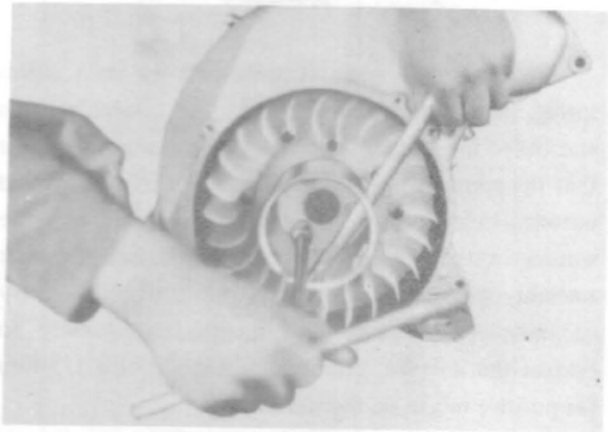

Fig. 12

A – 8

The magneto flywheel can now be removed. This requires the use of special puller that you will find in our special tool kit. Be sure to use the three short screws that come with the puller when removing the flywheel.

(Note: Immediately after the flywheel is removed, take the woodruff key off the shaft and in same satisfactory way attach it to the flywheel so that it is not lost.)

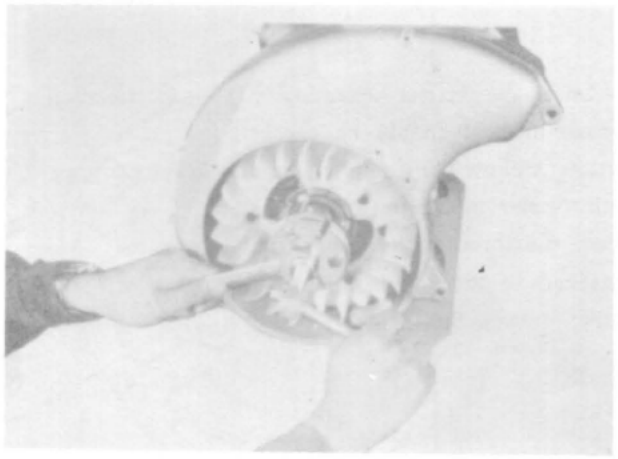

Fig. 13

A – 9

All parts of the magneto assembly, except for the magneto backing plate, have been removed. The only time that the magneto backing plate need be removed is in the case of complete engine teardown. The backing plate has to be removed in order to split the cases and this is accomplished by removing the four hold-down screws, with an impact screw driver.

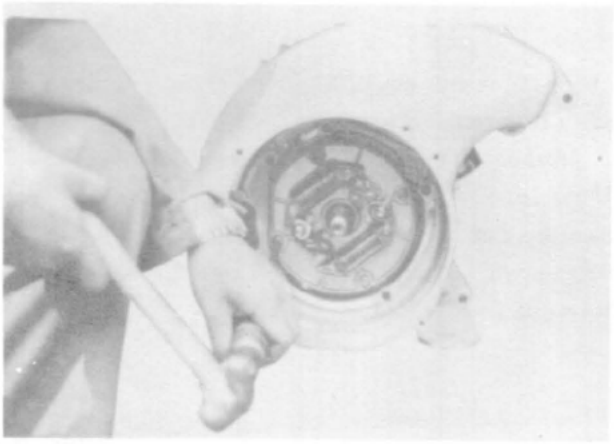

Fig. 14

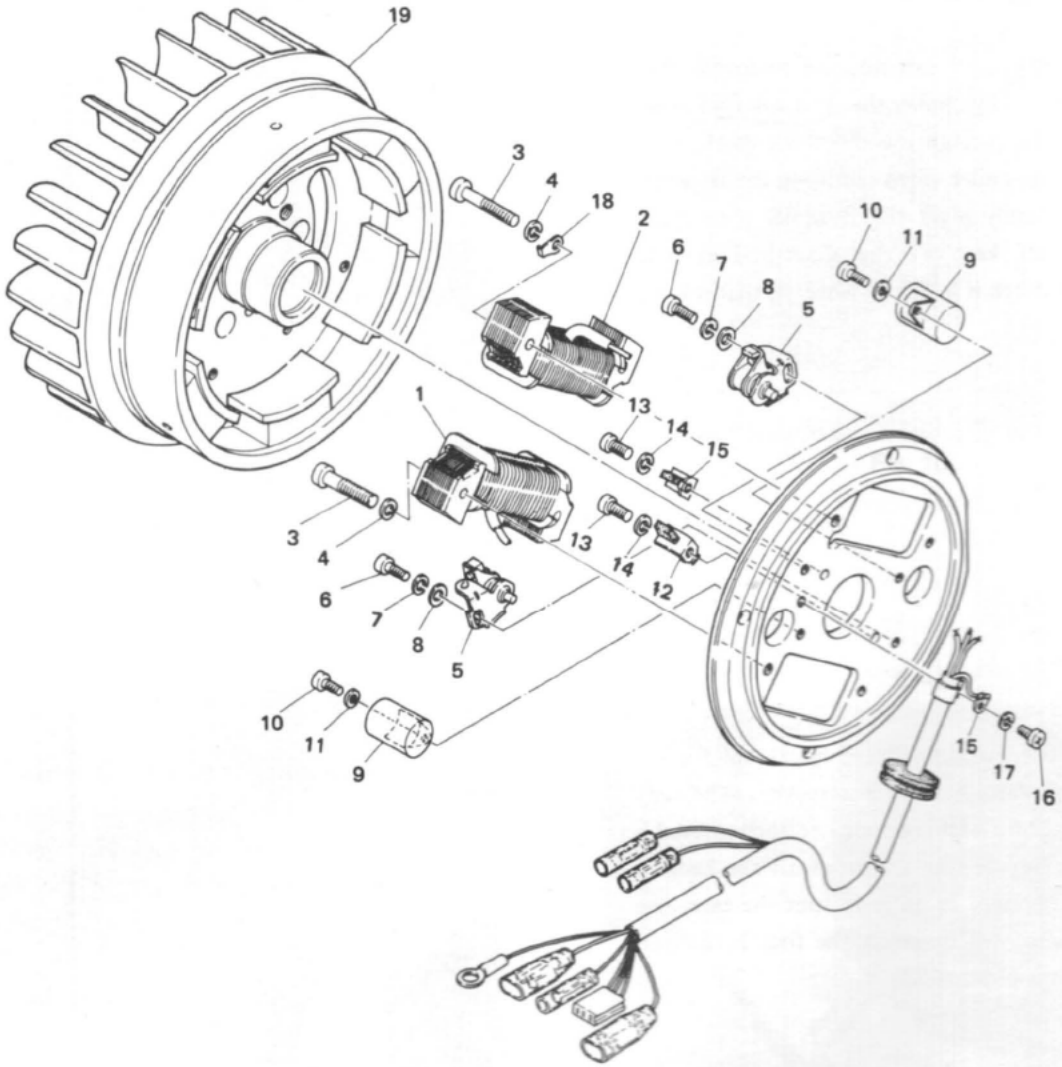

Fig. 15

FLYWHEEL MAGNETO

Ref. No.	Description	Parts No. (810,811)	Q'ty
	FLYWHEEL MAGNETO ASS'Y	810-81300-20	1
1	COIL, source	810-81312-20	1
2	COIL, lighting	810-91313-20	1
3	SCREW, pan head	98501-05030	4
4	WASHER, spring	92901-05100	4
5	CONTACT BREAKER ASS'Y	806-81321-20	2
6	SCREW, pan head (4-12)	110-81347-20	2
7	WASHER, spring	92901-04100	2
8	WASHER, plain	92901-04200	2
9	CONDENSER	802-81325-20	2
10	SCREW, pan head (4-10)	110-81346-20	2
11	WASHER, spring	92901-04100	2
12	LUBRICATOR	120-81331-20	2
13	SCREW, pan head (4-10)	110-81346-20	2
14	WASHER, spring	92901-04100	2
15	CLAMP, lead	104-81328-20	1
16	SCREW pan head (4-8)	165-81145-21	1
17	WASHER, spring	92901-04100	1
18	PLATE, timing	810-81332-20	1
19	ROTOR ASS'Y	810-81350-20	1
	FAN (Parts of Rotor Ass'y)	811-12611-00	1
	WASHER (Parts of Rotor Ass'y)	136-22316-00	8
	WASHER, SPRING (Parts of Rotor Ass'y)	92901-06100	8
	BOLT (Parts of Rotor Ass'y)	807-12615	8

B. FANCASE REMOVAL AND AIR SHROUD

B – 1

The upper air shroud is held in place by 6 philips head screws.

