g.w. Biggerstaff

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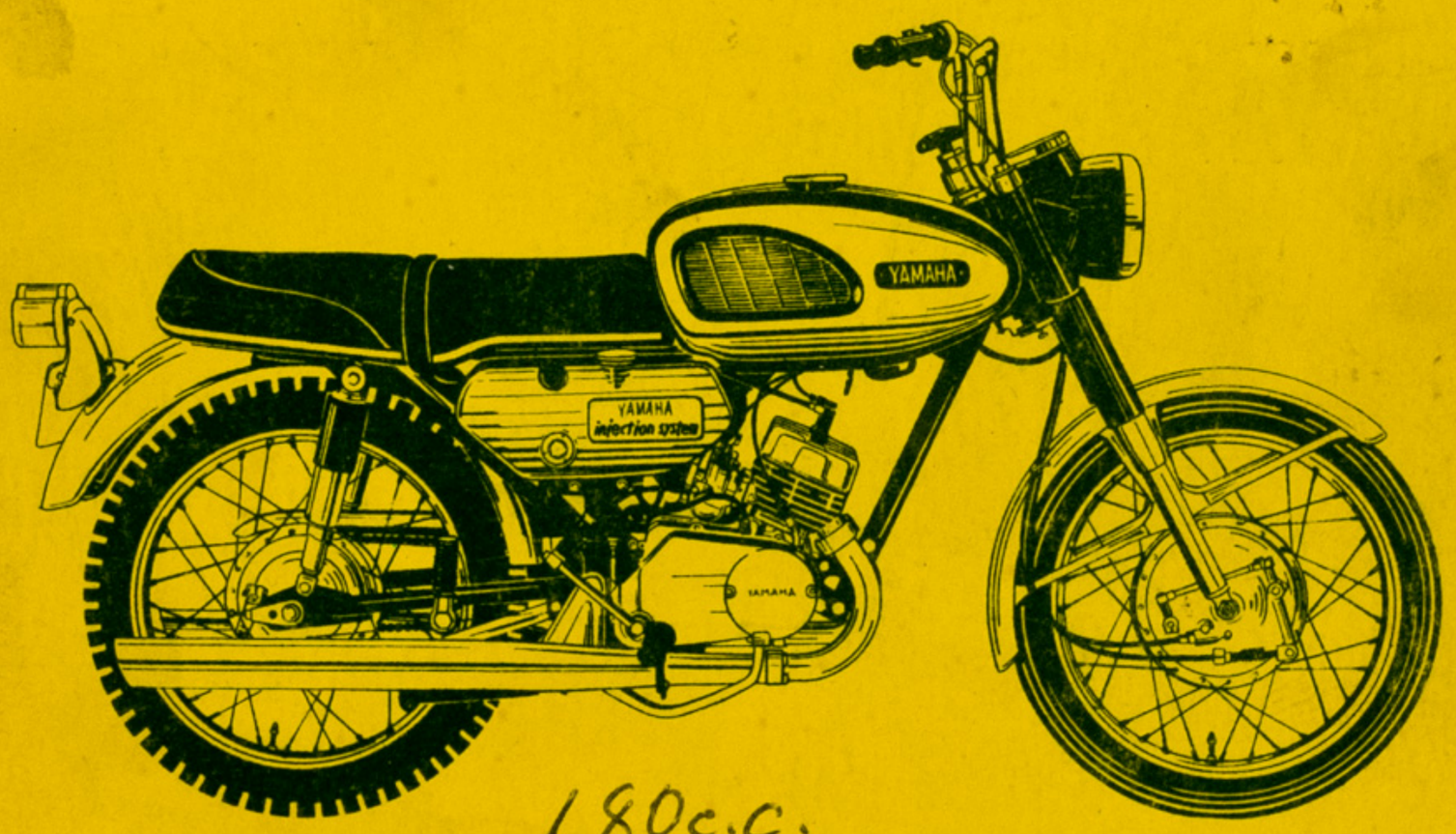
YAMAHA

SERVICE MANUAL



180c.c.

YCS-1 **YCS1-C**

YAMAHA MOTOR CO., LTD.

FOREWORD

For the world's motorcycle enthusiasts, YAMAHA has added the YAMAHA 180 YCSI (C) to wide range of models. It is built specifically to satisfy the exacting demand of racers. In extensive tests, this new 180-cc YSCI (C) has proved to match or outruns larger competitive motorcycles on less fuel.

The aluminium cylinder, lined with a special cast iron, is not conventional but YAMAHA's newest invention. So ideal is the famous YAMAHA Autolube that it helps the parallel twin engine work far better and far longer.

All these features are yours plus many other unique advantages . . . . one-touch kick starter, starter-built in carburetor and large-sized starter dynamo. This not only results in high speed performance but also improves acceleration, and easy riding.

This manual is intended to provide vital technical service information to keep the YCSI (C) in good working condition. It is urged, therefore, that all YAMAHA dealers and mechanics become familiar with handling and servicing the YCSI, (C) and thereby make their sales and service more efficient and profitable.

CONTENTS

Chapterer 1.

General

1-1. Features

1. High-Performance Parallel Twin Engine with Aluminium Cylinders

The YAMAHA 180 YCSI(C)employs a powerful 2 stroke 180-cc twin engine equipped with special cast iron sleeved cylinders. The results are outstanding . . . extra smooth in acceleration plus high speed performance. All this makes the YCSI(C) powerful enough to match the performance of 250-cc class motorcycles.

2. Highly Reliable YAMAHA Autolube Engine

Because of the famous YAMAHA Autolube lubrication, the engine is not only highly reliable and dependable but also extremely durable.

3. Well-Spaced 5-Speed Transmission

The 5-speed transmission is very well laid out, assuring "soft-touch" shifting and smooth transition from low to high speeds under any running conditions, ... on streets, slopes or highways.

4. One-Toach (Primary) Kick Starter

The engine can be started by simply squeezing the clutch lever and kicking the starter crank without shifting the transmission back to neutral. This, of course, is a great advantage to the rider.

5. Starter-Built-in Carburetor and Starter Dynamo

The starter-built-in carburetor is widely used in all YAMAHA motorcycles. Along with a large-sized starter dynamo, the unique design of the carburetor enables a quick start even in cold, freezing weather.

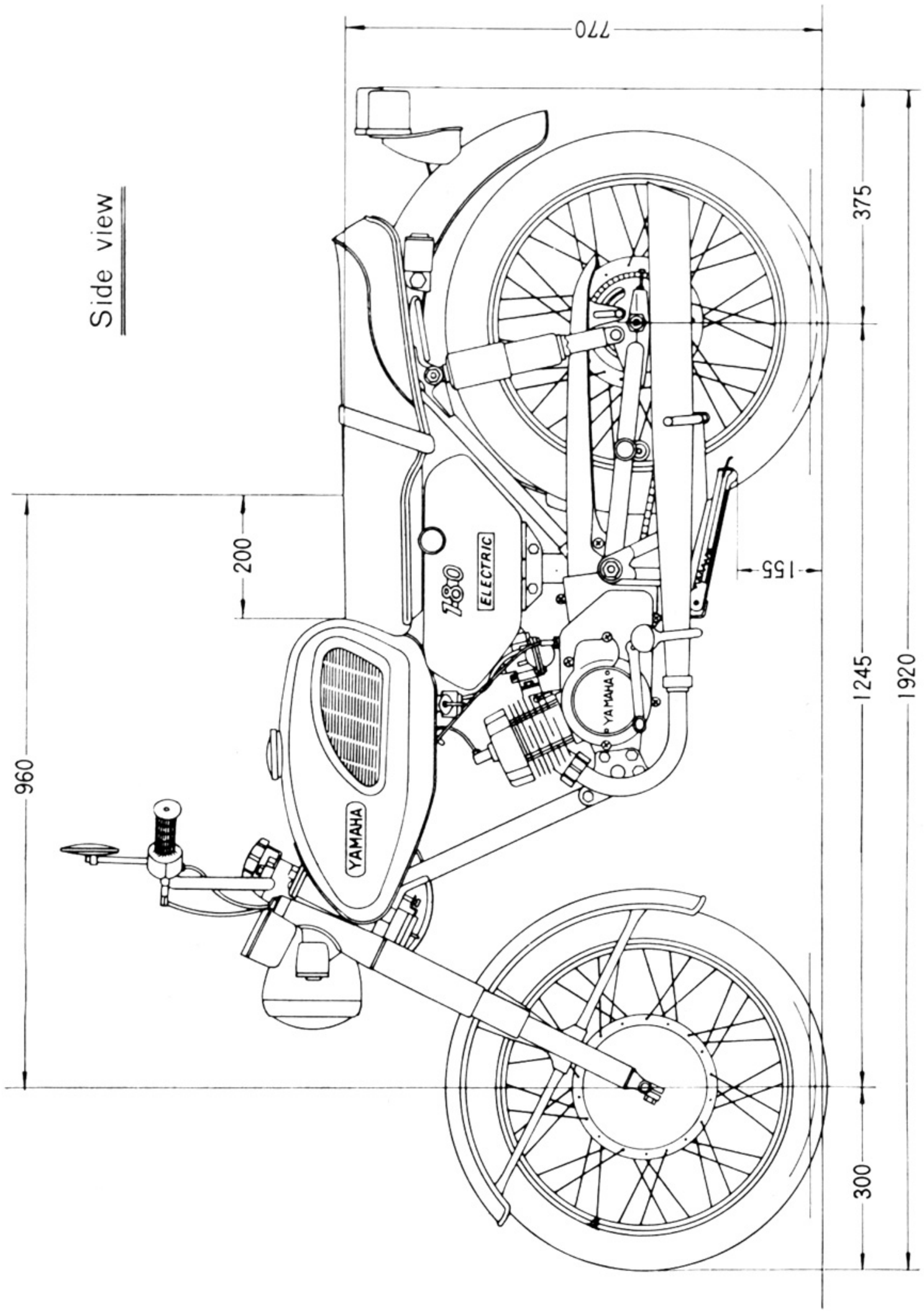
6. Most Effective Brakes

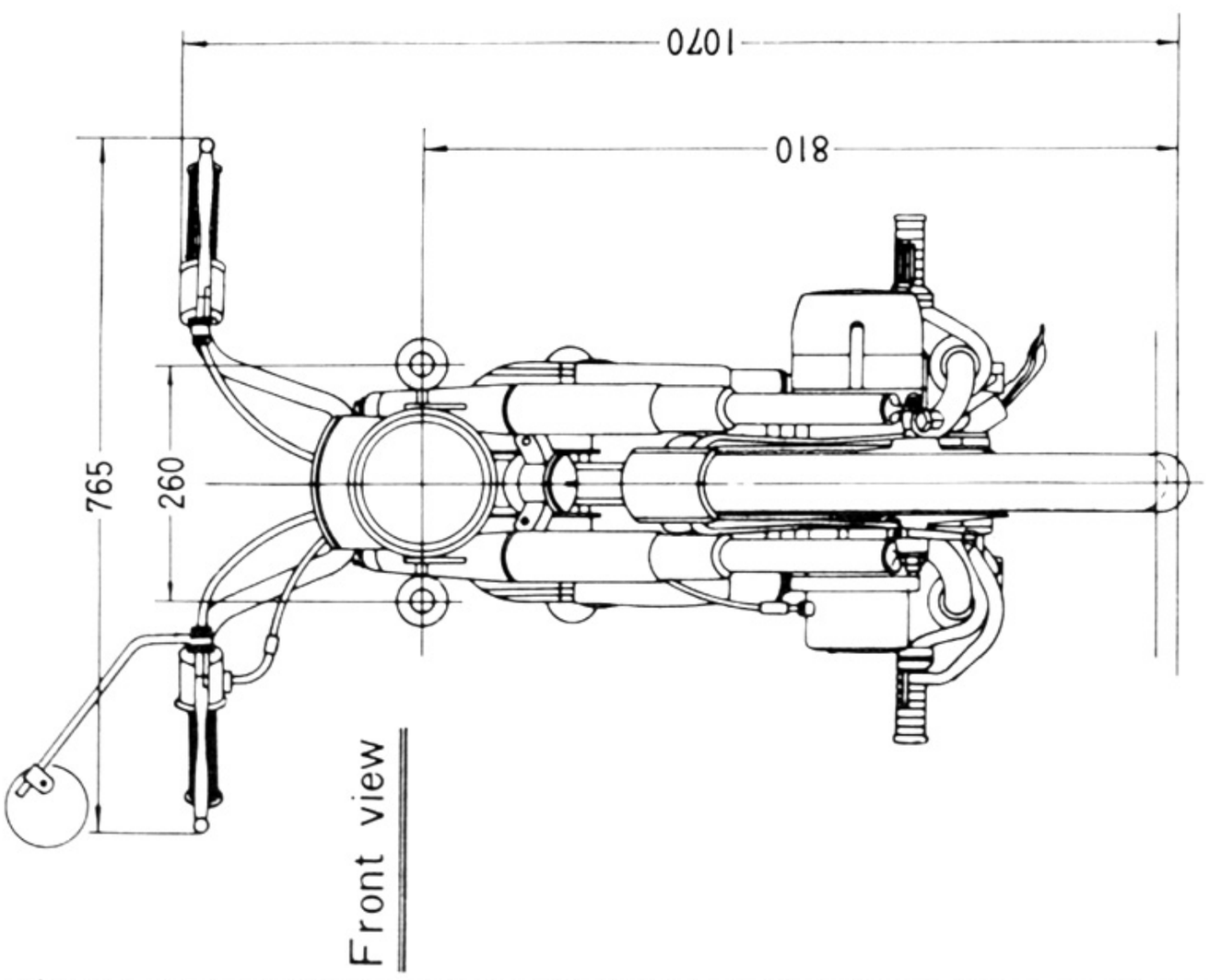
The front brake is of particular importance for high-speed sports motorcycles. With this in mind, the YCSI(C) is provided with a 2-leading shoe type of front brake, whose drum diameter is as large as that of the YAMAHA 350 YRI (180ϕ). Both front and rear brakes are perfectly water-dust proof, thus ensuring stable braking effciency at all times.

7. 3-Stage Adjustable Rear Suspension

The rear supension is adjustable in three stages. This provides a wide choice of spring tension according to running speeds or road condition.

EXTERNAL VIEW (YAMAHA YCS1)





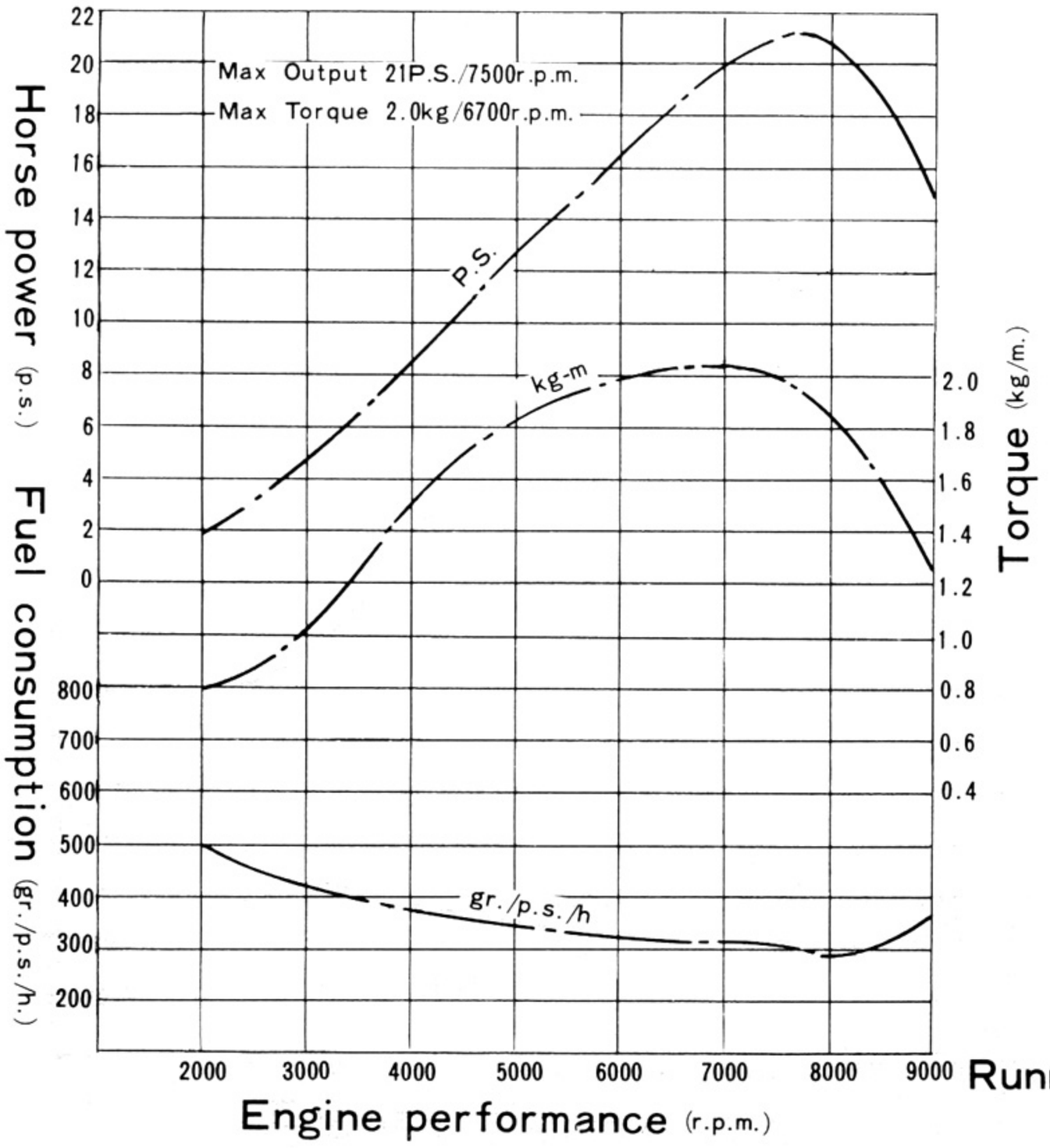
1-2 YAMAHA 180 YCS1/YCS1-C Specifications

Model:	YAMAHA 180 YCS1	YAMAHA 180 YCS1-C
Dimensions:		
Overall length	1,920 mm. (75.7 in.)	1,930 mm. (76.0 in.)
Overall width	765 mm. (30.1 in.)	800 mm. (31.4 in.)
Overall height	1,070 mm. (42.2 in.)	1,005 mm. (39.6 in.)
Wheelbase	1,245 mm. (49.1 in.)	1,245 mm. (49.1 in.)
Min. groand clearance	155 mm. (6.1 in.)	175 mm. (6.9 in.)
Weight:	118 kg. (260 lbs.)	119 kg. (262 lbs.)
Performance:		
Max. speed	140 km/h. (87 mph.)	130 km/h. (82 mph.)
Fuel consumption (on paved,	55 km/ℓ. (40 km/h.)	50 km/ℓ. (40 km/h.)
lovel roads)	130 mpg. (25 mph.)	118 mpg. (25 mph.)
Climbing ability	23°	25°
Min. turning radius	2,050 mm. (80.8 in.)	2,050 mm. (80.8 in.)
Braking distance	12 m or less (50 km/h.)	11 m or less (50 km/h.)
	4.0 ft. or less (31 mph.)	3.6 ft. or less (31 mph.)
Engine:		
Model	CS1-E	CS1-C
Type	2-stroke, gasoline	2-stroke, gasoline
Lubricating system	Separate lubrication (YAMAHA Autolube)	Separate lubrication (YAMAHA Autolube)
Cylinders	2 cylinder in parallel	2 cylinder in parallel
Displacement	180 c.c. (11.0 cu. in.)	180 c.c. (11.0 cu. in.)
Bore × stroke	50×46 mm. (1.97×1.81 in.)	50×46 mm. (1.97×1.81 in.)
Compression ratio	7.4 : 1	6.8 : 1
Max. output	21 PS/8,000 r.p.m.	21 PS/7,500 r.p.m.
Max. torque	2.0 kg-m./7,000 r.p.m. (14.5 ft-lbs./7,000 r.p.m.)	2.0 kg-m./6,700 r.p.m. (14.5 ft-lbs./6,700 r.p.m.)
Starting method	Electric starter	Electric starter
Ignition method	Battery ignition	Battery ignition
Carburetor:	VM18SC×2	VM20SC×2
Air cleaner:	Dry paper filter	Dry paper filter
Transmisson:		
Clutch	Wet multiple disc type	Wet multiple disc type
Primary reduction	Gear	Gear
Primary reduction ratio	53/16=3.313	53/16=3.313
Gear shifting		
Type	Constant mesh 5 speeds	Constant mesh 5 speeds
Gear ratio-1st	12/34=2.833 (23.151)	12/34=2.833 (25.032)
2nd	16/30=1.875 (15.320)	16/30=1.875 (16.568)
3rd	19/27=1.421 (11.611)	19/27=1.421 (12.556)
4th	22/23=1.045 (8.542)	22/23=1.045 (9.234)
5th	25/21=0.840 (6.864)	25/21=0.840 (7.422)

Secondary reduction Secondary reduction ratio	Chain 37/15=2.466	Chain 40/15=2.667
Chassis: Frame Suspension (front) Suspension (rear) Cushion (front) Cushion (rear)	 Steel pipe diamond structure Telescopic Swing arm Coil spring oil damper Coil spring oil damper	 Steel pipe diamond structure Telescopic Swing arm Coil spring oil damper Coil spring oil damper
Steering: Steering angle Caster Trail	 42° right and left 64° 85 mm. (3.35 in.)	 42° right and left 64° 85 mm. (3.35 in.)
Braking: Brake Operation method (front) Operation method (rear)	 Internal expansion Right hand operated Right foot operated	 Internal expansion Right hand operated Right foot operated
Tire size: Front Rear	2.50-18-4PR 2.75-18-4PR	2.75-18-4PR 3.00-18-4PR
Fuel tank capacity:	11.4 ℓ. (3 galls.)	11.4 ℓ. (3 galls.)
Oil tank capacity:	1.93 ℓ. (2.0 qts.)	1.93 ℓ. (2.0 qts.)
Charging generator: Model Maker	 CE-HR Mitsubishi Electric	 CE-HR Mitsubishi Electric
Voltage regulating method:	Tiril method	Tiril method
Spark plug:	B-8HC	B-8HC
Battery: Maker Model Capacity	 Furukawa Denchi BRT3-12 12V, 9-AH	 Furukawa Denchi BRT3-12 12V, 9-AH
Lights: Head light Tail/stop light Flasher light Neutral light Meter light Flasher pilot light	 12V, 35/35W 12V, 7W/23W 12V, 8W×4 12V, 2W 12V, 3W 12V, 2W	 12V, 35/35W 12V, 7W/23W 12V, 8W×4 12V, 2W 12V, 3W 12V, 2W