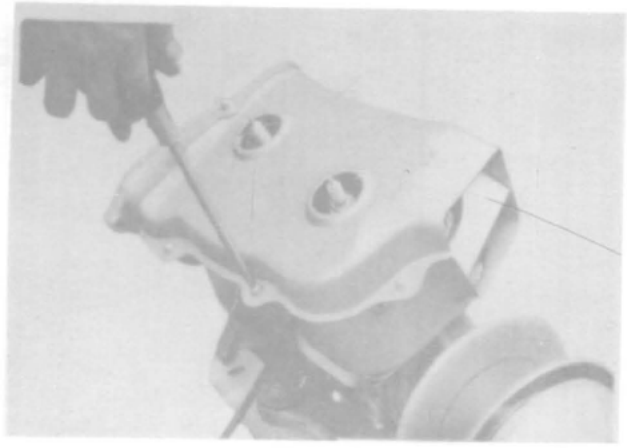

Fig. 16

B – 2

Remove the lower air shroud by taking out the 3 philips head screws that secure it.

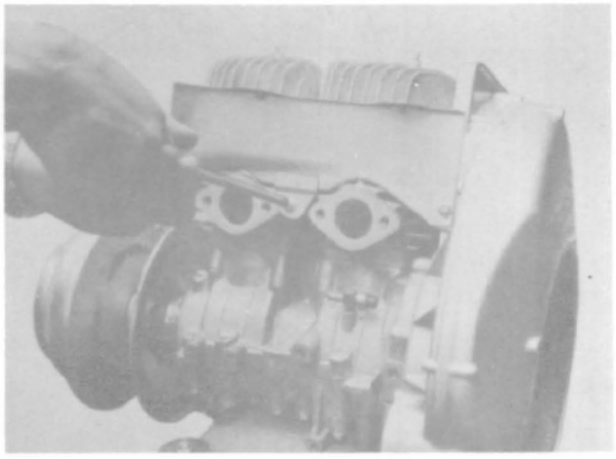

Fig. 17

B – 3

Straighten the bent positions of lock washers 1 and 2, and remove the bolts. The fan cases 1 and 2 can be removed out of the crankcase.

(Note that a packing agent gasket is applied to the mating surfaces of the fan cases 1 and 2.)

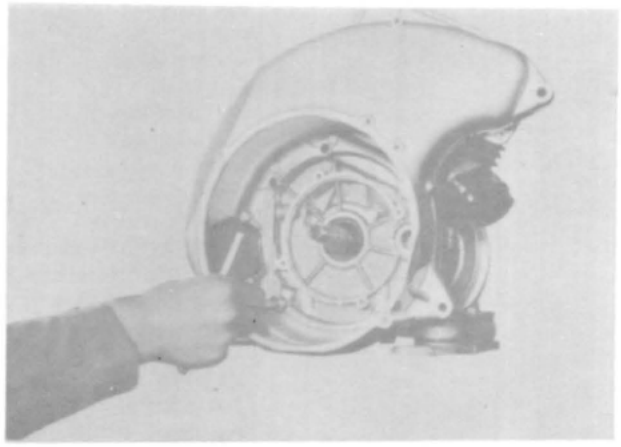

Fig. 18

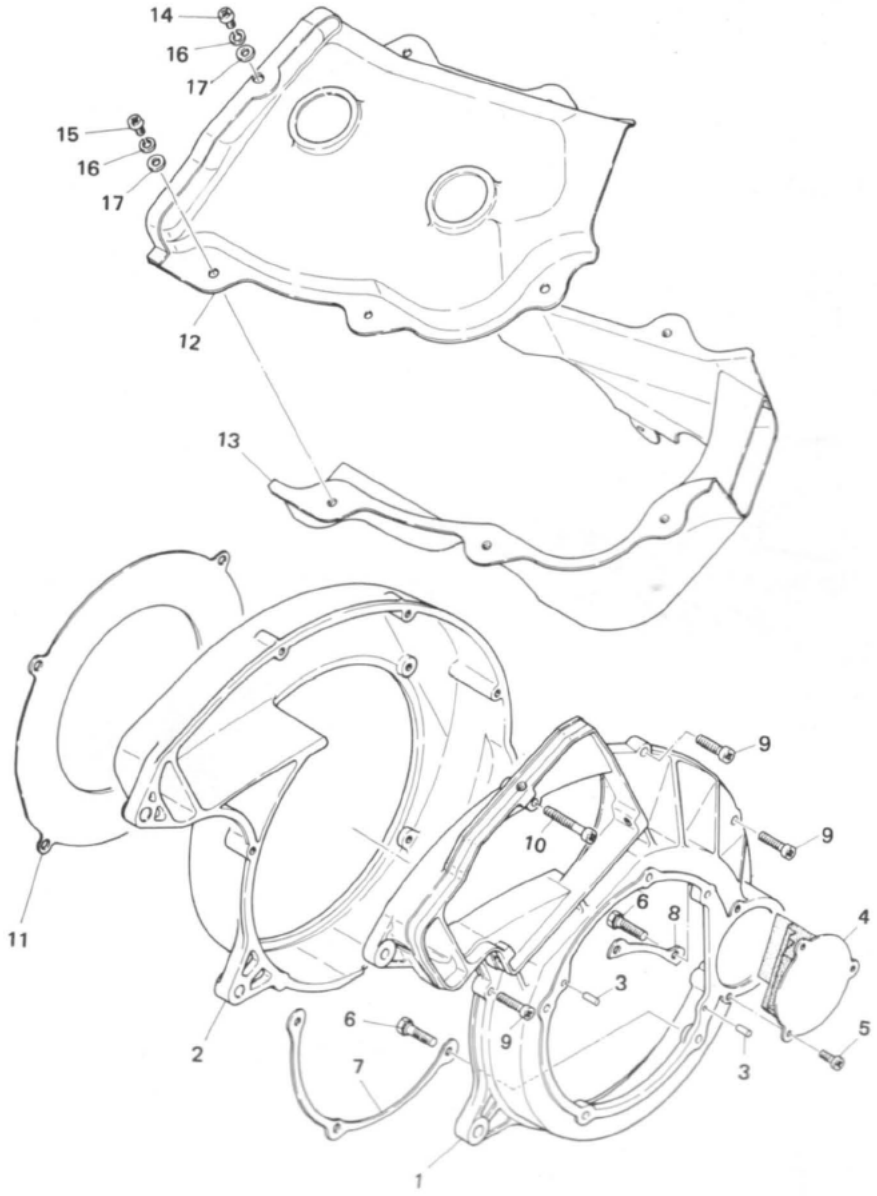

Fig. 19

FANCASE & AIR SHROUD

Ref. No.	Description	Parts No. (810,811)	Q'ty
1	CASE, fan 1	811-12621-00	1
2	CASE, fan 2	811-12622-00	1
3	PIN, dowel (4-13, 8)	93604-14012	2
4	PLATE	811-12633-00	1
5	SCREW, bind	98901-05010	3
6	BOLT	807-12623-00	5
7	WASHER, lock 1	807-12624-00	1
8	WASHER, lock 2	807-12625-00	1
9	SCREW, pan head	92501-06025	4
10	SCREW, pan ehad	92501-06040	1
11	DEFLECTOR	807-12631-00	1
12	AIR SHROUD, cylinder 1	810-12651-00 (811-)	1
13	AIR SHROUD, cylinder 2	810-12652-00 (811-)	1
14	SCREW, pan head	92501-06012	5
15	SCREW, pan head	92501-06010	5
16	WASHER, spring	92901-06100	10
17	WASHER, plain	92901-06200	10
	AIR DUCT	811-12661-00	1
	COLLAR (811 only)	811-12665-00	3
	SCREW BIND	91906-06020	3

C. REMOVAL OF PRIMARY SHEAVES

C – 1

The primary sheave cap assembly is attached to the crankshaft on the left side of the engine. Removal of the primary sheave bolt allows the primary sheave cap assembly to slide off the end of the crankshaft.

There is a lock washer to be bent down.

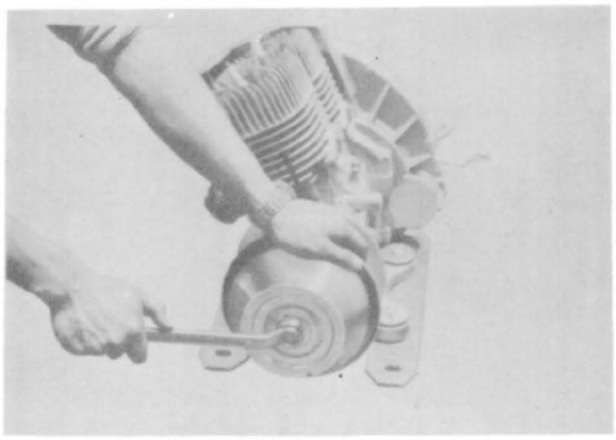

Fig. 20

C – 2

Remove the circlip and remove the collar. Remove the washer (1) and sliding sheave from the crankshaft. Now, the primary spring can be removed.

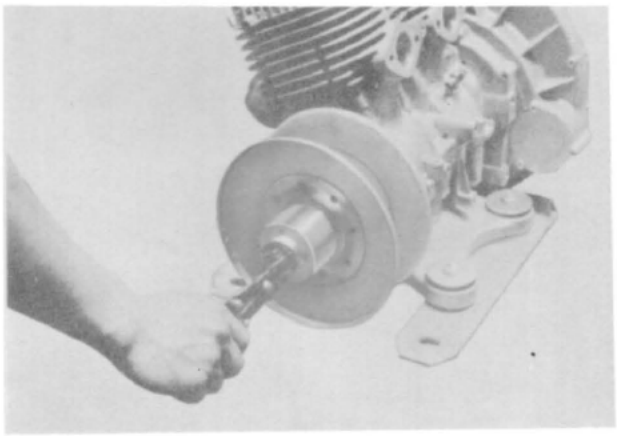

Fig. 21

C – 3

This illustration shows the primary sheave cap after it has been removed and taken apart.

The parts in relation to each other as they have been removed.

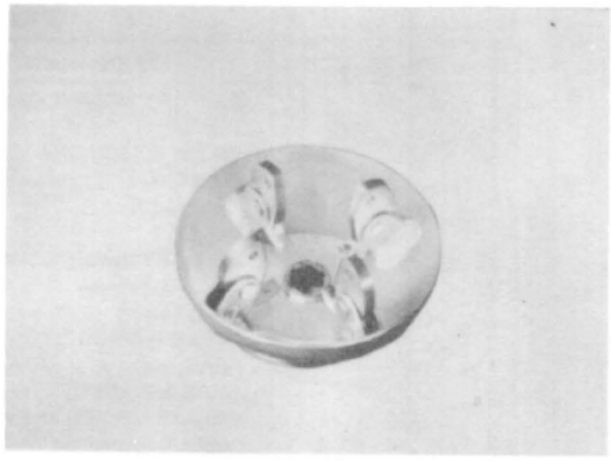

Fig. 22

Here is an exploded view of the entire primary sheave assembly.

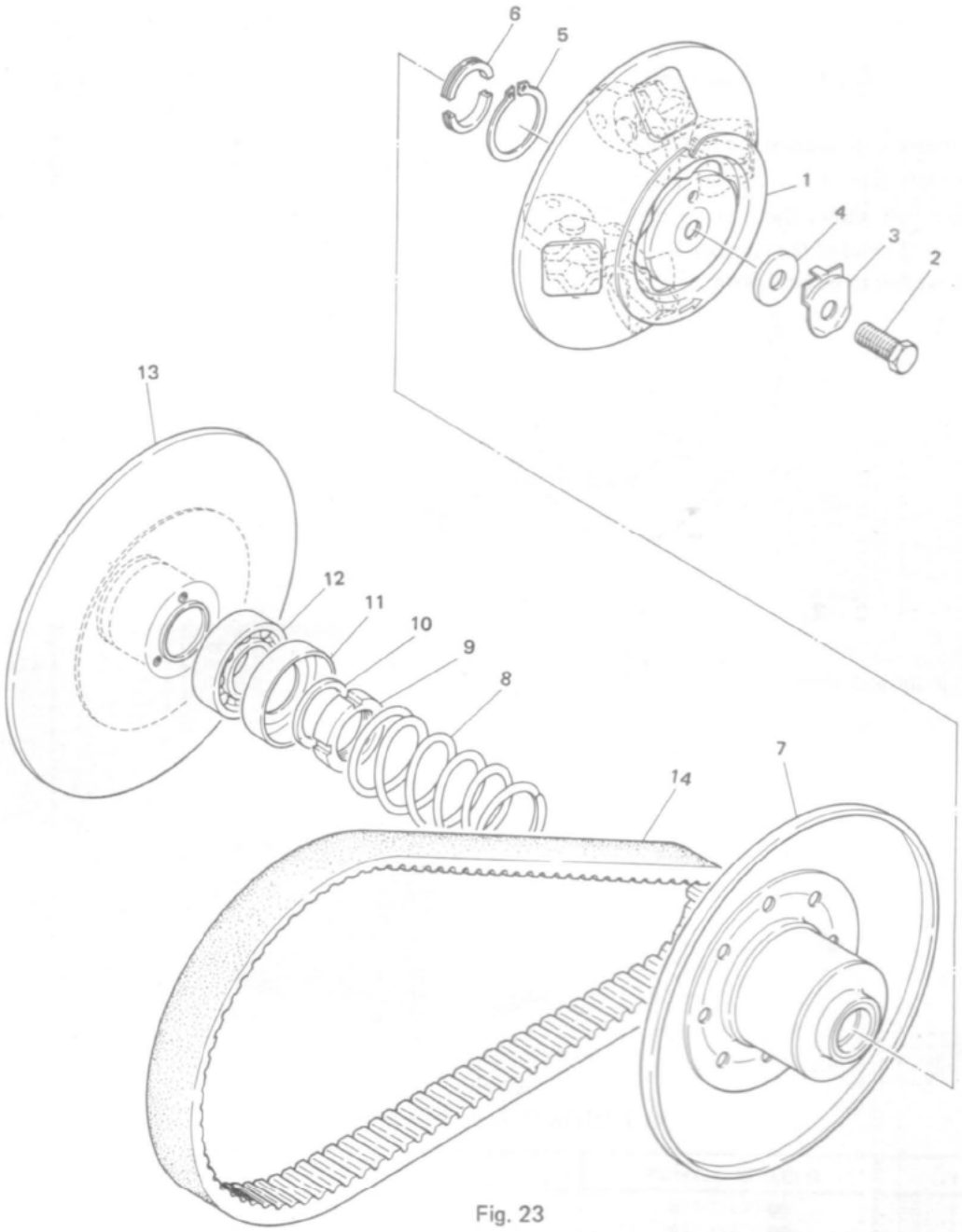

Fig. 23

PRIMARY SHEAVE

Ref. No.	Description	Parts No. (810,811)	Q'ty
1	PRIMARY SHEAVE CAP COMP	810-17630-00	1
2	BOLT	806-17647-00	1
3	WASHER, lock	810-17646-00	1
4	WASHER	810-17658-00	1
5	CLIP (S-30)	93410-30012	1
6	COLLAR	806-17645-00	2
7	PRIMARY SLIDING SHEAVE COMP	810-17620-01	1
8	SPRING, primary	810-17643-01	1
9	NUT, bearing	810-17642-00	1
10	WASHER (28-36-2)	806-17648-00	1
11	SEAT, spring	806-17644-00	1
12	BEARING (6205)	93306-20512	1
13	PRIMARY FIXED SHEAVE COMP	810-17610-00	1
14	V-BELT	806-17641-00	1

C – 4

The bearing ring nut must be removed in order to continue with the disassembly. The special bearing ring nut removal tool is used as shown to take the nut off the end of the shaft.

Once this ring nut has been removed, the spring washer spring seat and bearing can be slipped off, usually by hand.

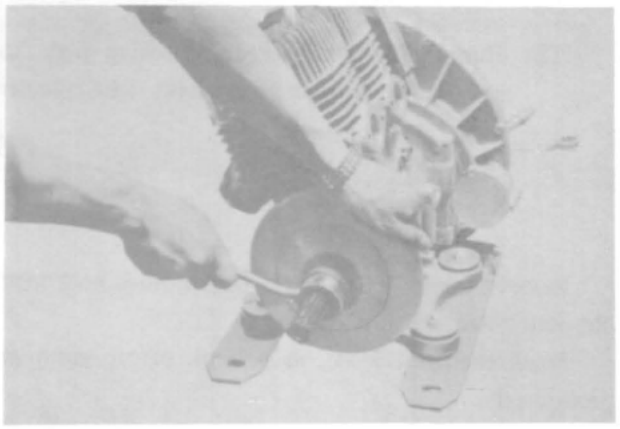

Fig. 24

C – 5

A taper-fit holds the inner primary sheave to the shaft.

A special tool is used to pull the inner sheave off of the shaft. This tool the one that was used to remove the magneto flywheel, only the long screws are used to hold the special tool in place rather than the short ones.

As you will notice in the picture, a wrench is used to hold the special tool so that it will not turn as the T-handle is screwed in.

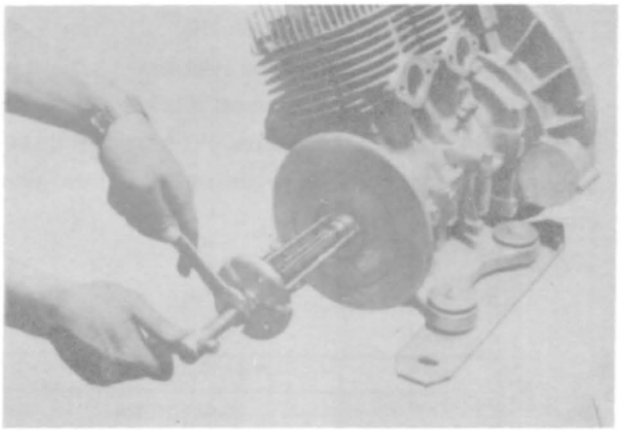

Fig. 25

NOTE: If the autolube accessory has been installed on this machine, do not remove the inner sheave completely without first disengaging the pump drive belt.

This illustration shows why the inner sheave should not be removed completely in the previous step.