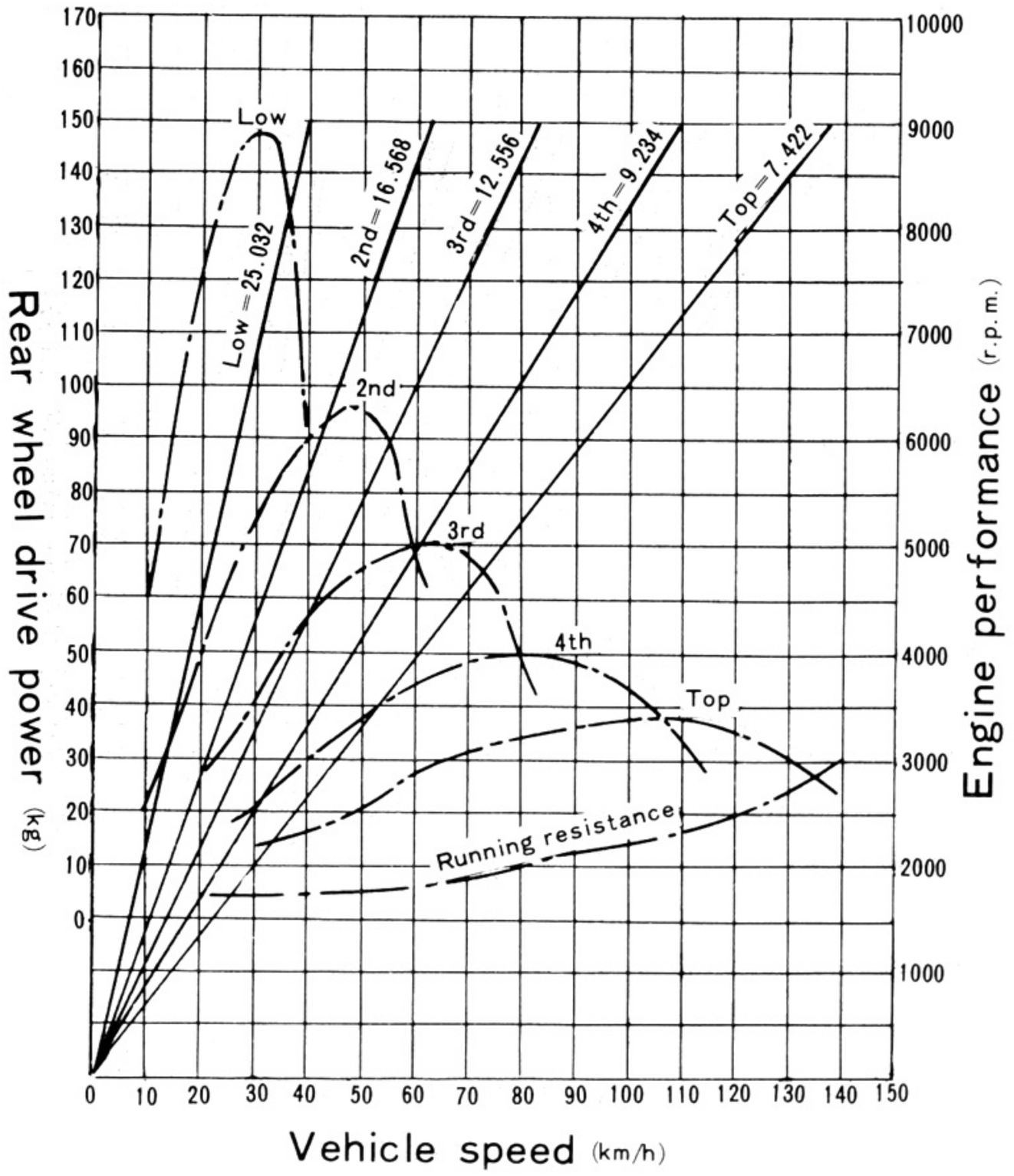
Engine performance curves

Model=YCS1-C



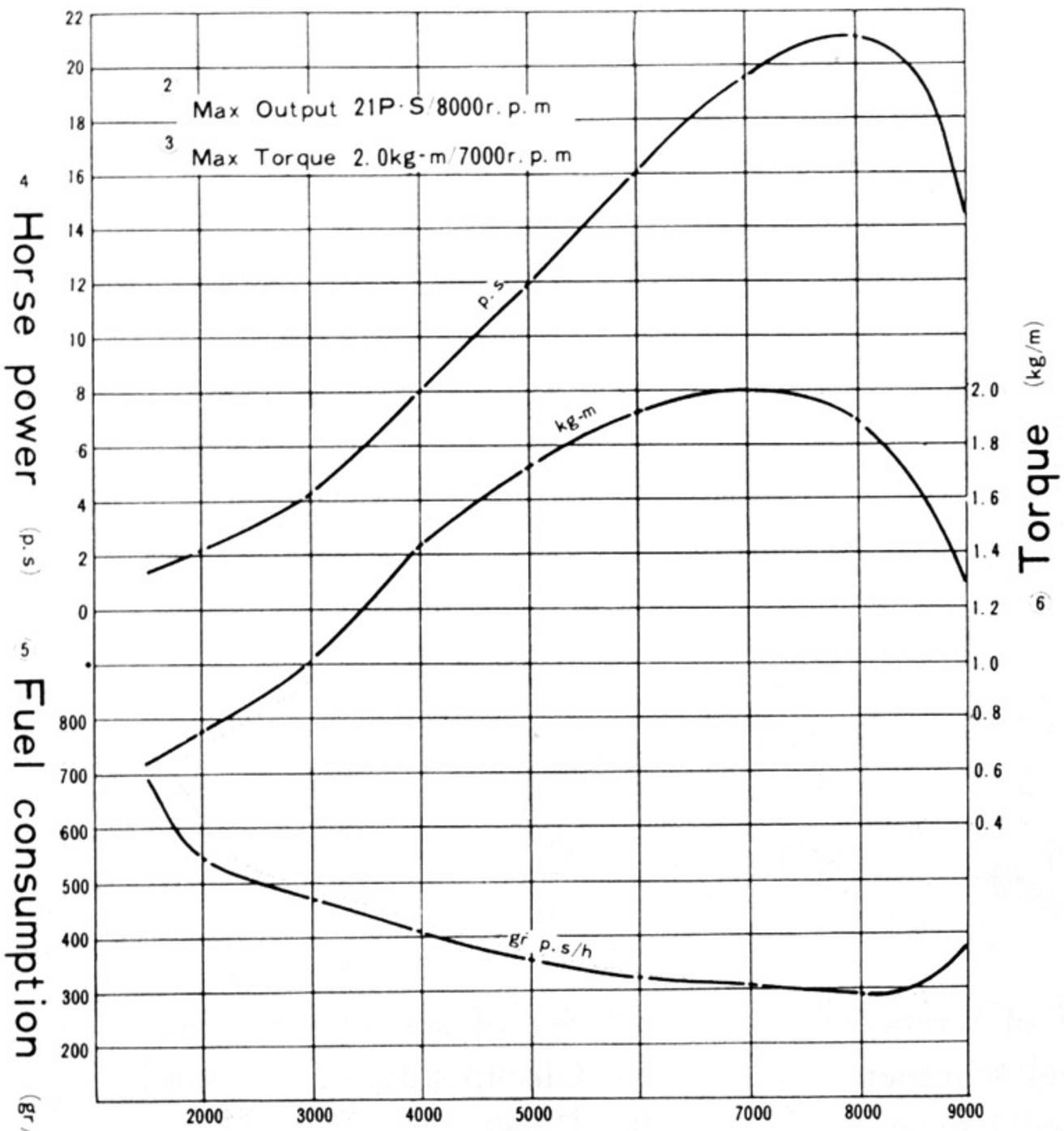
Running performance curve

Model=YCS1-C



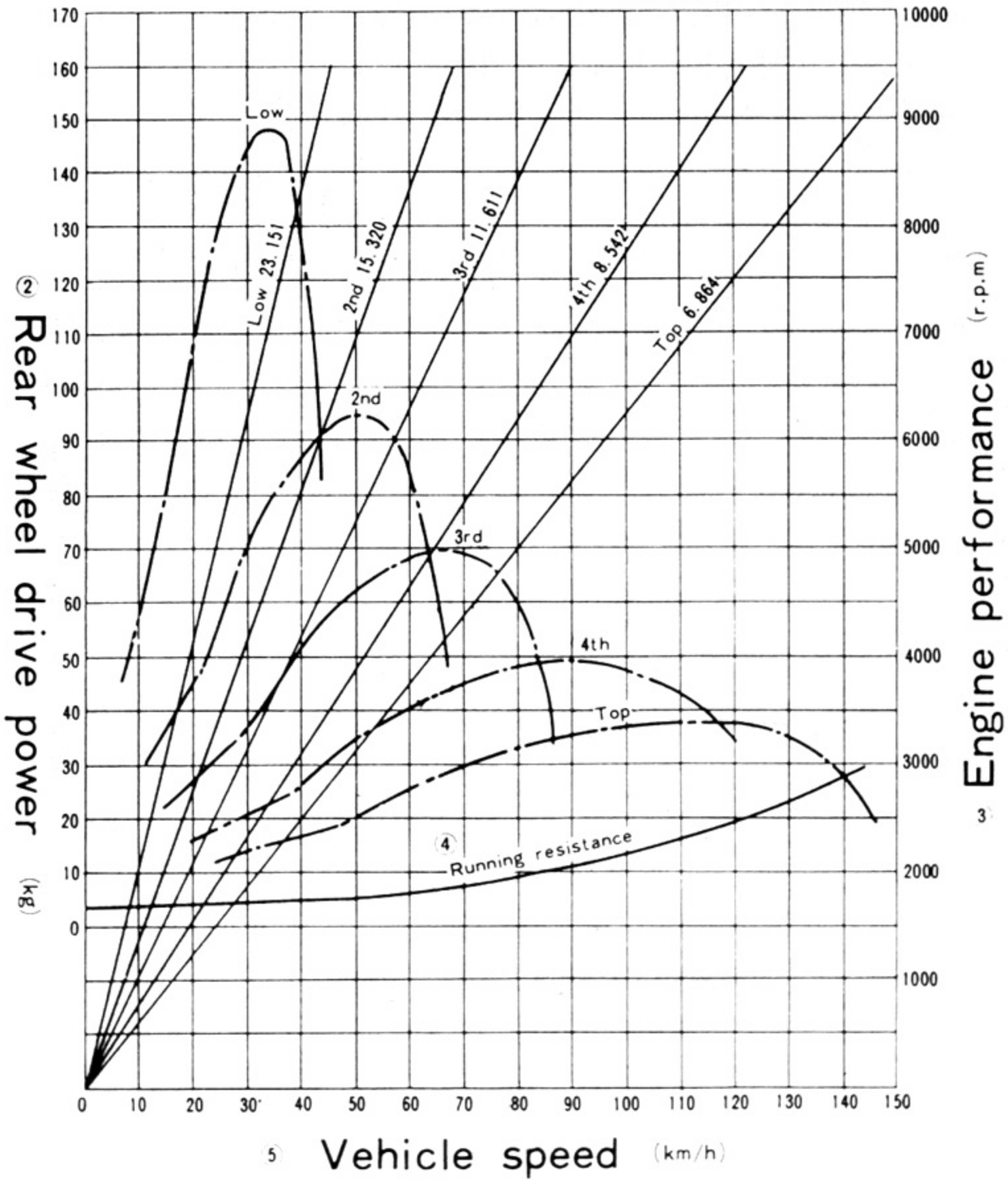
① Engine performance curves

Model = YCS I



① Running performance curve

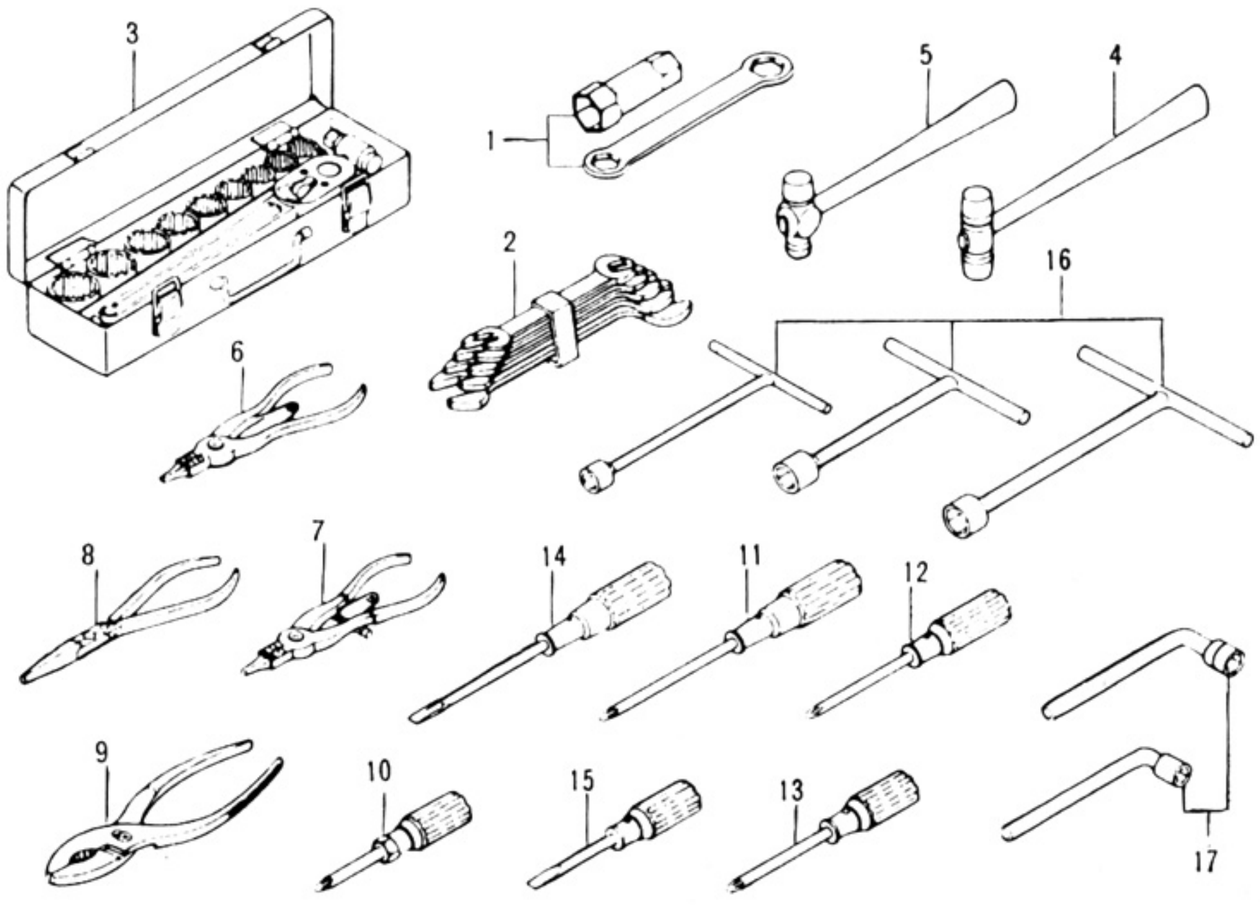
Model = YCS I



1-4. Tools and Instruments for Shop Service

The following tools and instruments are required for shop servicing the 180 YAMAHA YCS1 (C).

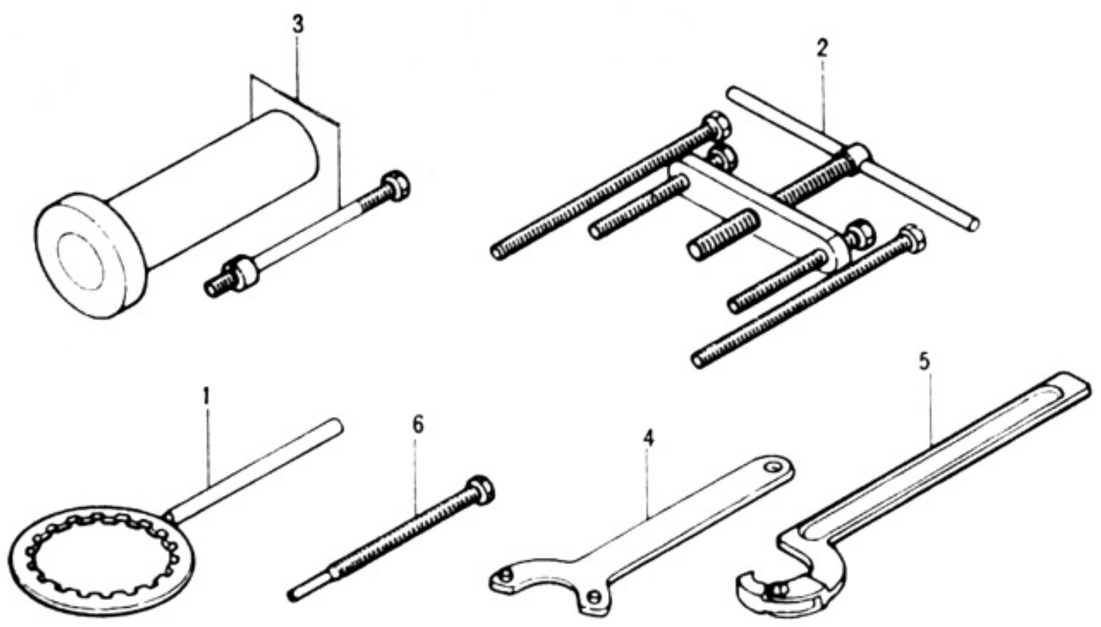
1. Ordinary Tools



1. Plus wrench 23×29
2. Set of wrenches
3. Set of socket wrenches
4. Soft-faced hammer
5. Steel hammer
6. Circlip pliers (ST type)
7. Circlip pliers (RT type)
8. Needle nose
9. Pliers
10. Phillips-head screw driver
11. Phillips-head screw driver (large)
12. Phillips-head screw driver (mcdium)
13. Phillips-head screw driver (small)
14. Slot-head screw driver (medium)
15. Slot-head screw driver (small)
16. T-handle socket wrench
17. T-handle socket wrench

Fig. 1-4-1

2. Special Tools and Instruments

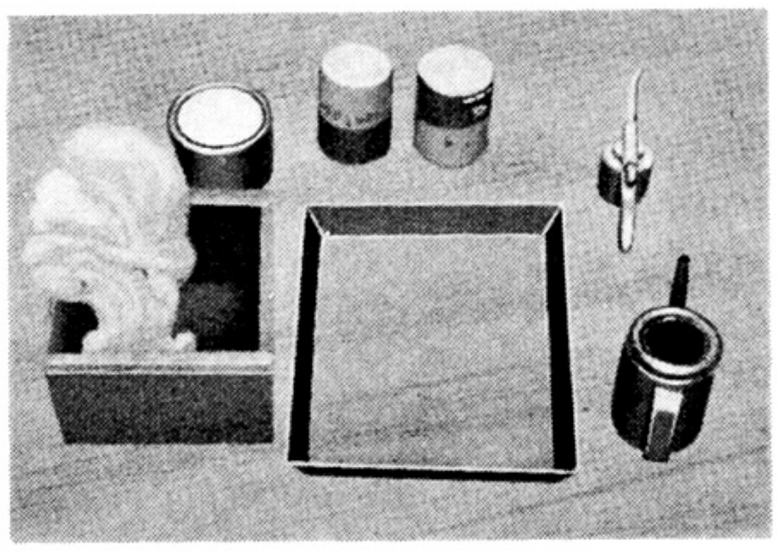


1. YA6 clutch holding tool
2. Carnkcase separating tool
3. Crankshaft installing tool
4. Flywheel magneto holding tool
5. New type exhaust ring nut wrench
6. Mitsubishi armature removing tool

In addition, an electro-tester, tachometer (engine R.P.M. meter), hydrometer, etc.

Fig. 1-4-2

3. Others



1. Grease
2. Autolube oil
3. YAMAHA bond (No. 5)
4. Rags
5. Overhauling stand
6. Parts tray
7. Oil can
8. Oil drain pan

Fig. 1-4-3

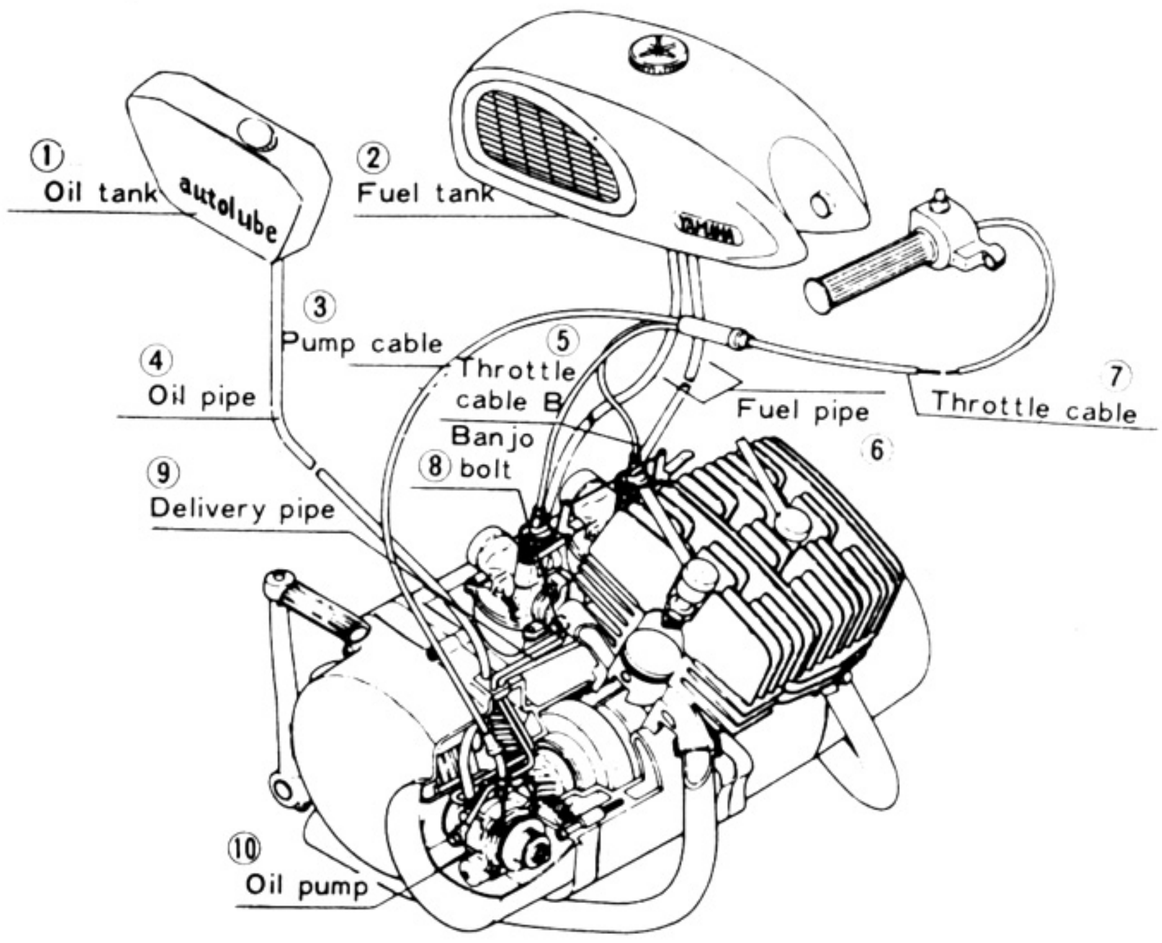
Using a wooden box with a drain pan underneath will facilitate engine disassembly and service. Expendable parts (such as gaskets) and replacement parts must also be on hand.

Chapter 2.

YAMAHA Autolube and 5-Port Cylinder

2-1 What is YAMAHA Autolube?

Yamaha Autolube is an automatic lubricating deuice for 2-stroke engines Developed by the Yamaha Technical Institute, it meters the oil with respect to engine and throttle opening, and reliably delivers this oil by means of a precision pump. As the result, the Yamaha engine does not require the gasoline-oil pre-mixture that other 2-sroke engines must use.



YAMAHA Autolube
Fig. 2-1-1

2-2 Features of YAMAHA Autolube

○The oil pump is driven by the engine through a reduction gear, and is connected to the carburetor throttle valve cables which are controlled by the accelerator grip.

○The oil pump automatically regulates the volume of lubricating oil according to engine rpm (engine speed) and throttle valve opening (load), thus an optimum amount of oil for engine lubrication is delivered under any operating condition.

○This "automatic separate lubrication" does not merely eliminate disadvantages in the pre-mix system, but it further frees the potential efficiency, performance, and durability of the 2-stroke engine.

1. The Autolube feeds an optimum amount of oil for lubriation according to running condition :
   - ○economizes fuel consumption.
   - ○reduces carbon accumulation.
   - ○reduces exhaust smoke.
   - ○improves lubrication efficiency.
2. The Autolube simplifies fuel supply.
   - ○requires gasoline supply only.
   - ○lessens fuel contamination.
3. The Autolube is highly dependable in lubriaction.
   - ○eliminates special care as to oil quality and fuel-oil pre-mixing ratio.

2-3. Handling the Oil Pump

The oil pump is a precision-machined assembly. Make no attempt to disassemble it. When you remove the oil pump from the engine, protect it from dust, dirt, etc.
After reinstallation, be sure to bleed and test the pump correctly. Proper handling will keep the free of trouble.

1. Bleeding

When the oil pump has been removed the oil line is disconnected, or when the oil tank is empty (on brand new machines), air enters the pump case, and interrupts the flow of oil, so the pump must be bled.