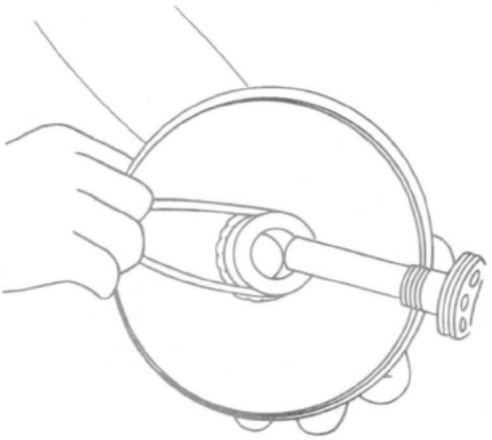

Fig. 26

D. TOP END REMOVAL

NOTE: During disassembly keep matching parts together that is, right piston with right cylinder, etc.

D – 1

Remove the cylinder heads. Each head is held down by four nuts.

Break each nut loose, in pattern, before removing completely.

NOTE: On reassembly, the head bolts are torqued, gradually and in pattern, to 180 in/lbs.

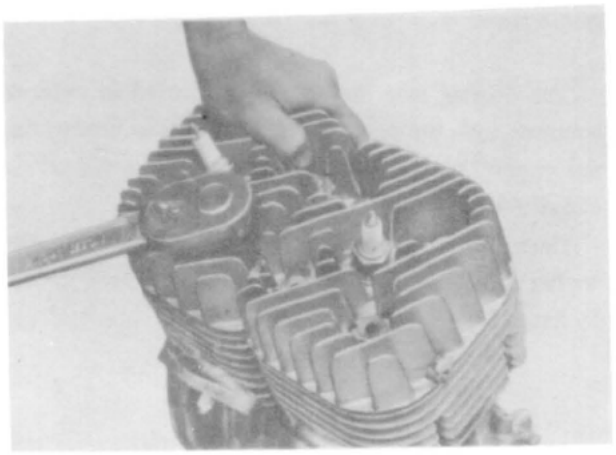

Fig. 27

D – 2

The next step is to remove the cylinders.

When the cylinders are lifted off it is advisable to slip a clean rag beneath the piston. This will stop any carbon, broken parts, or other contaminates from falling into the engine.

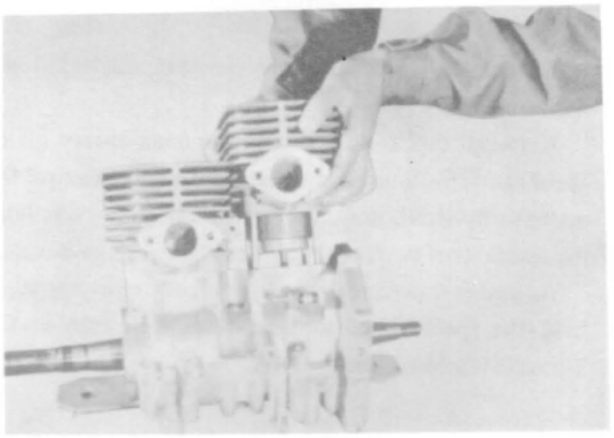

Fig. 28

D – 3

The piston assembly is removed at this time. Use a needle nose pliers to remove the piston pin clip.

Use a soft drift pin to push the piston pin out for enough to allow a pair of pliers to grip and completely remove the piston pin.

Once the piston pin has been removed the piston can be lifted off the rod and set aside. Be sure to remove the needle bearings in the upper rod end so as not to lose them when the engine is moved.

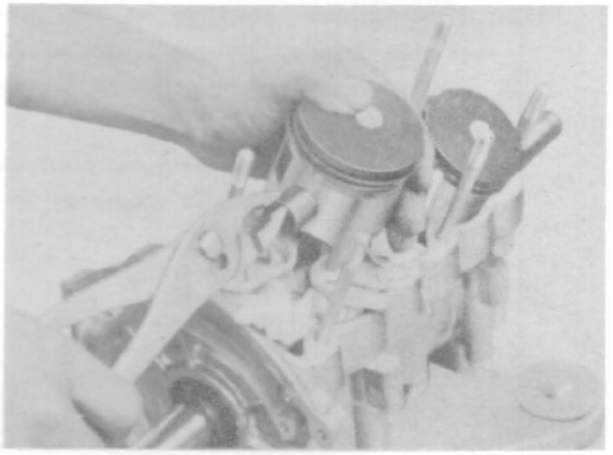

Fig. 29

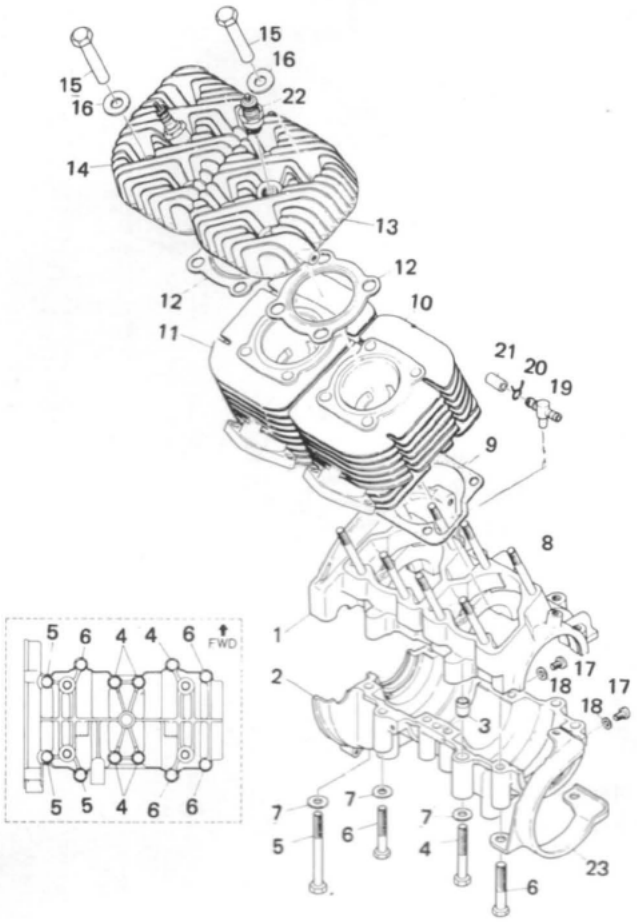

Fig. 30

CRANKCASE

Ref. No.	Description	Parts No. (810,811)	Q'ty
1	CRANK CASE ASS'Y	810-15100-00	1
1	CASE, crank 1	810-15111-00	1
2	CASE, crank 2	810-15121-00	1
3	PIN, dowel A (9.8-12-16)	91810-08016	2
4	BOLT	97101-08060	5
5	BOLT	97101-08070	3
6	BOLT	97101-08050	4
7	WASHER, plain	92901-08200	10
8	BOLT, cylinder holding	248-11361-00	8
9	GASKET, cylinder	807-11351-01	2
10	CYLINDER, left	810-11311-00 (811-)	1
11	CYLINDER, right	810-11321-00 (811-)	1
12	GASKET, cylinder head	806-11181-00 (811-)	2
13	HEAD, cylinder left	810-11111-01 (811-)	1
14	HEAD, cylinder right	810-11121-00 (811-)	1
15	NUT, cylinder holding	807-11171-00	8
16	WASHER, plain	92901-12200	8
17	SCREW, pan head	92501-06010	2
18	GASKET, screw	137-15384-00	2
19	PIPE, joint	807-24461-00	1
20	CLIP, pipe 1	806-24356-00	1
21	CAP, blind	807-24462-09	1
22	PLUG, spark (B-7HZ)	94700-00004	2
23	PROTECTOR	810-15491-00	1

Reference: The lower crankcase has two drain screws. These drain screws are used to empty the crankcase before the engine is stored away for long periods. When installing these screws, apply a Sealing agent so that they will not become loose.

E. CRANKSHAFT ASS'Y REMOVAL

E – 1

Remove the four bolts that hold the upper engine mounting bracket. The engine is now free of all extra external parts and attachments. The cases are now ready to be split, if so desired.

[Reference]

Installing the engine bracket

1. The engine bracket lower should be installed with special care so that it will not be positioned with the upside down or with the inside out or with the right side on the left.
2. The upper washer is thicker than the lower.

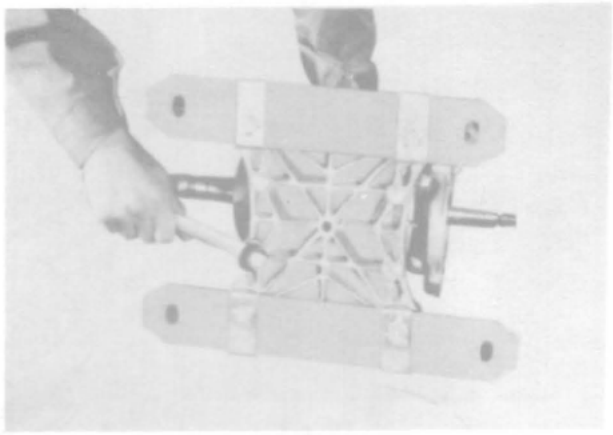

Fig. 31

E – 2

This illustration shows the proper sequence for removing the case bolts. This sequence must be followed in order to avoid distortion of the two crankcases.

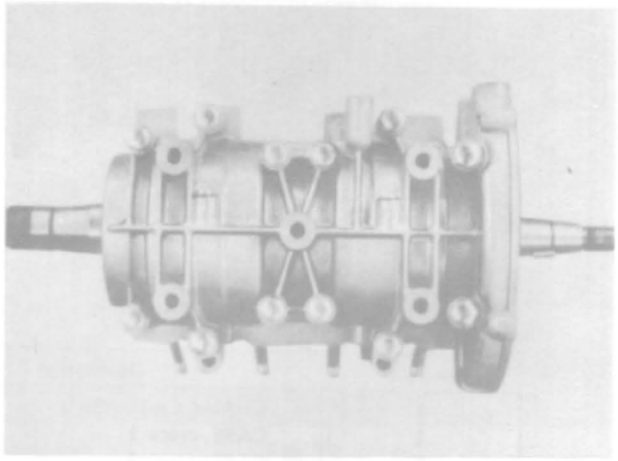

Fig. 32

E – 3

Use a soft hammer to lightly tap around the entire edge of the cases. This will free the cases in case any adhesion is present. The cases can now be split by hand. As is shown in the illustration, the cases have knock pins (locating pins.).

Be sure that the two locating pins are immediately gathered up and kept in a safe place so that none are lost before the engine is assembled again.

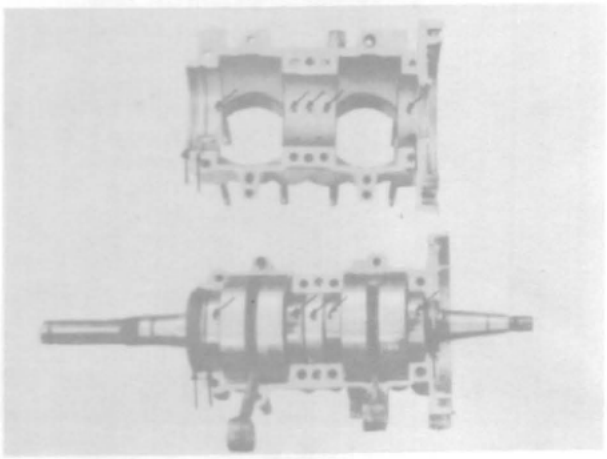

Fig. 33

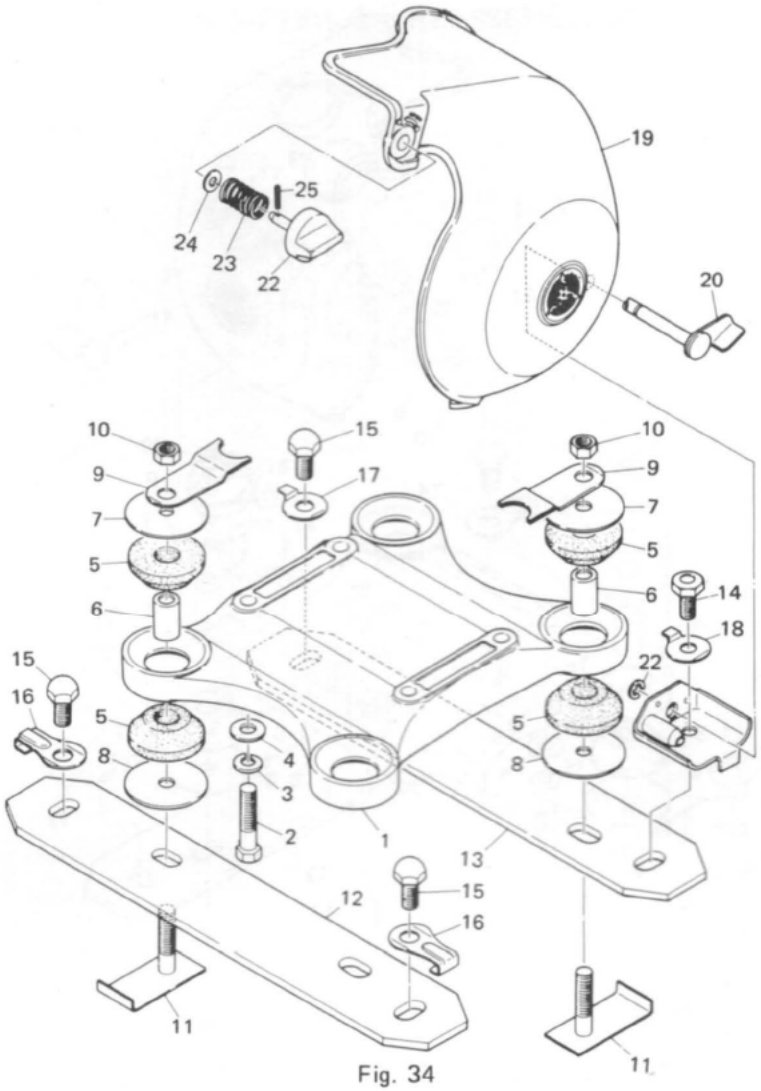

Fig. 34

ENGINE BRACKET (810)

Ref. No.	Description	Parts No.	Q'ty
1	BRACKET, engine upper	810-21411-00	1
2	BOLT	91201-10050	4
3	WASHER, spring	92901-10100	4
4	WASHER, plain	92901-10200	4
5	DAMPER, engine mount	807-15316-00	8
6	SPACER, damper	807-15317-00	4
7	WASHER 1 (10.5-52-3.2)	807-21491-00	4
8	WASHER 2 (10.5-52-1.6)	807-21492-00	4
9	WASHER, lock	810-15176-00	4
10	NUT	98801-10300	4
11	BOLT	810-21482-00	4
12	BRACKET, engine lower front	806-21419-00	1
13	BRACKET, engine lower rear	810-21429-00	1
14	BOLT, engine mounting	806-21481-00	1
15	BOLT, engine mounting 2	810-21482-00	3
16	WASHER, lock 2	810-21492-00	3
17	WASHER, lock	806-21491-01	1
18	BRACKET, drive guard	806-77315-01	1
19	GUARD, drive	810-77311-00	1
20	ARM, fitting	806-77314-00	1
21	CIRCLIP (E-6)	93430-06005	1
22	KNOB	806-77324-00	1
23	WASHER	810-77318-00	2
24	SPRING	806-77325-00	1
25	PIN, spring	91609-25016	1

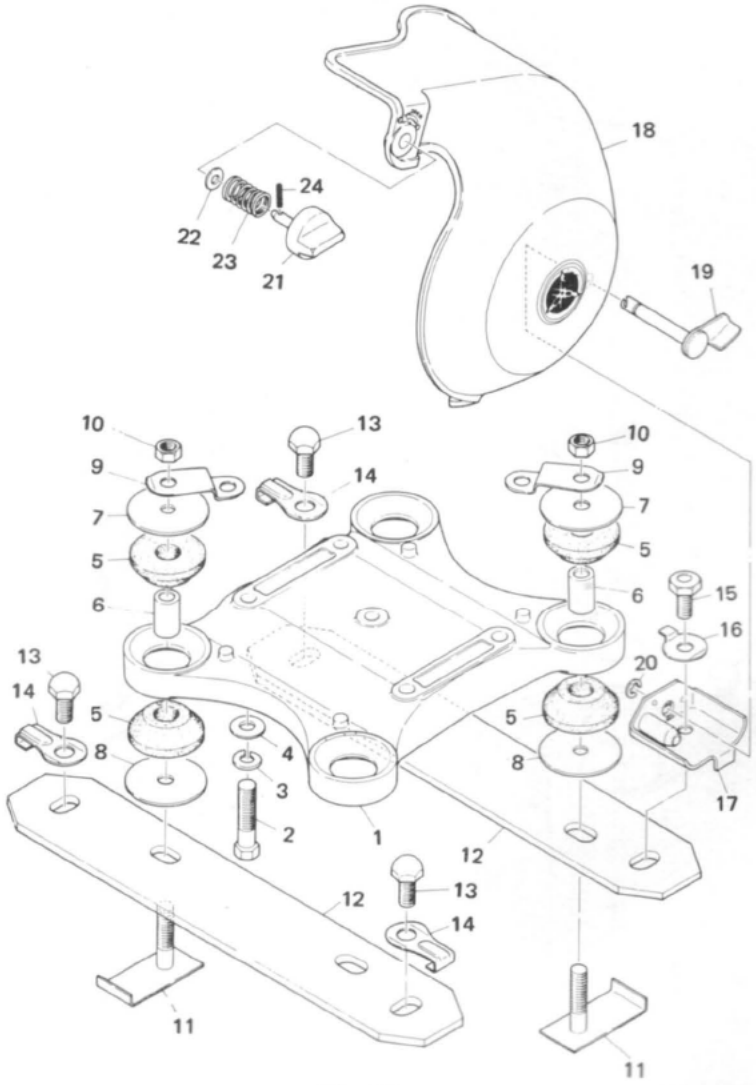

Fig. 35

ENGINE BRACKET (811)