○Remove the bleeder bolt, and rotate the starter plate (manual feed wheel) clockwise to feed oil through the pump. Hold the adjusting pulley back (pull the pump cable) to let the plunger pump at maximum stroke. As you turn the starter plate, oil will begin flowing out of the bleeder hole. When air bubbles no longer appear in the oil, you can install and tighten the bleeder bolt. (Fig. 2-2-1)

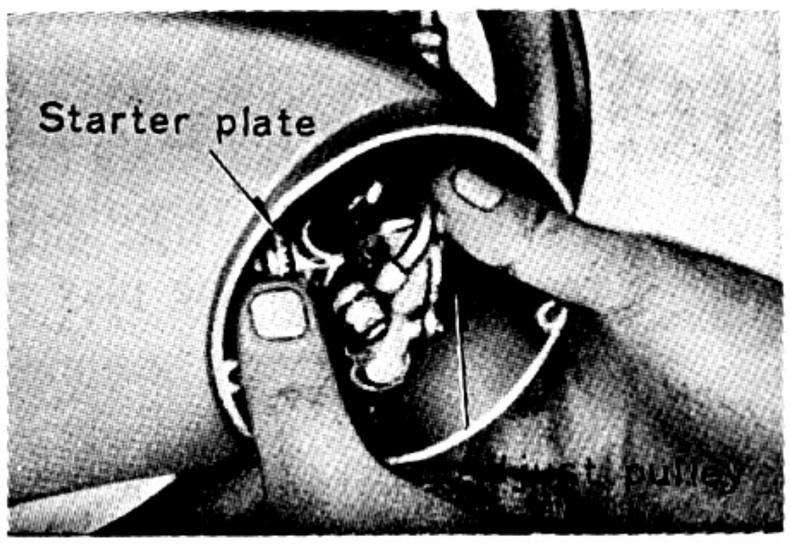


Fig. 2-2-1

○After the pump is reinstalled, correctly adjust the oil pump, coble then start the engine, and with the engine idling, pull the pump cable to let the plunger pump at full stroke.
It usually takes one or two minites to expel all the air, so keep your eye on the oil flowing through the delivery line. When clear air bubbles no longer appear in the line, bleeding is complete.

2. Setting the Carburetor and Pump

(1) Start the epgine and warm it up, then set its sneed is between 1,100 rpm and 1,200 rpm.

a. Be sure the pilot air screw on each carburetor is backed off 2 turns from a lightly seated position.

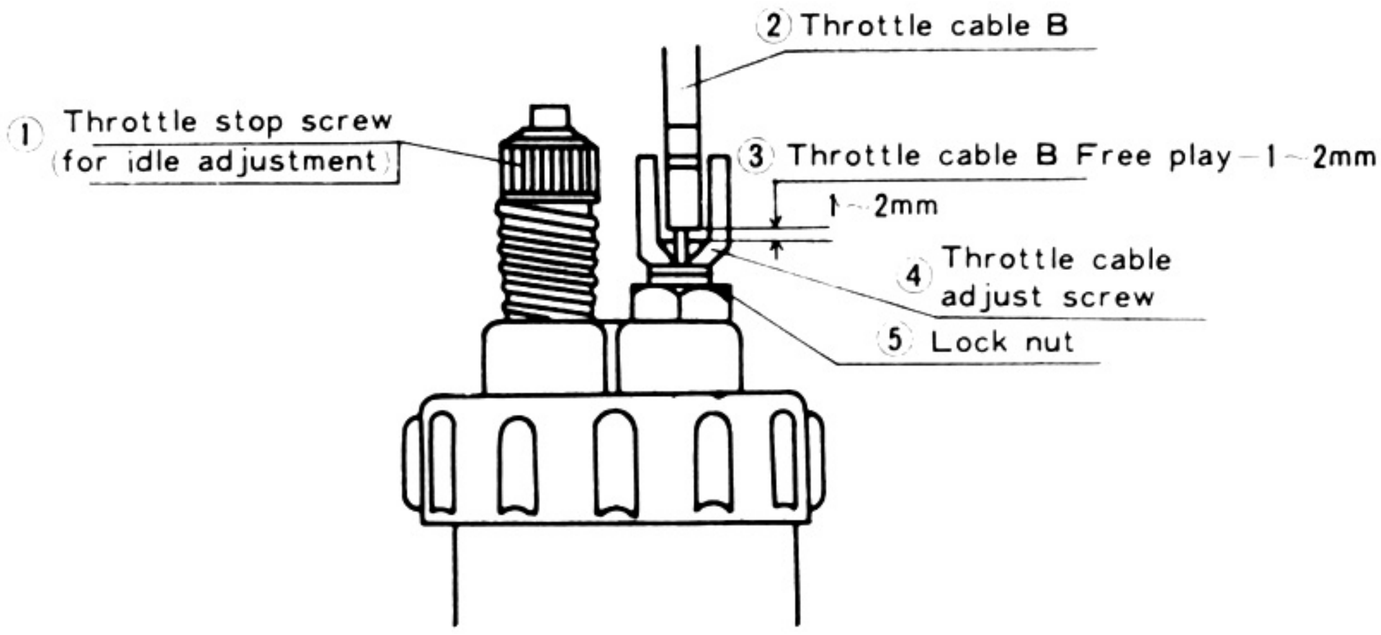


Fig. 2-2-2

b. Adjust the throttle cables so that explosions on both right and left take place evenly.

(2) Adjust the throttle valves so that they function simultaneously.

a. Remove all slack from the two B throttle cables.
Adjsut the throttle cable with the throttle cable adjusting screw. (Fig. 2-2-2)

To remove the play of the B throttle cable, grasp the cable, and move it up and down. If the cable becomes tight, engine idling speed tends to increase.

Adjust both throttle valves so that they function simultaneously.

b. Adjust the play of the throttle cable connccted to the handle grip to 0.5 – 1.0 mm by turning the adjusting nut to the cable guide pipe. (Fig. 2–2–3)

① Handle grip
② Cable guide pipe (A)
③ Throttle cable
④ Adjusting nut

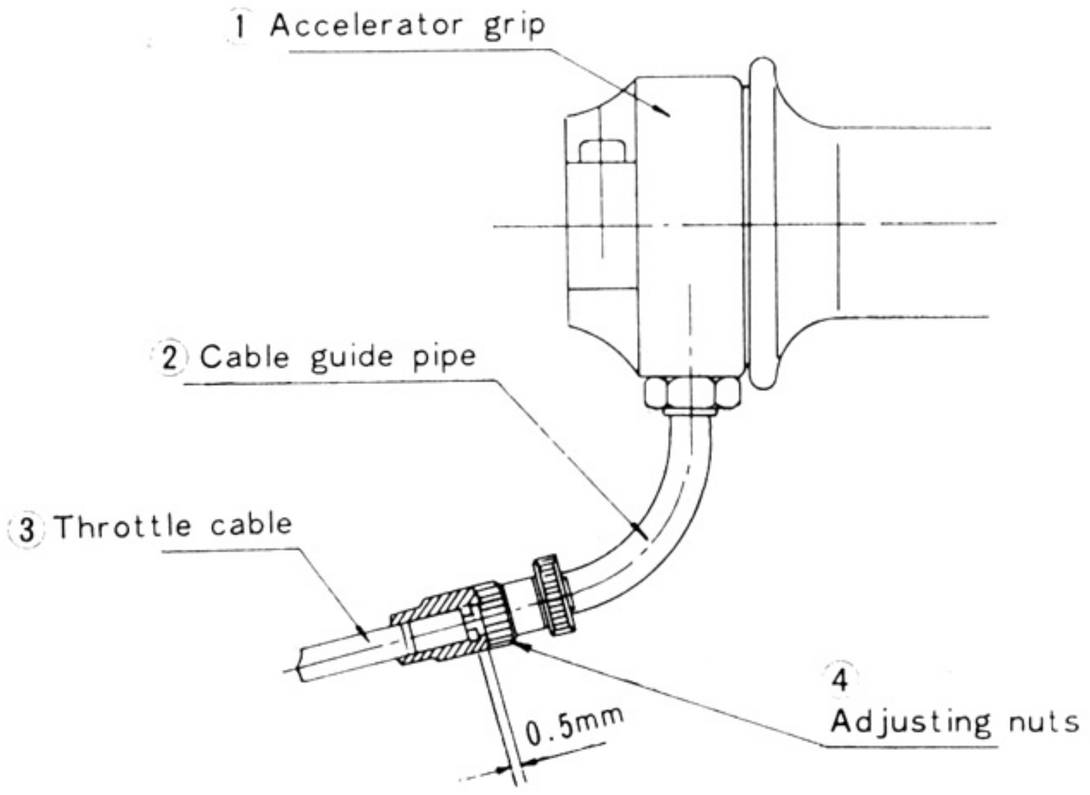


Fig. 2–2–3

(3) After adjusting the throttle cable, set the pump correctly.

a. Slowly open the accelerator grip until the play of the throttle cable is removed. (When the play is reduced to zero, the grip becomes somewhat tight.)

Adjust the pump cable so that the mark on the adjusting pulley is aligned with the guide pin. (Fig. 2–2–4)

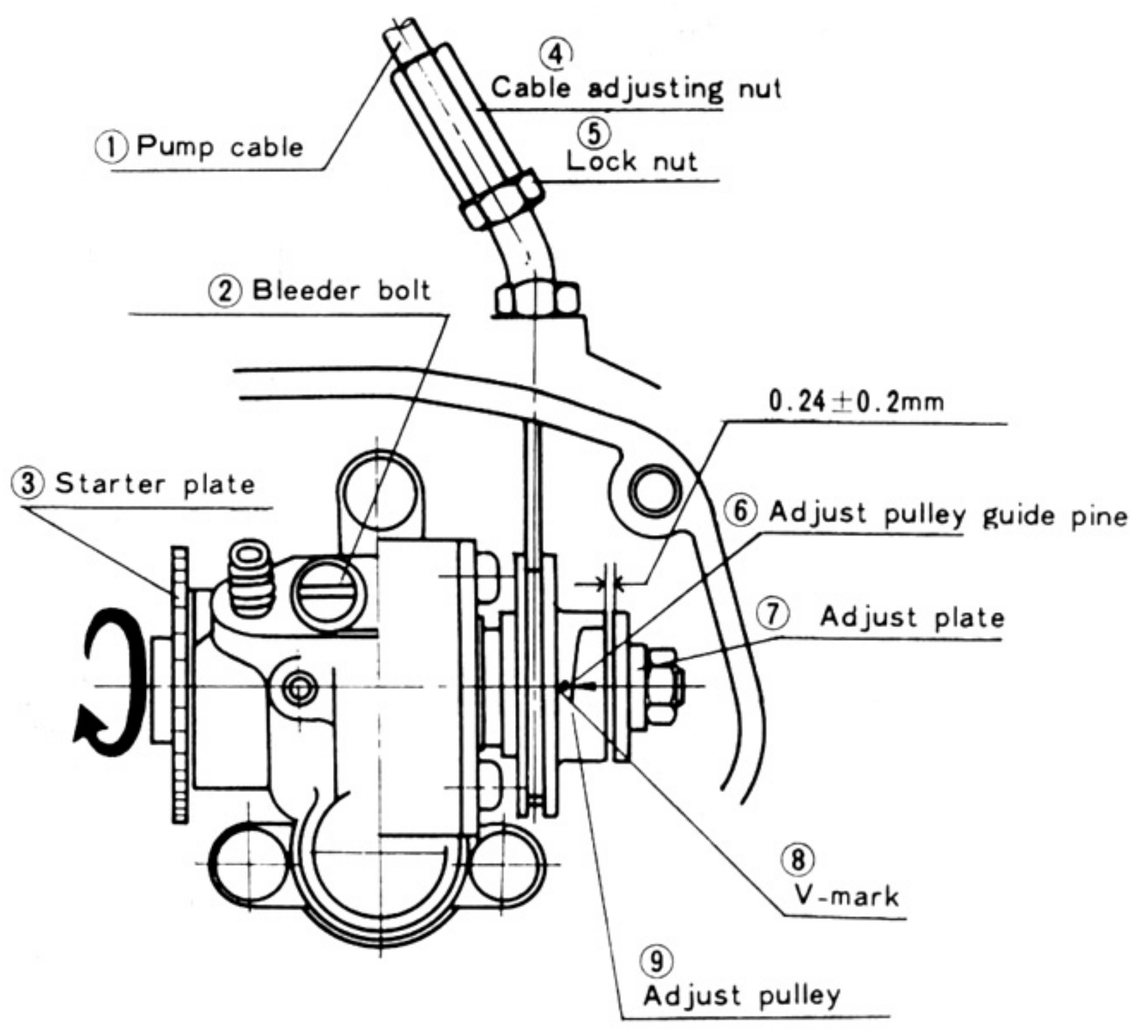


Fig. 2–2–4

(4) Checking Minimum Pump (plunger) Stroke

a. Stop the engine.
b. Fully close the the accelerator grip.
c. Turn the oil pump starter plate in the direction of the arrow (marked on the plate) until the plunger moves to the end of its stroke. Then measure the narrowest gap between the adjusting pulley and the adjusting plate, with a feeler gauge.
d. Correction Standards :

Inspection limit	0.15 mm
Correction standard	0.20 – 0.25 mm

If the adjusting plate-to-pulley clearance is less than the inspection limit, remove the adjusting plate and install a 0.1mm adjusting shim or shims to obtain standard clearance.

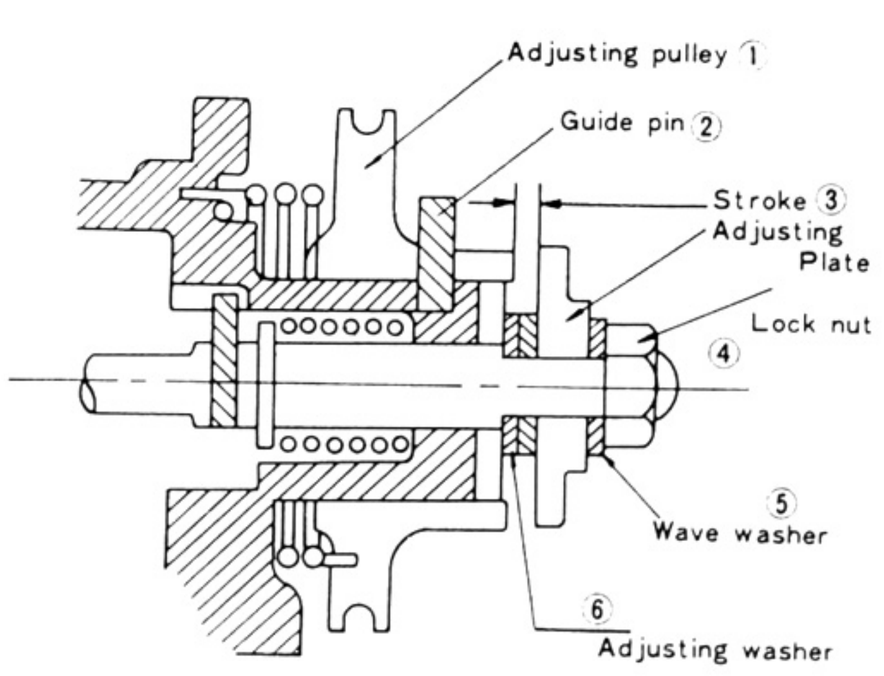


Fig. 2–2–5

2—4 Description of 5-Port Cylinder (YCS1-C, YCS1Minor)

As a high-efficient loop scavenging method for 2-stroke engines, the schnuerle scavenging system is widely employed throughout the world.

In this system, the transfer ports are arranged immediately right and left of the exhaust port(s). If the transfer ports are so designed that their sizes and positions, as well as the angles of the two streams of fresh charge, are very satisfactory, the schnuerle scavenging system will be better than any other loop scavenging system.
The system however, has a design limit in itself; that is, the transfer ports cannot be made large enough to completely clear the combustion gas from the combustion chamber, because of their relationship with the other ports (inlet and exhaust).

As a result, part of the combustion gas remains in the upper central area of the cylinder. If such a disadvantage can be overcome, the scavenging efficiency will greatly improve, and the performance of 2-stroke engine will also be enhanced. To this end, the rotary valve engine with the third transfer ports cylinder has been developed, and can be expected to achieve higher performance than piston valve engines.

As already mentioned, the 5-port cylinder has been designed with the aim of surpassing the present limit of the scavenging system for piston valve engines. With this new design of the cylinder, the combustion gas can be completely cleared out by the streams from the new "auxiliary transfer ports", and in consequnce, greater engine output can be obtained, along with higher scavenging efficiency.

The 5-port cylinder is the first of its kind and a revolutionaly innovation that YAMAHA has succeeded in adopting to 2-stroke engines, following the famous rotary valve and Autolube lubricating systems.

2—5 Construction and Features (See Figs. 2-5-1 and 2.)

The cylinder is provided with two auxiliary transfer passages branching off the main transfer passages located above the crankcase gas-tight joint (sealing surface).

The auxiliary transfer ports are positioned almost even with the main transfer ports, and induction is deflected to the area where the combustion gas otherwise tends to remain.

As the high pressure of the burnt gas moves the piston downward, the fresh charge of gas rushes into the cylinder, forming a loop stream (a), and clearing the burnt gas out into the exhaust port. At the same time, the air/fuel mixture rushes into the cylinder from the auxiliary transfer ports forming additional loop streams (c) to clear out the remaining burnt gas in the upper central area of the cylinder.

These auxiliary transfer ports play the same role as the third transfer port in the rotary valve engine. As a result, the 5-port system can compare favorably with the conventional rotary valve system, assuring high-performance both at low and at high engine speeds.

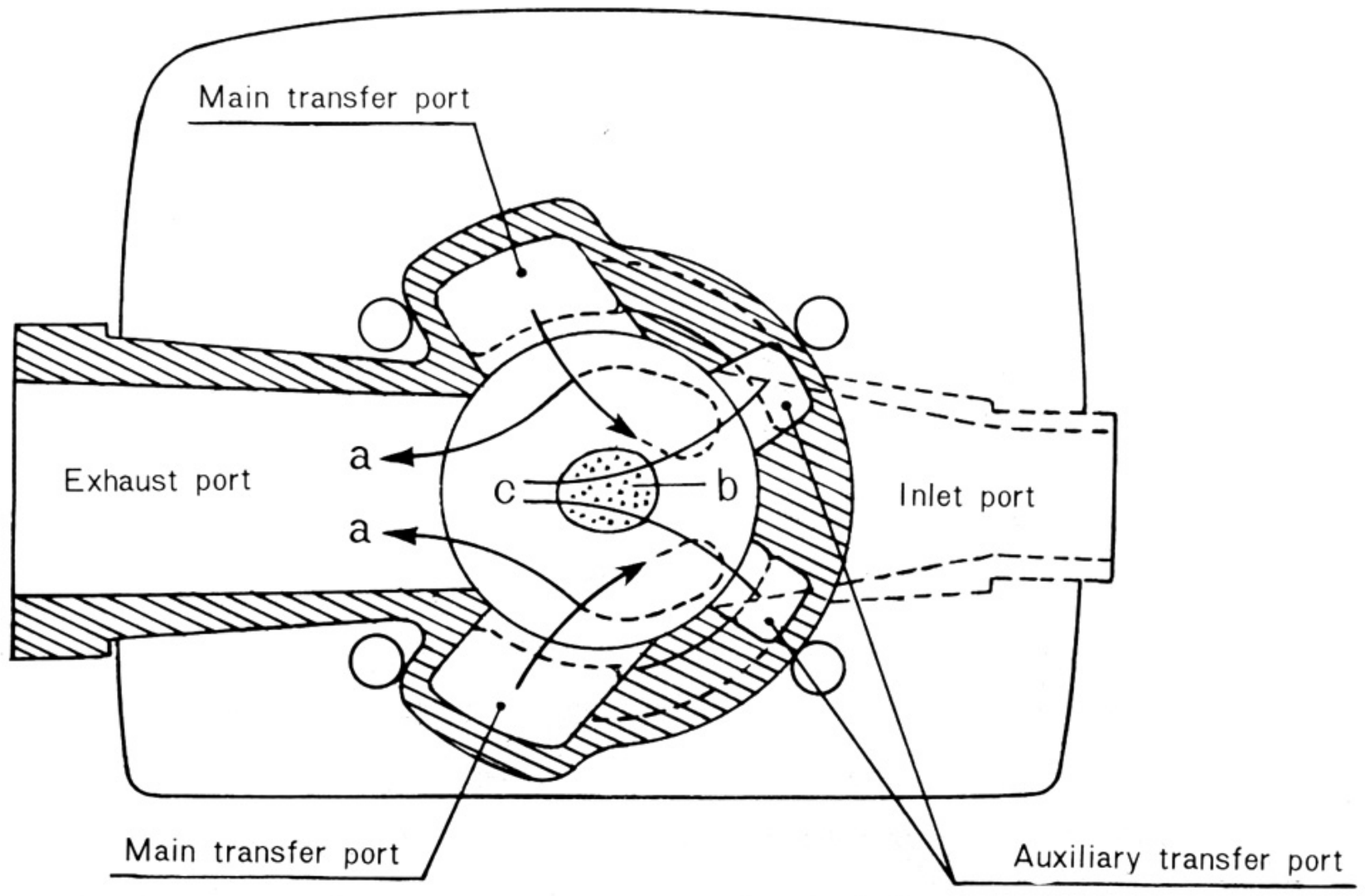


Fig. 2-5-1

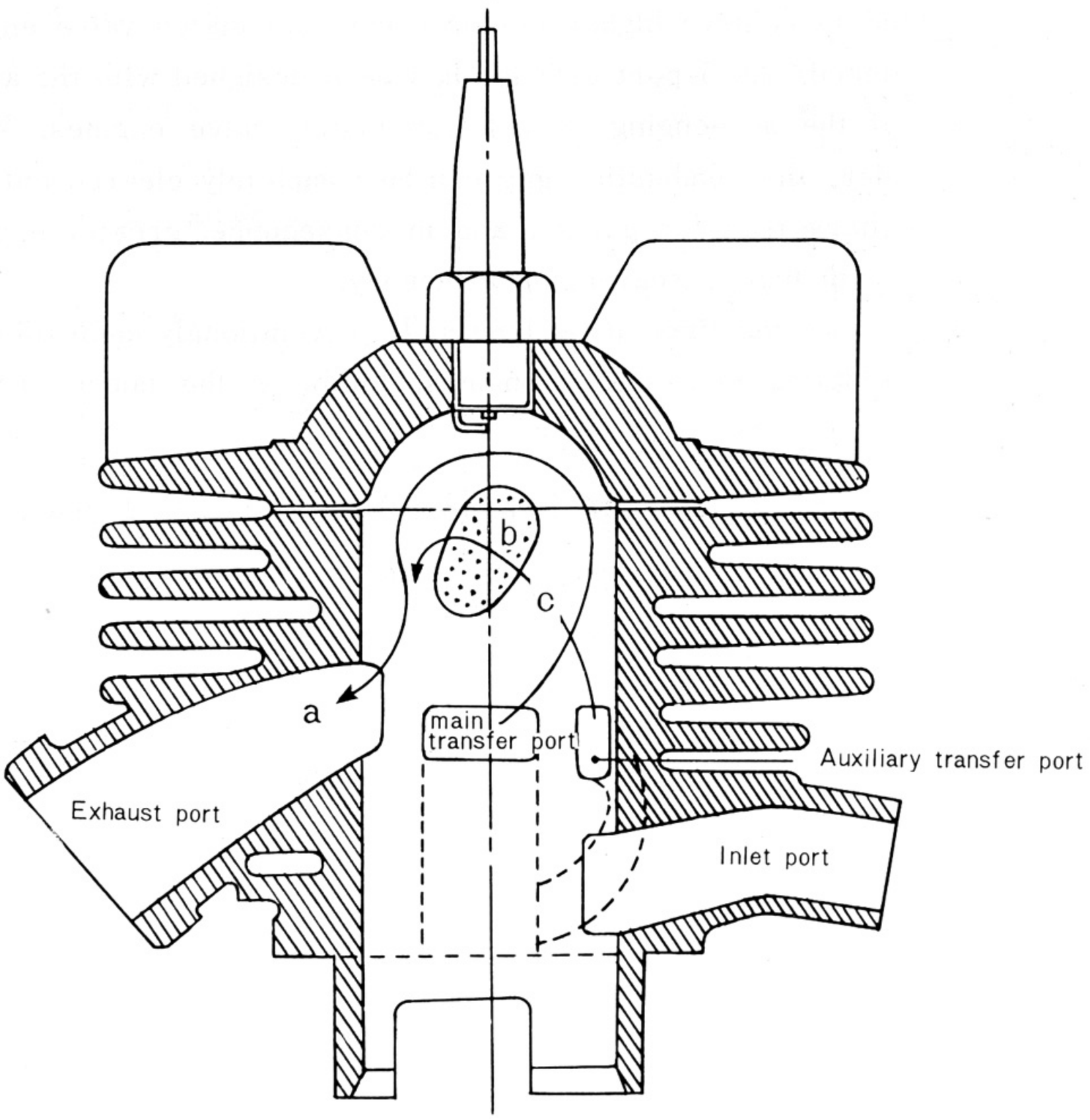


Fig. 2-5-2

Chapter 3.

Engine

The engine should be disassembled and reassembled in an orderly sequence to make your work easier and more efficient. The procedures outlined here are "examples," not inflexible rules for all repair jobs.

Caution on Engine Disassembling :

○Before removing the engine, clean the dirt and dust from its cylinder heads, cylinders and crankcase in order to keep these parts clean inside during disassembly.

○Always use clean tools and use them correctly to avoid damaging parts.

○Keep disassembled parts on the parts trays in separate groups or sub-assemblies.

3-1. Removing the Engine

1. Warm up the engine for one or two minutes, and drain the transmission oil. (Fig. 3-1-1)

   Amount of transmission oil :

   850 cc 0.9 qt. (YAMAHA gear oil SAE 10W/30 or similar gear oil)

2. Remove the mufflers and exhaust pipes. (Fig. 3-1-2)
3. Remove the foot rest, change pedal and crankcase cover (L).

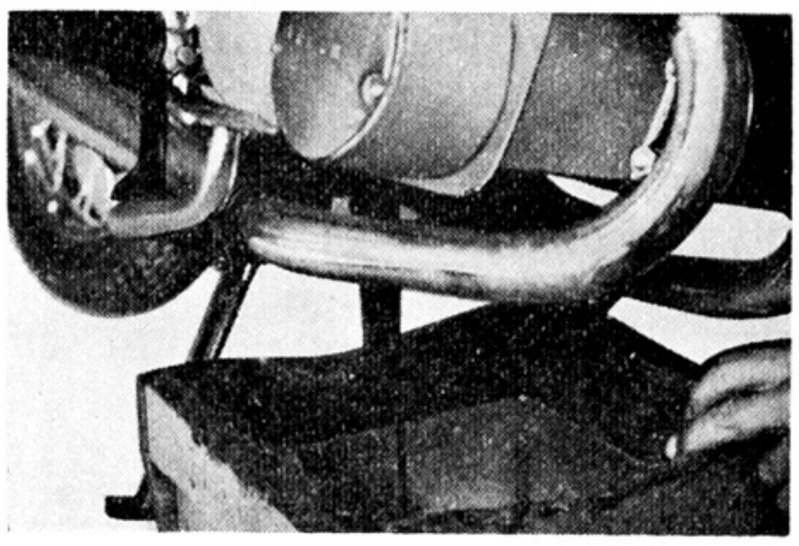


Fig. 3-1-1

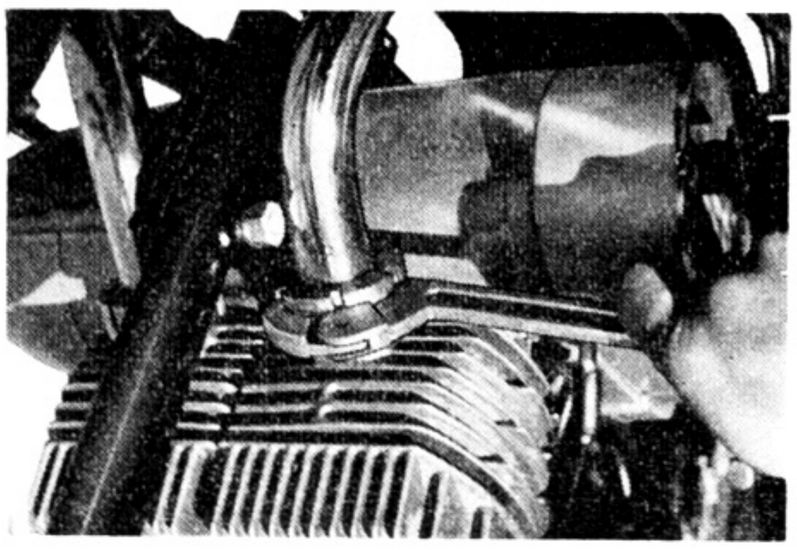


Fig. 3-1-2

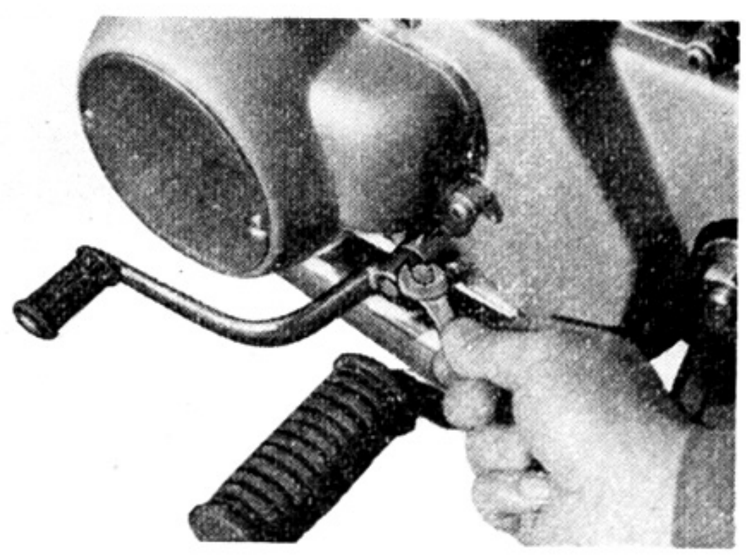


Fig. 3-1-3

4. Remove the dynamo. (Remove the wire harness.)

(1) Remove the governor. (Fig. 3-1-4)

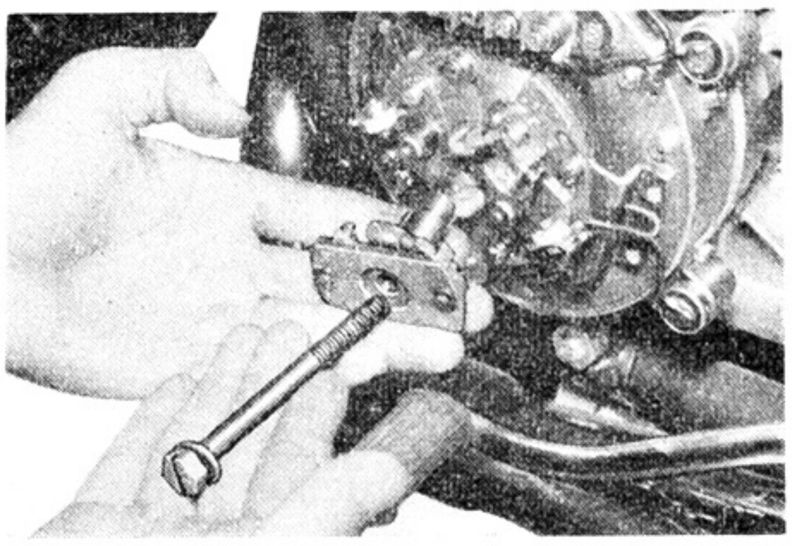


Fig. 3-1-4

(2) Remove the yoke ass'y, (Fig. 3-1-5)