Ref. No.	Description	Parts No.	Q'ty
1	BRACKET, engine upper	810-21411-00	1
2	BOLT	91201-10050	4
3	WASHER, spring	92901-10100	4
4	WASHER, plain	92901-10200	4
5	DAMPER, engine mount	807-15316-00	8
6	SPACER, damper	807-15317-00	4
7	WASHER 1 (10.5-52-3.2)	807-21491-00	4
8	WASHER 2 (10.5-52-1.6)	807-21492-00	4
9	WASHER, lock	810-15176-00	4
10	NUT	98801-10300	4
11	BOLT	807-21482-00	4
12	BRACKET, engine lower	807-21419-00	2
13	BOLT, engine mounting 2	810-21482-00	3
14	WASHER, lock 2	810-21492-00	3
15	BOLT, engine mounting	806-21481-00	1
16	WASHER, lock	806-21491-01	1
17	BRACKET, drive guard	806-77315-01	1
18	GUARD, drive	810-77311-00	1
19	ARM, fitting	806-77314-00	1
20	CIRCLIP (E-6)	93430-06005	1
21	KNOB	806-77324-00	1
22	WASHER 2	802-77318-00	2
23	SPRING	806-77325-00	1
24	PIN, spring	91609-25016	1

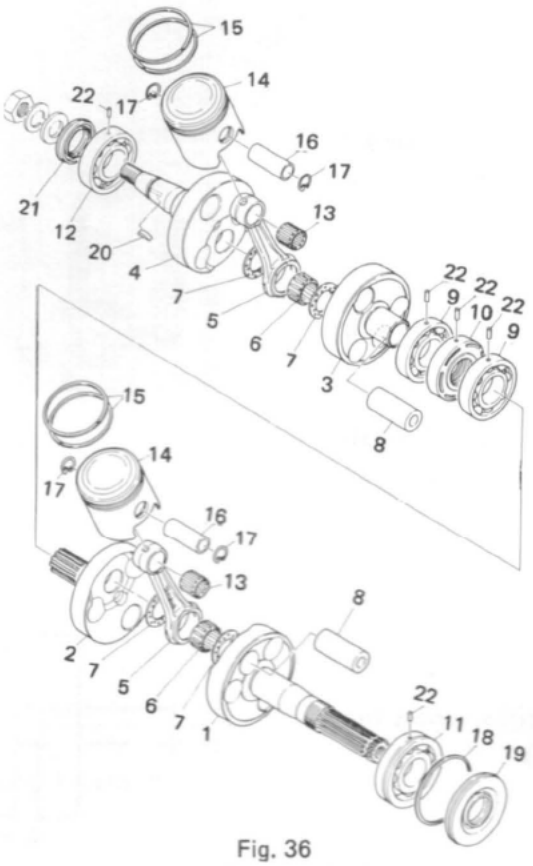

Fig. 36
CRANK & PISTON

Ref. No.	Description	Parts No.		Q'ty
		810	811	
	CRANK ASS'Y	810-11400-00	807-11400-00	1
1	CRANK 1, left	811-11412-00	811-11412-00	1
2	CRANK 1, right	807-11422-00	811-11422-00	1
3	CRANK 2, left	807-11432-00	807-11432-00	1
4	CRANK 2, right	807-11442-00	807-114422-00	1
5	ROD, connecting	235-11651-00	235-11651-00	2
6	BEARING, con-rod big end	93310-42434	93310-42434	2
7	WASHER, crank pin (24.2-38-1)	152-11685-00	152-11685-00	4
8	PIN, crank	168-11681-00	168-11681-00	2
9	BEARING (6206C3)	93306-20602	93306-20602	2
10	SEAL, labyrinth	168-11515-00	811-11515-00	1
11	BEARING (6306C3)	93306-30603	93306-30603	1
12	BEARING (6206C3)	93306-20602	93306-20602	1
13	BEARING, con-rod small end	93310-21824	93310-21824	2
14	PISTON (0.96)	806-11631-00-96	807-11631-00-96	U. R 2
	PISTON (0.97)	806-11631-00-97	807-11631-00-97	U. R 2
	PISTON (0.98)	806-11631-00-98	807-11631-00-98	U. R 2
	PISTON (0.99)	806-11631-00-99	807-11639-00-99	U. R 2
	PISTON (.00)	806-11631-00-01	807-11631-00-01	U. R 2
	PISTON (1st O. S)	806-11635-00	807-11631-10	2
	PISTON (2nd O. S)	806-11636-00	807-11631-20	2
15	PISTON RING SET	806-11601-00	807-11601-00	2s
	PISTON RING SET (1st O. S)	806-11601-10	807-11601-10	2s
	PISTON RING SET (2nd O. S)	806-11601-20	807-11601-20	2s
16	PIN, piston	168-11633-00	168-11633-00	2
17	CLIP, piston pin	604-11634-00	604-11634-00	4
18	CIRCLIP	93440-78011	93440-78011	1
19	OIL SEAL (SW-32-78-10)	93103-32054	93103-32054	1
20	KEY, woodruff	214-11545-01	214-11545-01	1
21	OIL SEAL (SW-32-48-10)	93103-32055	93103-32055	1
22	PIN, dowel (4-12)	93604-12037	93604-12037	5

A. CRANKSHAFT ASS'Y

A – 1

After removal of the crankshaft, wear of the connecting rod big end, crank pin and bearing should be checked.

Excessive wear of the connecting rod big end is checked by measuring the axial play of the connecting rod small end when it is moved from side to side with your fingers. The axial play should not exceed 2 mm (0.080").

After the crank pin and bearing are replaced, maximum axial play should not exceed 0.8 ~ 1.0 mm (0.032 ~ 0.04").

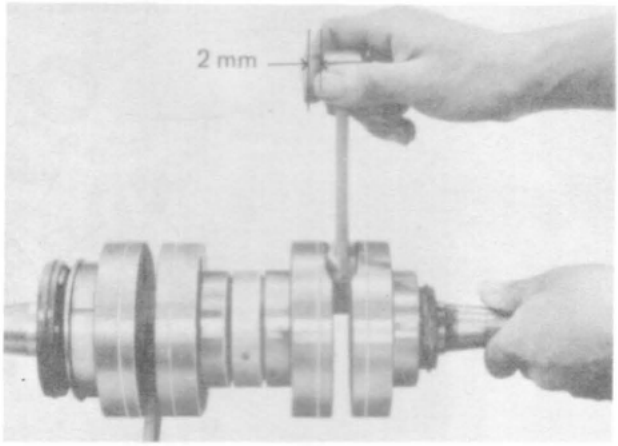

Fig. 37

A – 2

Use a Feeler gauge to measure for the correct free play of 0.1 ~ 0.3 mm (0.004 ~ 0.012").

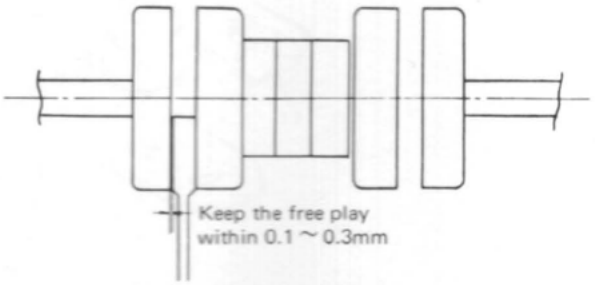

Fig. 38

A – 3

Checking the crankshaft for alignment:

Set the crankshaft on V-blocks so that the bearing sections are positioned on the V-blocks, and check for alignment with a dial gauge.

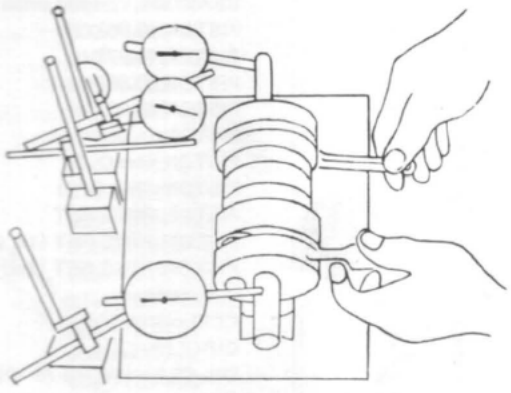

Fig. 39

A – 4

Crankshaft run-out can be checked by placing the crankshaft ends in a V-block.

By using a dial indicator, the deflection of the crankshaft should be measured at the four places shown, and held to a maximum tolerance of 0.015 (0.0006″).

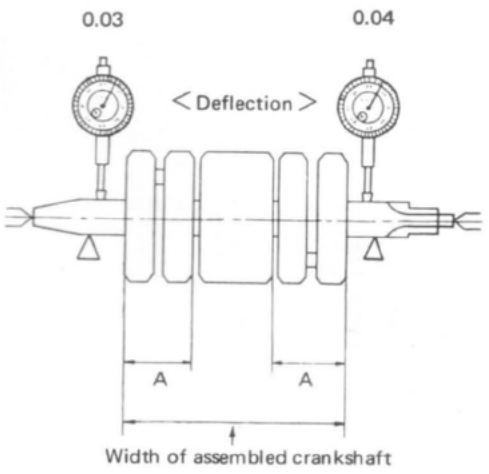

Fig. 40

A – 5

Correction of the crankshaft deflection can be accomplished by tapping the flywheels with a brass hammer and or using wedges placed between the flywheels.