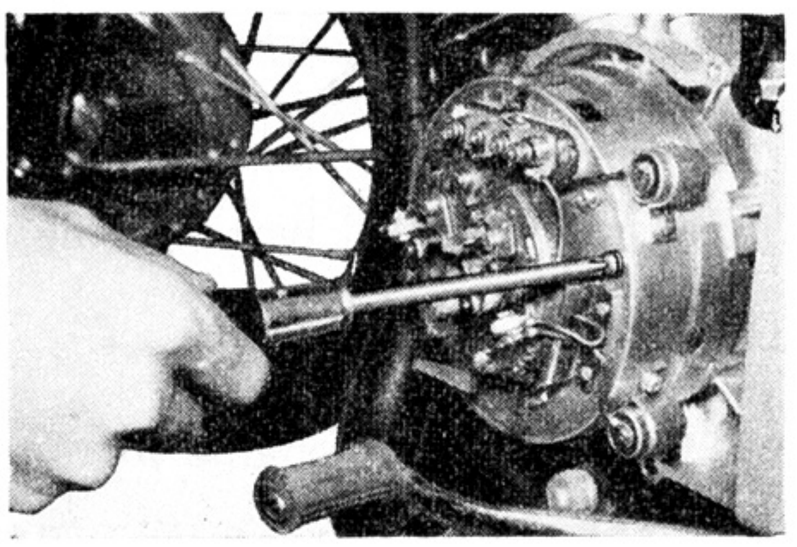


Fig. 3-1-5

(3) Remove the armature by the use of the armature puller bolt. (Fig. 3-1-6)

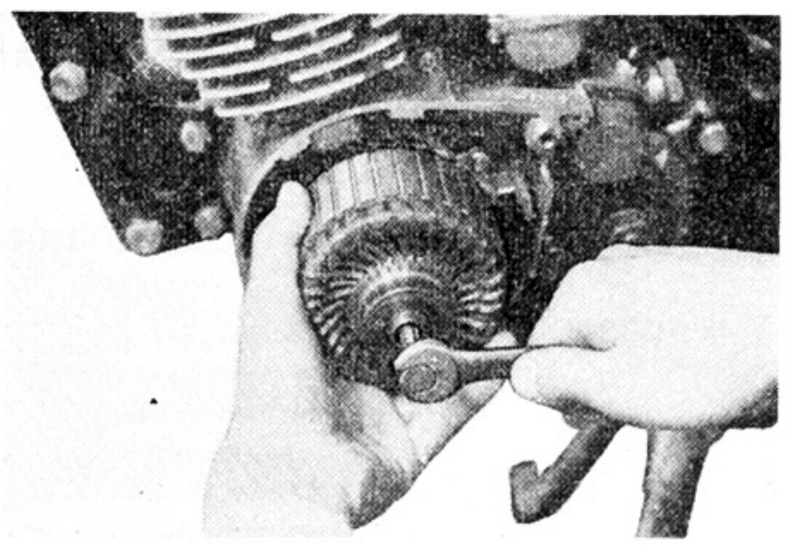


Fig. 3-1-6

5. Remove the carburetor throttle valve. (Fig. 3-1-7)

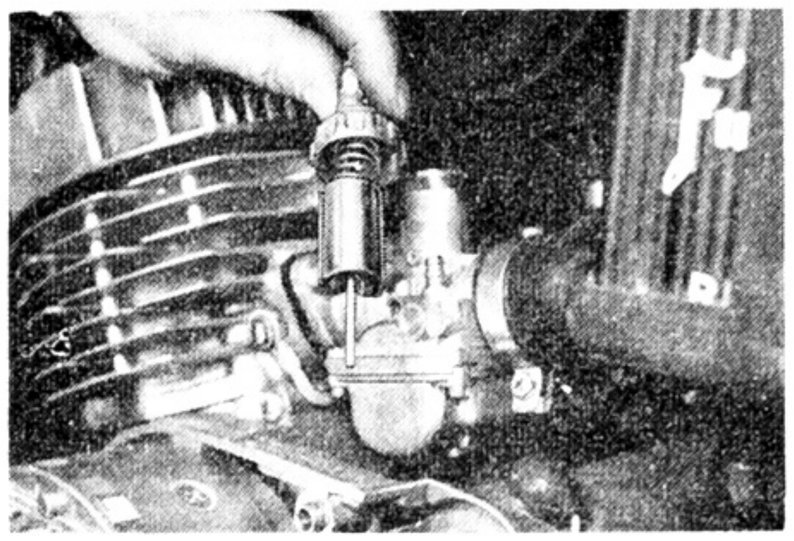


Fig. 3-1-7

6. Remove the air cleaner rubber.
(Fig. 3-1-8)
7. Remove the neutral light wiring.
8. Remove the carburetor.

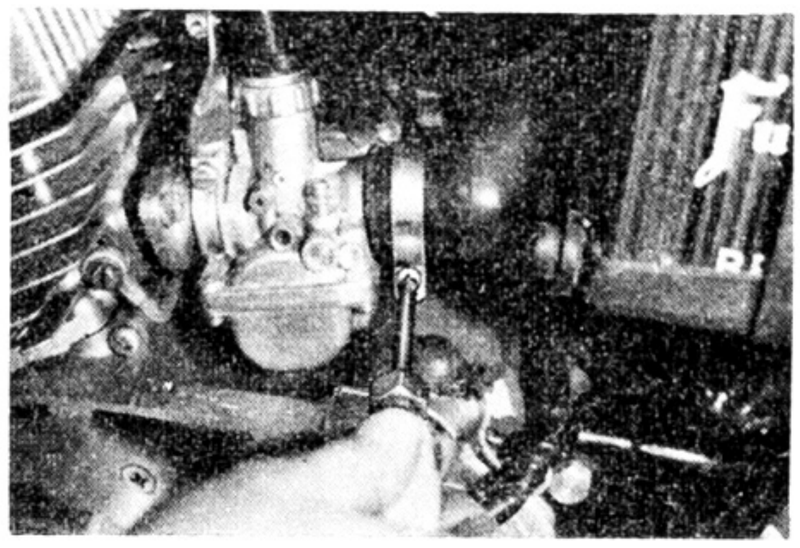


Fig. 3-1-8

9. Remove the chain. (Fig. 3-1-9)

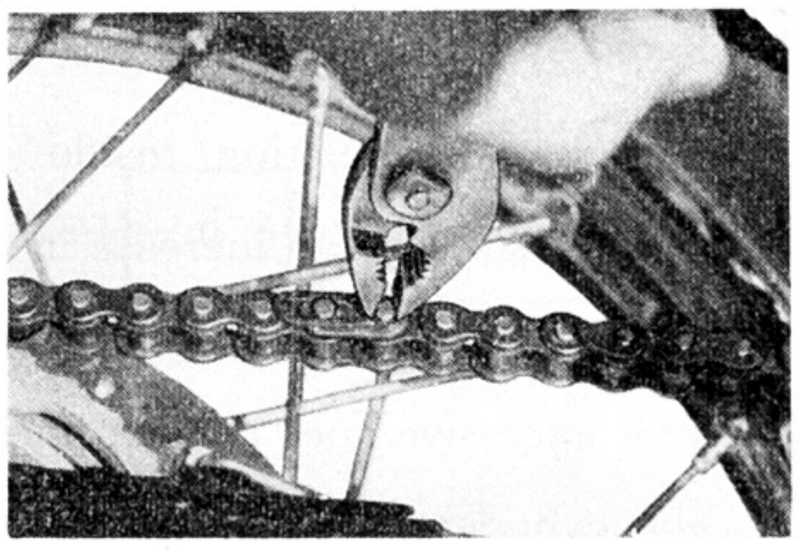


Fig. 3-1-9

10. Disconnect the oil pipe from the oil tank bottom. (Fig. 3-1-10)
Install a plug in the oil tank outlet.
11. Remove the oil pump cable. (Fig. 3-1-11)
12. Remove the engine mounting bolts, and remove the engine from the chassis.
(Fig. 3-1-12)

Fig. 3-1-10

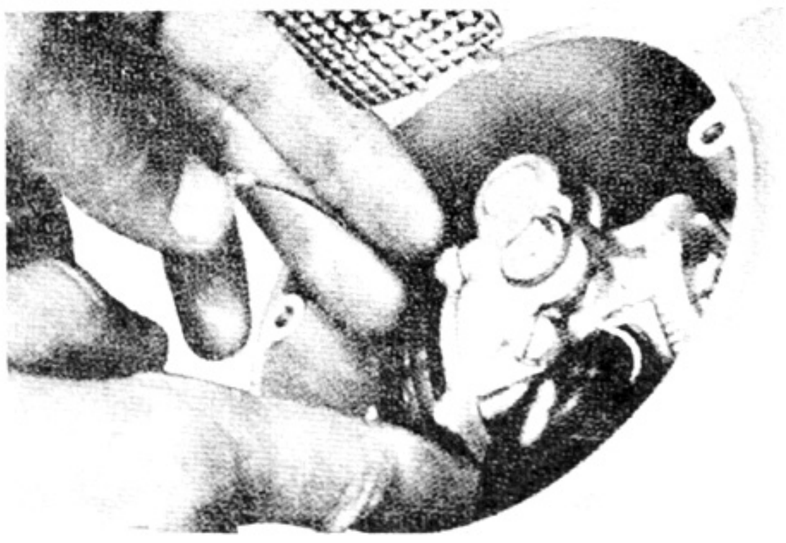


Fig. 3-1-11

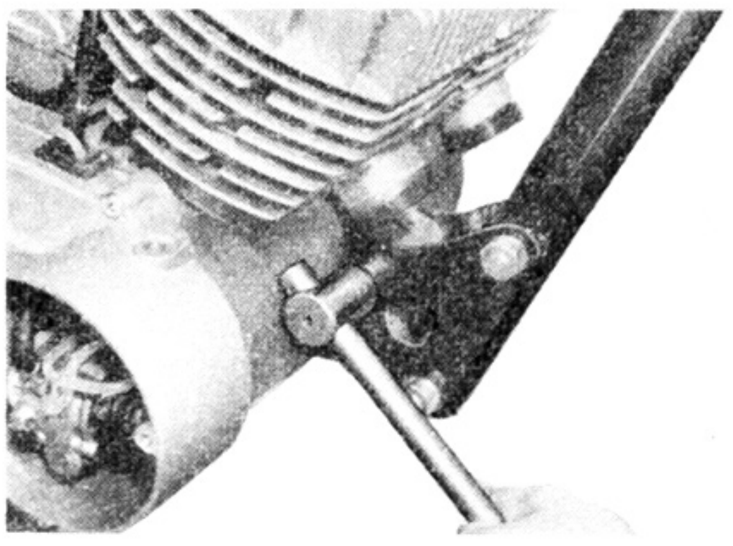


Fig. 3-1-12

3-2. Cylinder Heads

1. Removal and Reinstallation

Remove the nuts on the four cylinder stud bolts, then remove the cylinder head and cylinder head gaskets. (Fig. 3-2-1)

If the gaskets are damaged or defective, replace them.

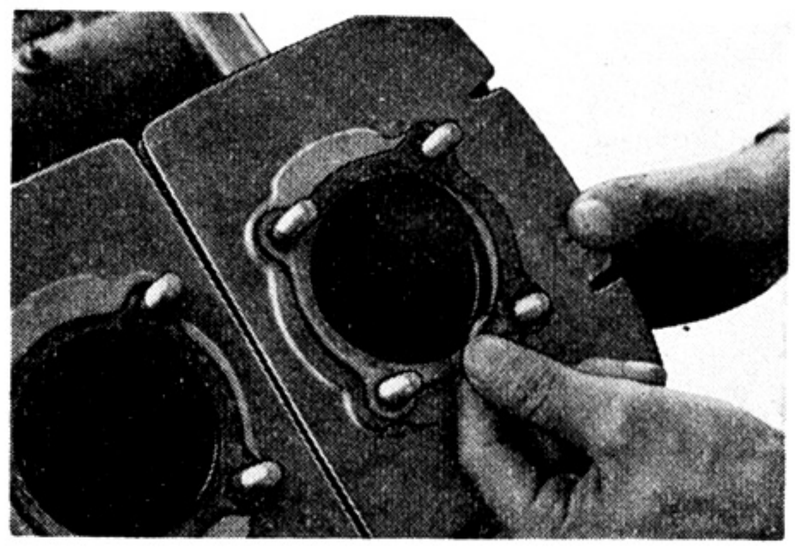


Fig. 3-2-1

2. Removing Carbon

Carbon accumulation inside the cylinder head results in an increase in the compression ratio, causing pre-ignition, overheating, and excessive fuel consumption, so scrape the cylinder heads clean. (Fig. 3-2-2)

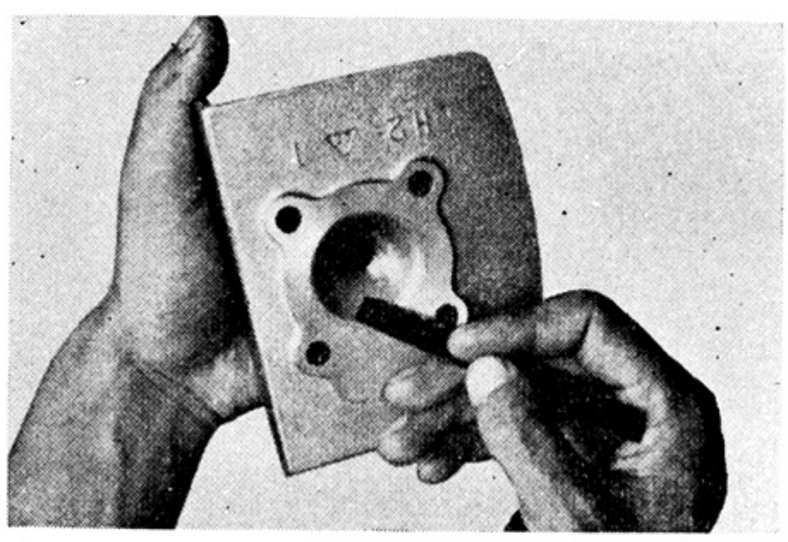


Fig. 3-2-2

3-3. Cylinders

The YAMAHA 180 YCS1 (C) has aluminum cylinders with cast iron sleeves. The new cylinder not only weighs less than the conventionel type, but also has solved problems such as seizure between the piston and the cylinder resulting from the difference in heat expansion coefficient (while the motorcycle is running at high speed).

The cylinder possesses an outstanding radiation efficiency, thus assuring high performance.

1. Removal

As shown in Fig. 3-3-1, remove the cylinder by gently striking it with a soft-faced hammer.