Fig. 41

B. PISTON MAINTENANCE

B – 1

The piston-to-cylinder wall clearance should be checked before reassembly.

This is done by measuring the largest outside diameter of the piston and the smallest inside diameter of the cylinder bore. The largest diameter of the piston is checked 10 mm (0.4") above the bottom of the piston skirt.

New piston to cylinder wall clearance is 0.04 ~ 0.05 mm.

#810 #811 0.04 ~ 0.050 mm (0.0016" ~ 0.0020")

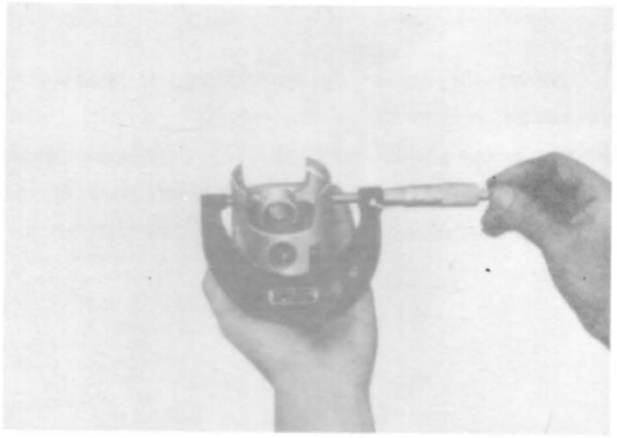

Fig. 42

B – 2

The piston pin fit can be checked by inserting the piston pin into the piston and checking the amount of resistance encountered.

The piston pin should fit into the piston with a snug thumb press fit.

Also, check the needle bearings and needle bearing cage for excessive wear, or overheating.

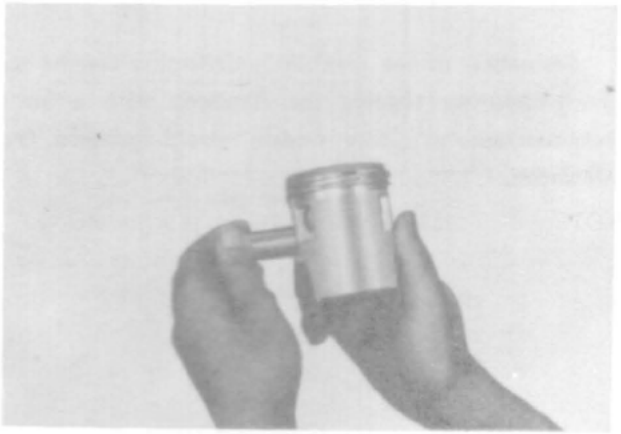

Fig. 43

B – 3

The piston rings are removed from the piston by spreading them open with you fingers and lifting them off the piston. The piston ring gap can be checked by placing the rings inside the cylinder bore horizontally. The ringgap should be checked with a feeler gauge placed into the opening between the ends of the ring. Maximum gap of both upper and lower piston rings should not exceed 0.15 ~ 0.35 mm (0.006 ~ 0.014").

Fig. 44

B – 4

Remove the carbon build-up from the piston ring grooves and replace the piston rings. It is important that the piston ring gap should be aligned with the knock pin in the ring groove as shown in the illustration. This is especially critical when installing the cylinder over the piston.

Fig. 45

B – 5

The up and down play of the piston rings in the piston ring groove should be checked with a feeler gauge.

Clearance should be 0.003 ~ 0.007 (0.001 ~ 0.0027") for both upper and lower rings.

NOTE: If piston dome or piston skirt is badly scored or damaged, it would be advisable to replace the piston.

Once seizure has occurred and the piston has been damaged, seizure can more readily re-occur.

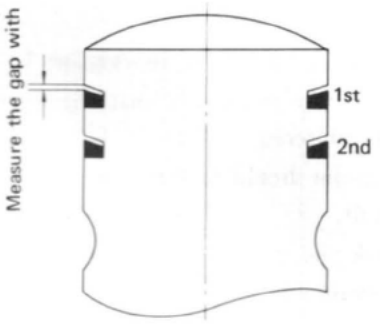

Fig. 46

Installing the piston

The piston should be installed so that the arrow mark on the piston crown points to the exhaust port (toward the front of the engine).

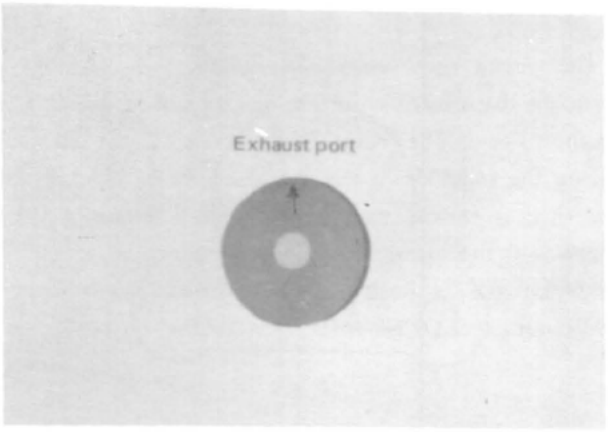

Fig. 47

B – 6

Assembly of the crankshaft in the crankcase should be carefully done. Each of the crankshaft bearings has a lock pin hole in the outside race and two aligning marks offset 90° from the lock pin hole. The aligning marks should be matched with the sealing surface of the upper crankcase half so as to insure correct matching of the knock pin in the knock pin hole.

Should the crankshaft be assembled in the cases with the bearings misaligned, the knock pin will be pushed into the body of the crankcase and the bearing will not be properly secured after the crankcases are sealed. Damage to both the crankshaft and crankcases can therefore occur.

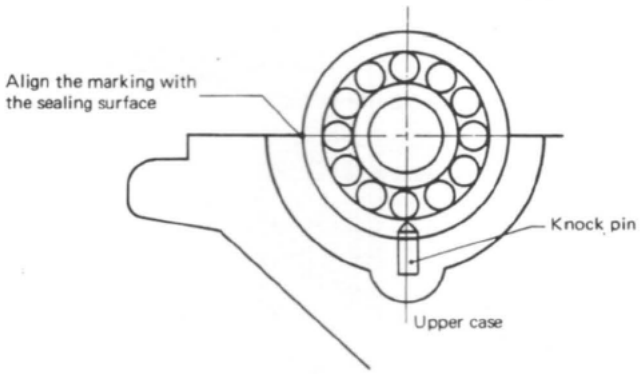

Fig. 48

B – 7

The bottom half of the crankcase can now be fitted over the crankshaft and onto the upper crankcase half. The crankcase bolts can now be placed in the case. Torque the crankcase bolts to 7.5 ft.lbs. for initial tightening and 15 ft.lbs. for final torque.

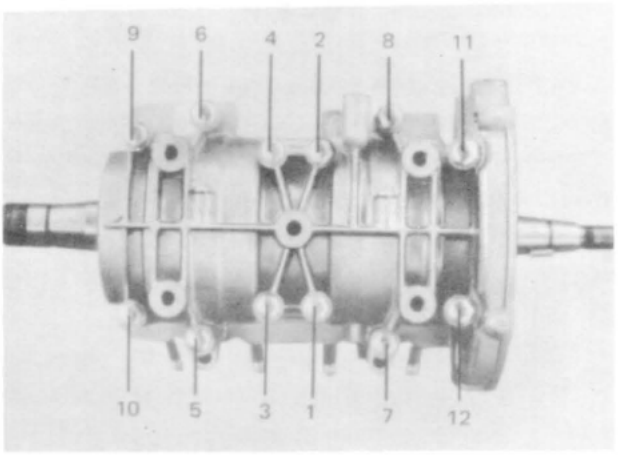

Fig. 49

C. CYLINDER MAINTENANCE

C – 1

When the cylinder and piston are removed, there are several checks which should be performed. First of all, the cylinder bore should be checked for wear or scoring each time it is removed. The "out of round" and "taper" can be checked with an inside micrometer. The out of round of the cylinder bore is checked by moving the micrometer in a circular direction 90° at a time. The difference in measurements should not exceed 0.05 mm (0 ~ 0.002").

Honing or reboring should be done if this tolerance is exceeded. Taper of the cylinder bore is measured by moving the micrometer from the top to the bottom of the cylinder being careful to miss the port openings. The difference in these measurements (between top and bottom) should not exceed 0.05 mm (0.002"). If upon inspection of the cylinder bore, scoring of the cylinder wall is observed, hone or rebore until these scores disappear. Before assembly, always clean the carbon from the exhaust port. Also wash out the cylinder with solvent or soap and water to insure that all hone material has been removed. Failure to do this may result in premature wearing or scoring of the cylinder and piston.

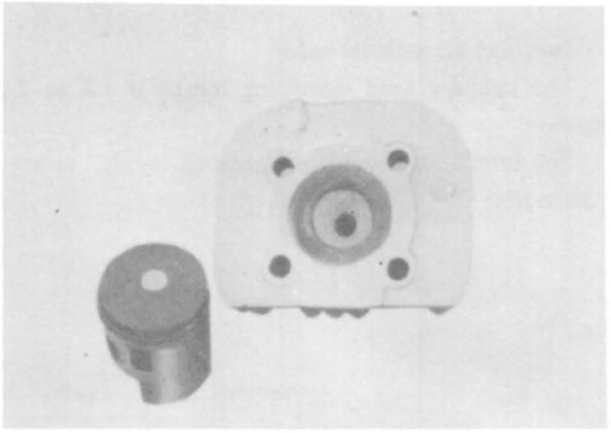

Fig. 50

Fig. 51

C – 2

Since the formation of carbon is a product of two-stroke operation, decarbonization at regular intervals is essential. Removing the cylinder head and scraping the carbon from piston crown and cylinder head should be done at every tune-up or every 40 hours of operation.

During every other decarbonization, the cylinder should be removed and the exhaust port decarbonized.

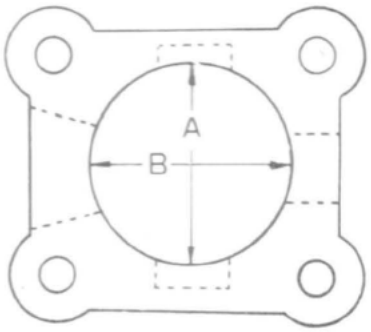

Fig. 52

Installing the cylinder head

The cylinder head tightening torque is 1.8 to 2.2 kg-m.

The four bolts should be tightened evenly. (160 ~ 190 in./lbs)

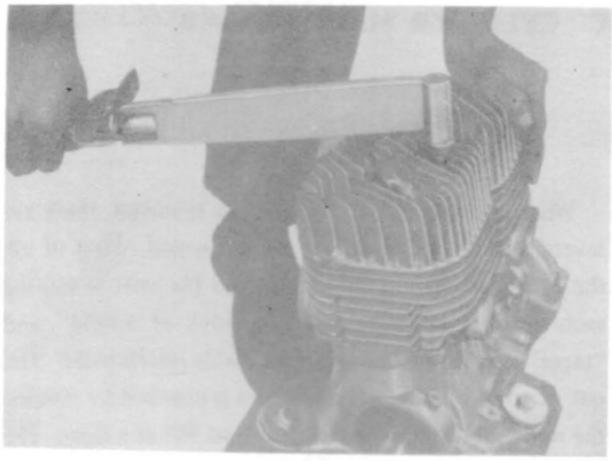

Fig. 53

D. ELECTRIC CIRCUIT DIAGRAM

D – 1 810, 811 ELECTRIC CIRCUIT DIAGRAM

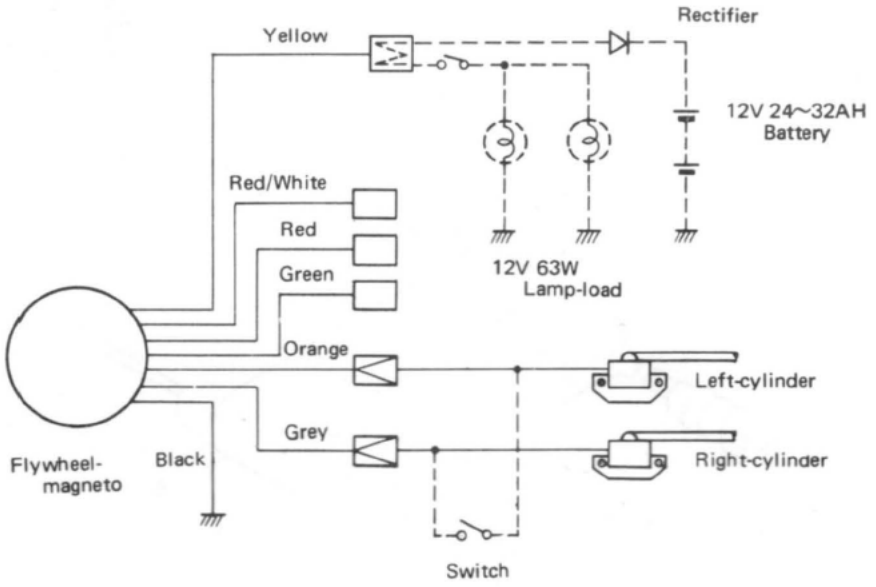

Fig. 54

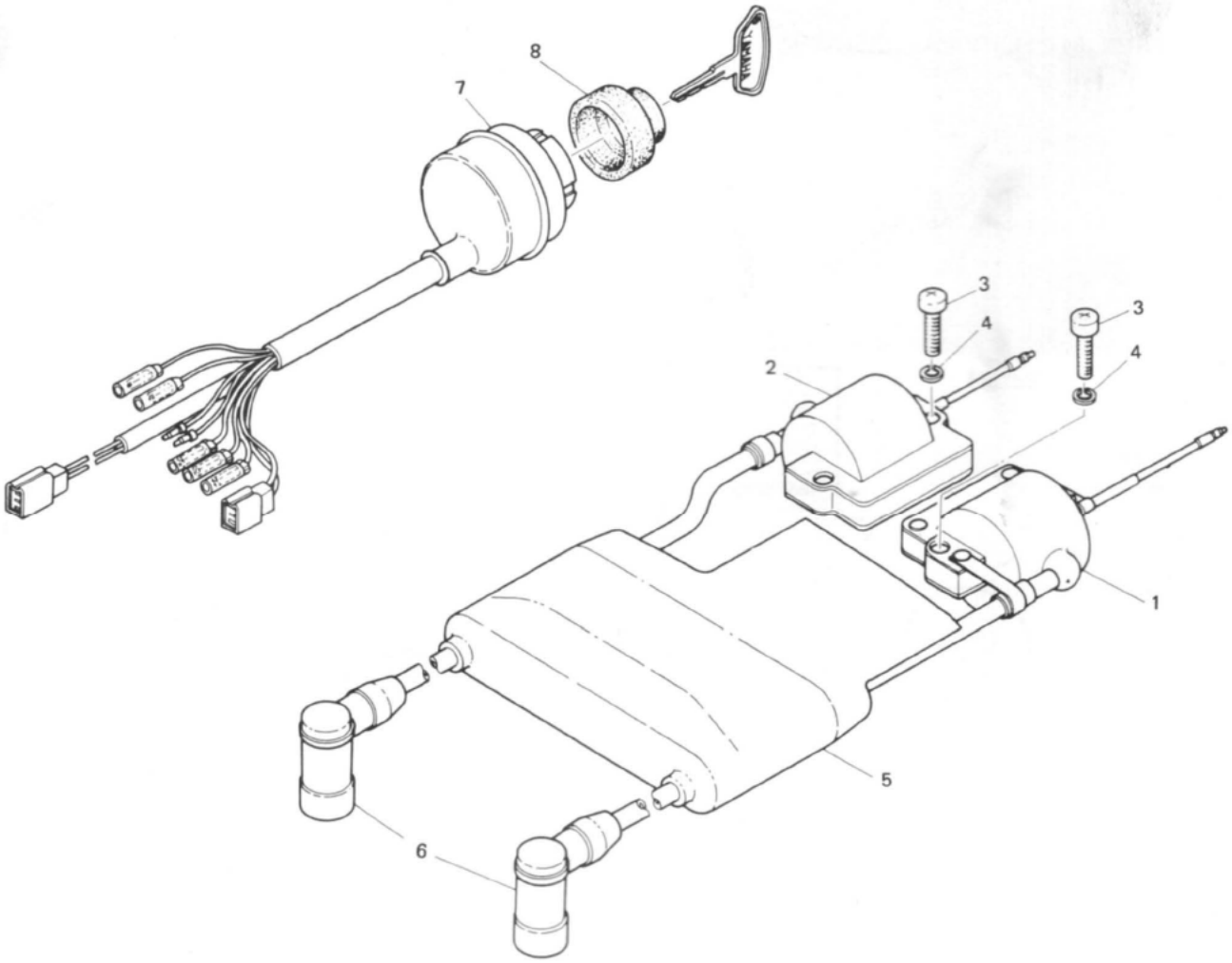

Fig. 55

ELECTRICAL

Ref. No.	Description	Parts No. (810,811)	Q'ty
1	IGNITION COIL ASS'Y 1	810-82310-40	1
2	IGNITION COIL ASS'Y 2	810-82320-41	1
3	SCREW, pan head	98506-06020	4
4	WASHER, spring	92906-06100	4
5	COVER, ignition coil	810-82314-00	1
6	PLUG CAP ASS'Y	117-82370-20	1
7	BAND, switch cord	168-83936-00	2
8	MAIN SWITCH ASS'Y	810-82508-20	1
9	CAP, main switch	806-82516-00	1
10	STOP SWITCHED ASS'Y	806-82530-00	1
11	BAND	810-82591-00	3

"Should further maintenance or service information be desired, Service Manuals can be purchased from your local authorized SNO-JET dealer."

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