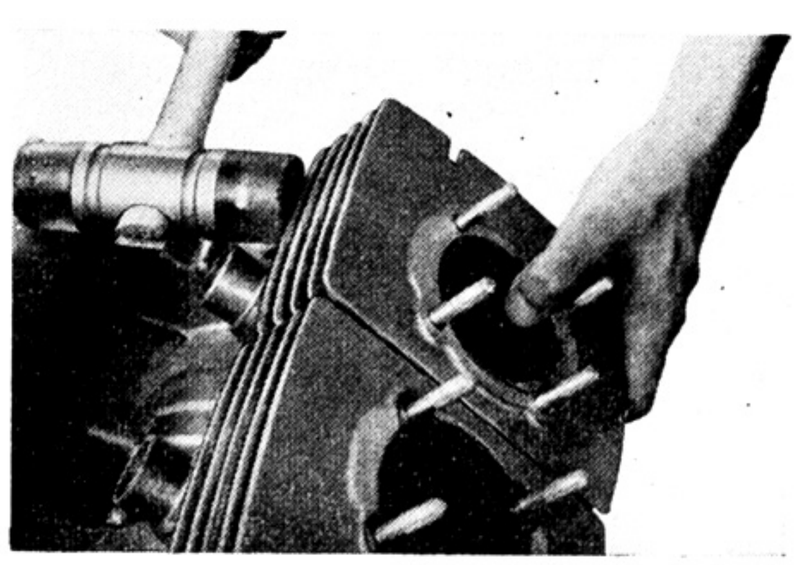
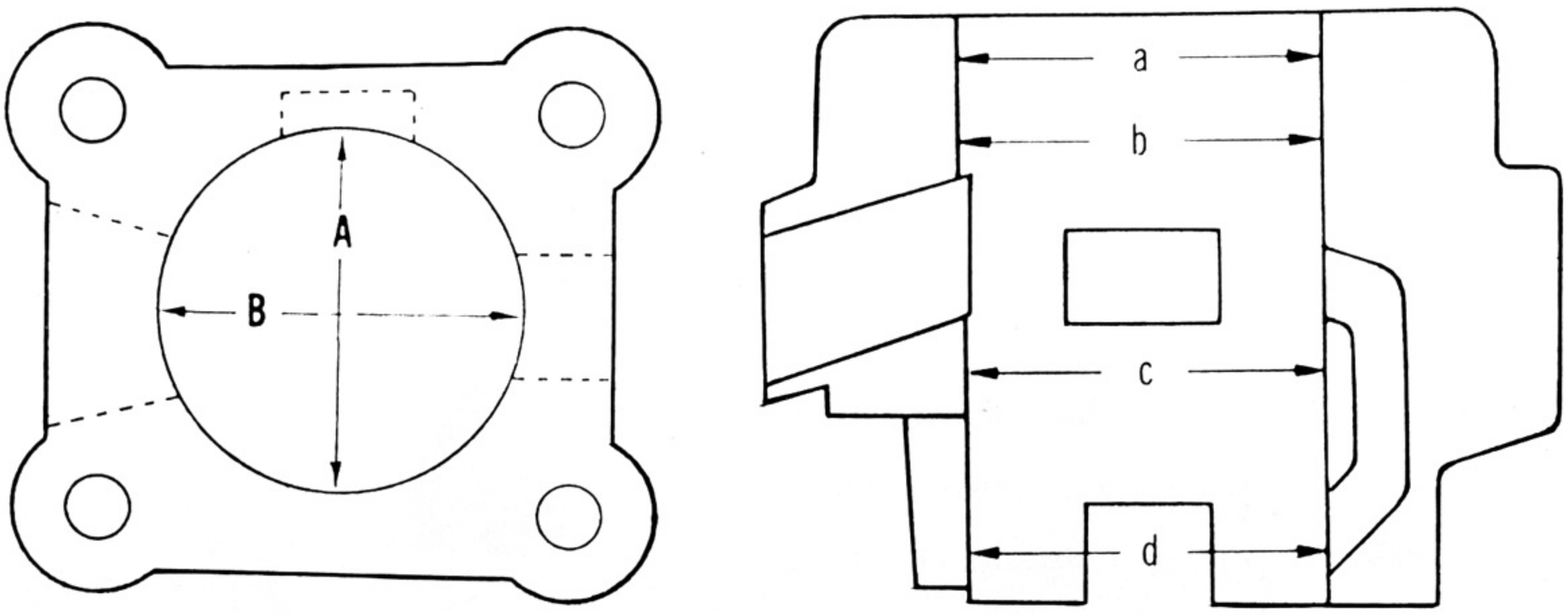


Fig. 3-3-1

2. Checking Cylinder Wear

Measure each cylinder's bore diameter at four different depth with a bore-measuring micrometer or a cylinder gauge placed parallel to, then at right angles to the crankshaft, for 8 measurements in each cylinder. If the difference between the maximum and minimum diameters measured excceds 0.05 mm, rebore and hone the cylinder. (Fig. 3-3-2)



Measuring Positions Fig. 3-3-2

The minimum clearance between the piston and the cylinder should be between 0.030 mm and 0.035 mm.

Note on Cylinder Reconditioning :

a. Pistons are available in 0.25 mm and 0.50mm oversizes.

b. Cylinders should be rebored and honed to the diameter of the oversize piston plus piston to-cylinder clearance.

c. The error between maximum and minimum bore diameters after honing should be no more than 0.01 mm.

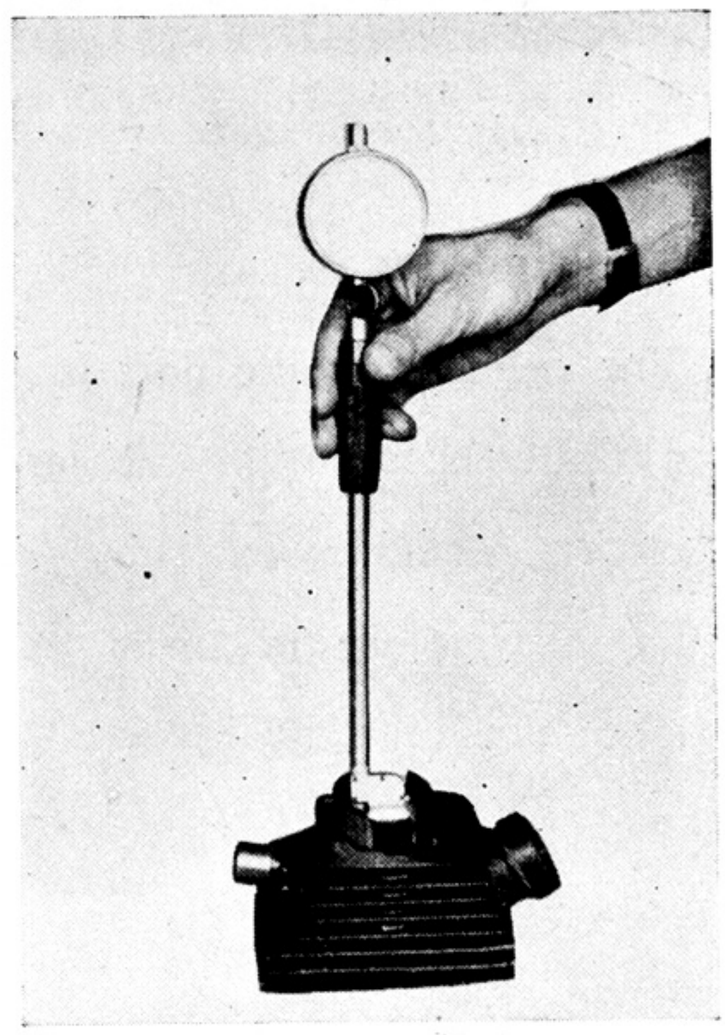


Fig. 3-3-3

3. Installation

a. Always use new cylinder gaskets when overhauling the engine. (Fig. 3-3-4)

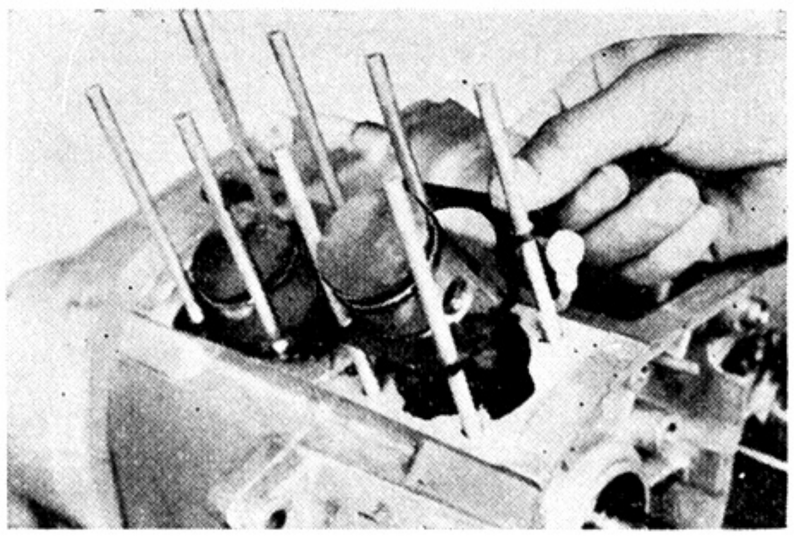


Fig. 3-3-4

b. When installing the cylinder over the piston, squeeze the piston rings into their grooves (their end gaps should close on the knock pin) so they will not catch and break on the bottom of the cylinder. (Fig. 3-3-5)

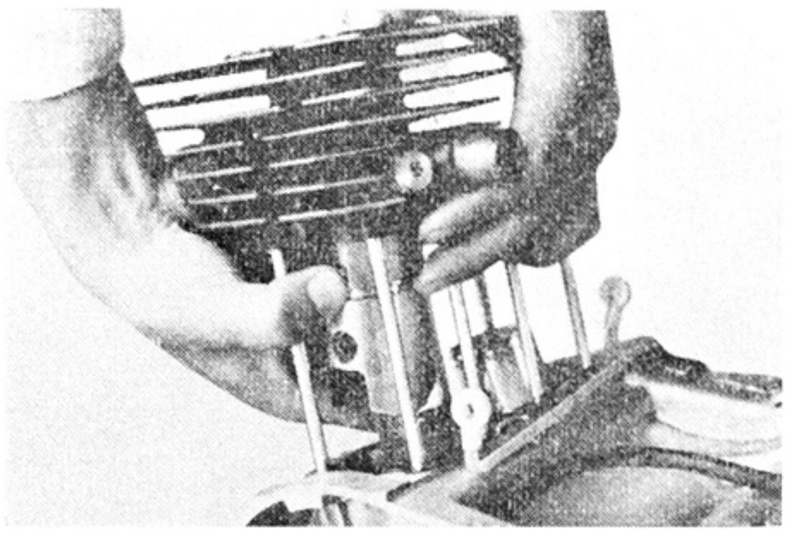


Fig. 3-3-5

4. Romoving Carbon

Carbon tends to accumulate heavily on the walls of the cylinder exhaust ports. Scrape the carbon off with a screw driver. (Fig. 3-3-6)

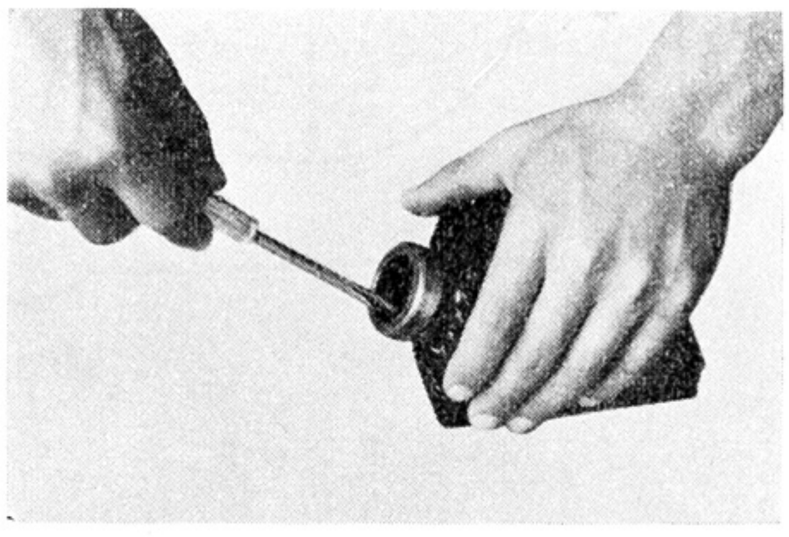


Fig. 3-3-6

5. Miscellaneous

The cylinder intake port is provided with a flange coupling. A large carburetor can be installed by simply changing the flange coupling in order to tune up the engine. (Fig. 3-3-7)

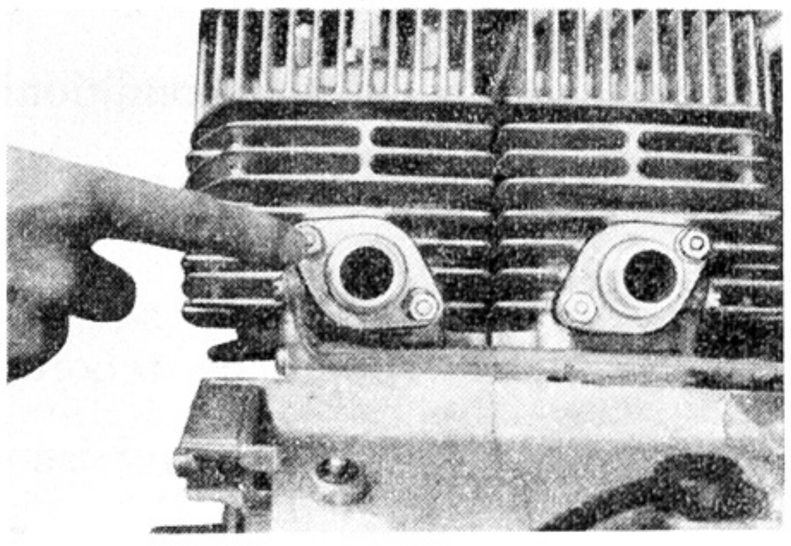


Fig. 3-3-7

3-4. Piston Pins

1. Pulling Out the Piston Pin

Remove the clip at one end of the piston pin, with needle nose pliers, and push the pin out from the other side of the piston with a screw driver. (Fig. 3-4-1)

Before removing the piston pin clip, cover the crankcase opening with a clean rag so you will not accidentally drop the clip into the crankcase.

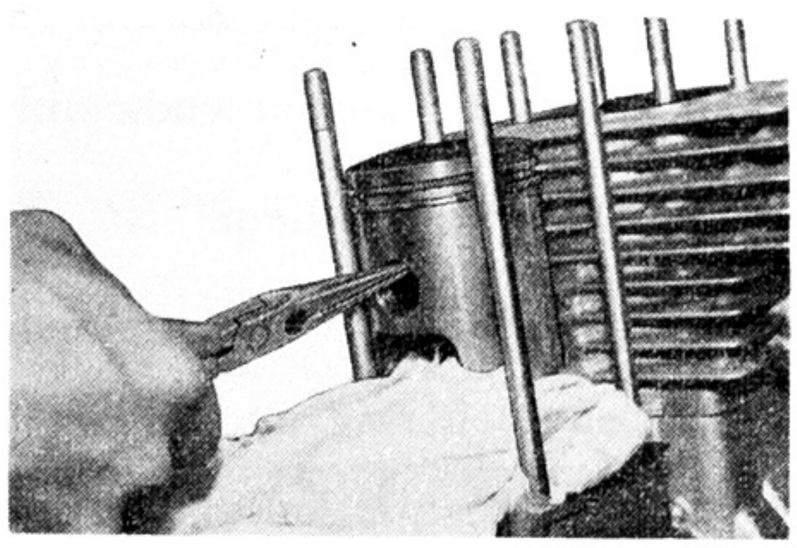


Fig. 3-4-1

2. Piston-to-Piston Pin Fit

The piston pin should fit snugly in its bore so that it drags a little as you push it. If the pin is loose, the pin and/or the piston should be replaced. A pin with stepwear in its center should be replaced, along with the connecting rod small end needle bearing. (Fig. 3-4-2)

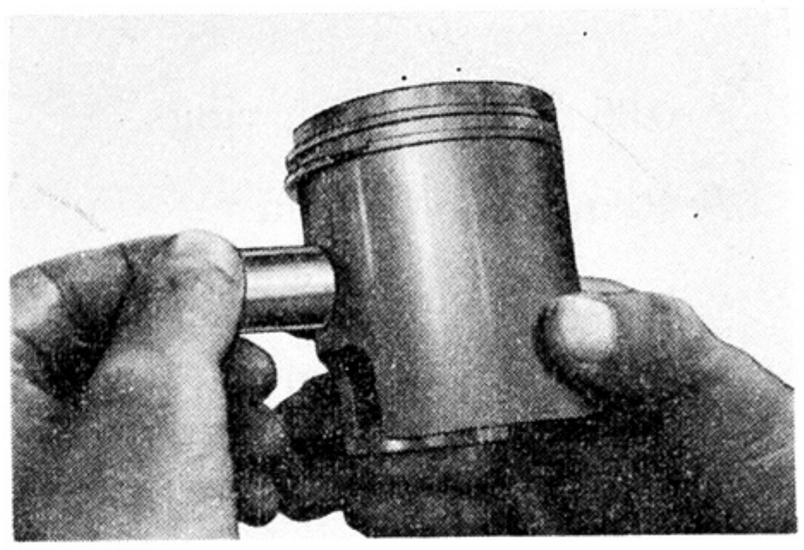


Fig. 3-4-2

3-5 Piston Rings

1. Removing the Rings

Put your thumbs at each end of the piston ring and pull the piston ring ends apart. Then slide it out of the groove on the back side of the ring lands. (Fig. 3-5-1 and 2)

Fig. 3-5-1

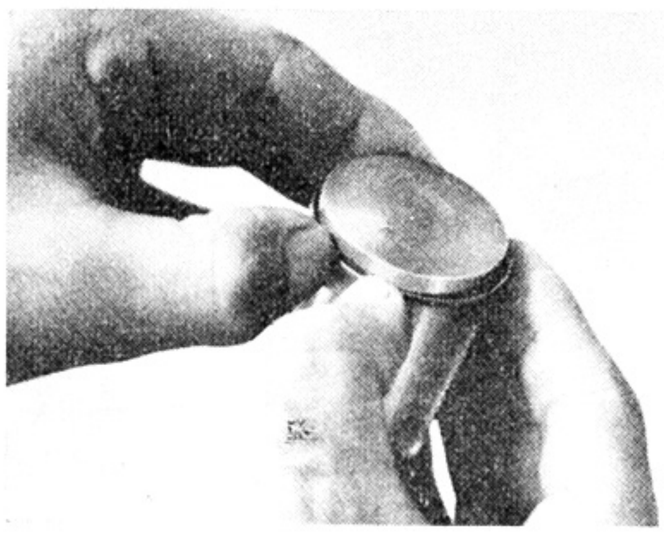


Fig. 3-5-2

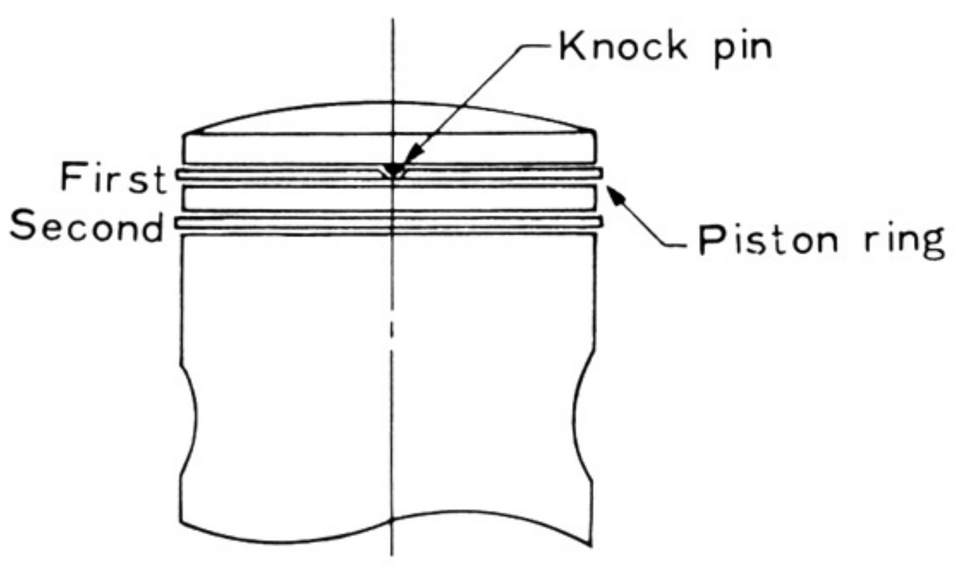


Fig. 3-5-3

2. Fitting the Rings

Both rings (top and bottom) are of the same type, and chrome plated. When installing the rings, align their ends with the knock pin. (Fig. 3-5-3)

3. Checking Piston Rings

a. Measuring Piston Ring Wear

Push each ring into the cylinder so that the ring is parallel to the cylinder bottom, and measure the end gap with a feeler gauge. (Fig. 3-5-4)

End gap should be between 0.15 mm and 0.35 mm for both rings.

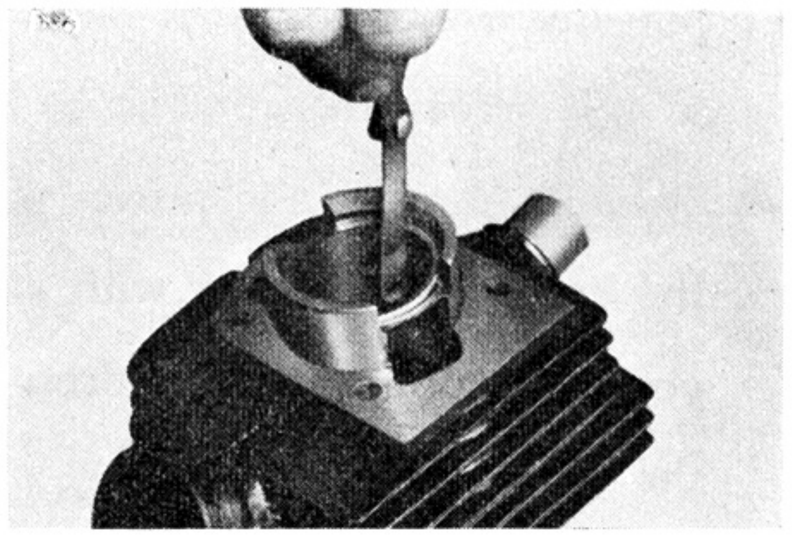


Fig. 3-5-4

b. Removing Carbon

Carbon on the piston rings and in the ring grooves will make the rings stick to the piston, impairing piston performance. Remove the rings from the piston, and clean the carbon from them and their grooves in the piston. (Fig. 3-5-5)

No. 1 ring (top) ·····0.03 - 0.07 mm

No. 2 ring (bottom) ·····0.03 - 0.07 mm

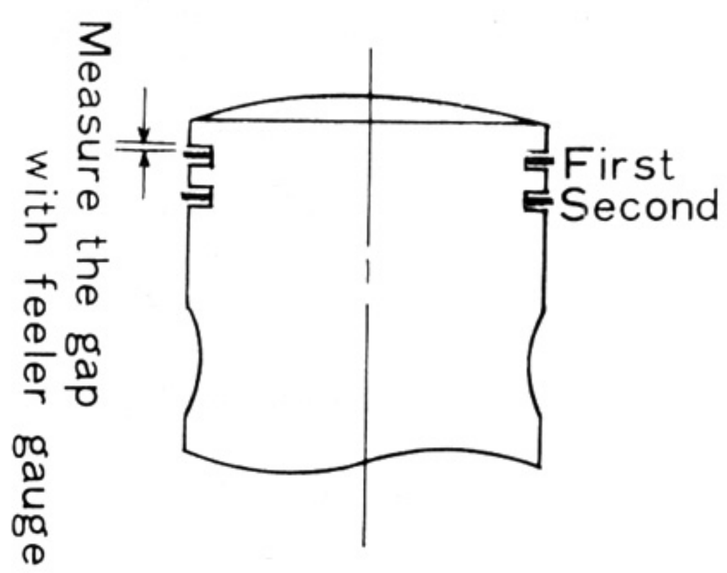


Fig. 3-5-5

3-6. Pistons

1. Checking and Reconditioning Pistons

a. Measuring Piston Clearance

The term "Piston clearance" is defined as the difference between the minimum cylinder bore diameter and the maximum outer diameter of the piston.

As described in 3-3 above, piston clearance should be between 0.030 mm and 0.035 mm. To determine maximum piston diameter, measure the piston with a micrometer at right angles to the wrist pin 10 mm from the its bottom edge of the skirt. (Fig.3-6-1)

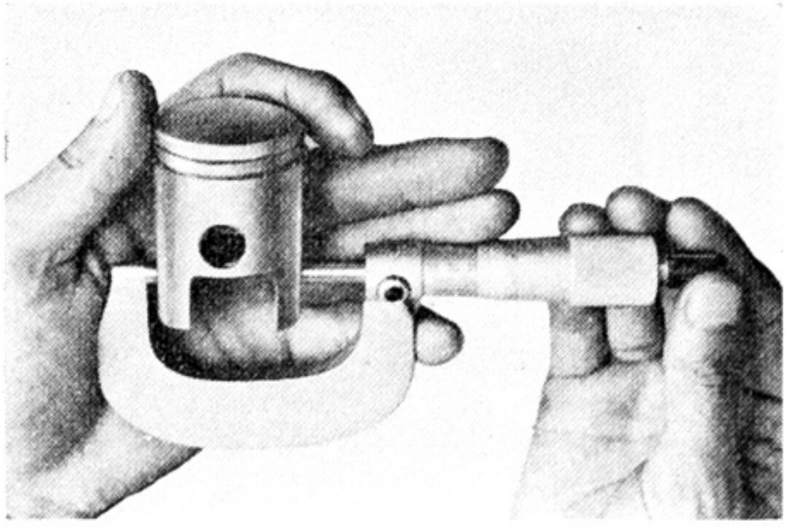


Fig. 3-6-1

b. Checking and Reconditioning Pistons

Ristons showing signs of seizure are noisy and keep the engine from developing full power. If a piston that has seized is used again without any correction, another seizure will develop at the same point. Lightly sand these seizure area on the piston (areas showing excessive friction) with #400 sandpaper. (Figs. 3-6-2 and 3)

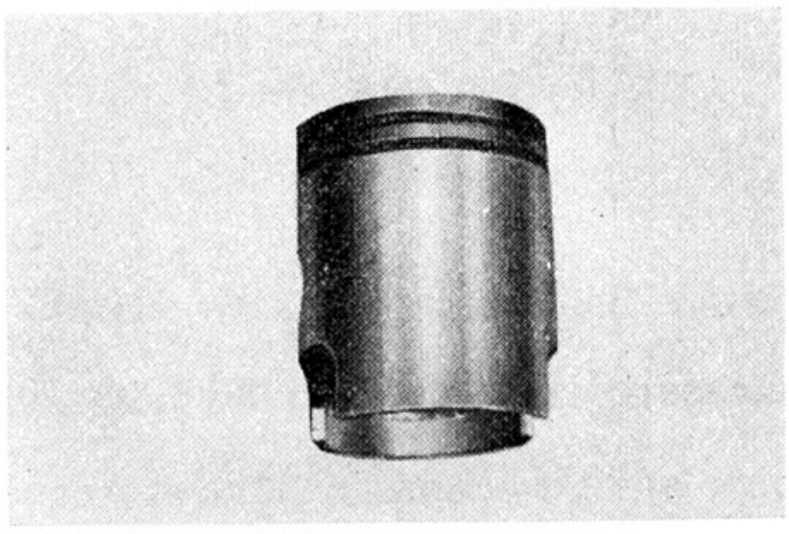


Fig. 3-6-2

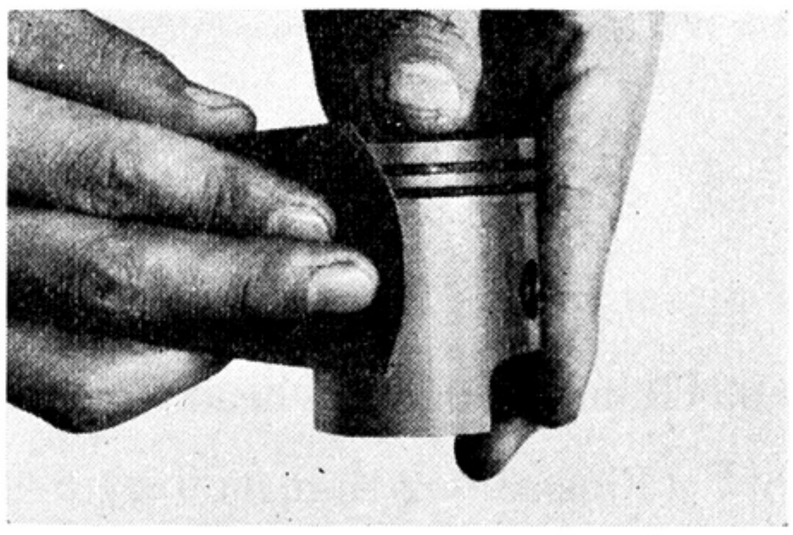


Fig. 3-6-3

c. Removing Carbon

Scrape off carbon accumulation inside the cylinder head, with a screw driver or a hack-saw blade. (Fig. 3-6-4)

Scrape off carbon accumulation in the piston ring grooves in order to prevent the ring from sticking. (Fig. 3-6-5)

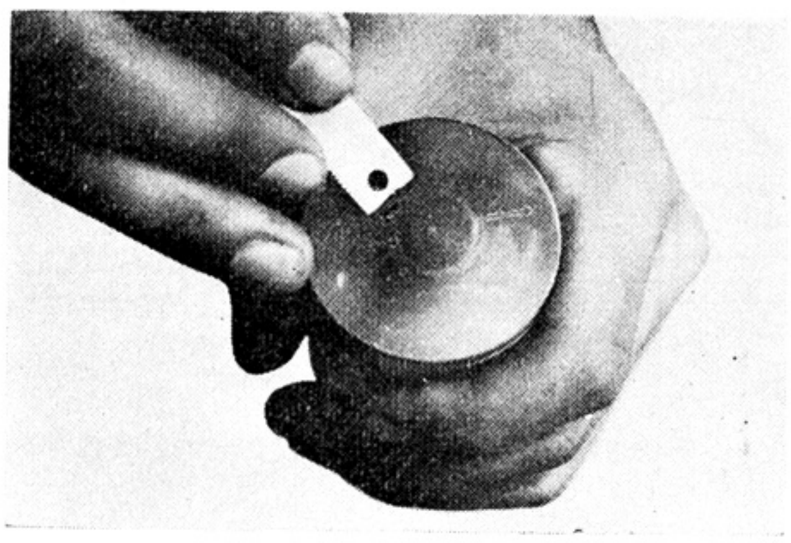


Fig. 3-6-4

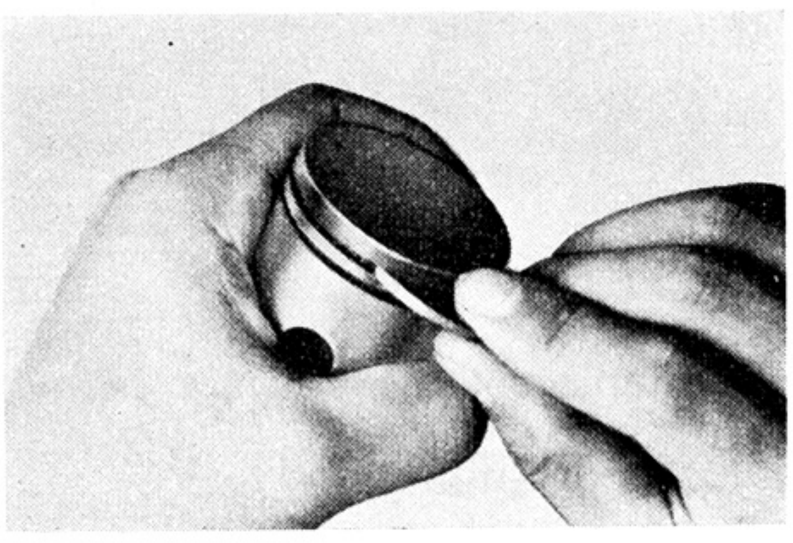


Fig. 3-6-5

2. Piston Installation Direction

Install each piston with the arrow marked on its head pointing downward (toward the exhaust port of the cylinder). (Fig. 3-6-6)

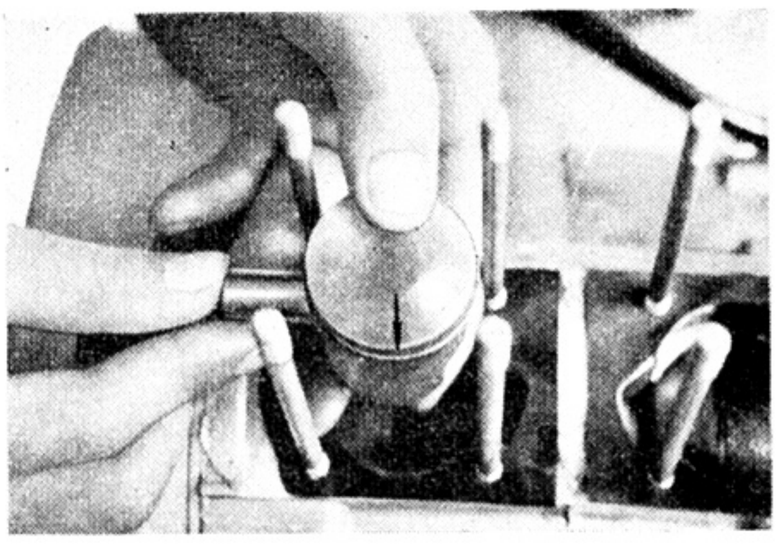


Fig. 3-6-6

3-7 Crankcase Cover (R)

1. Removal

a. Remove the kick starter crank clamping bolt, and remove the crank. (Fig. 3-7-1)

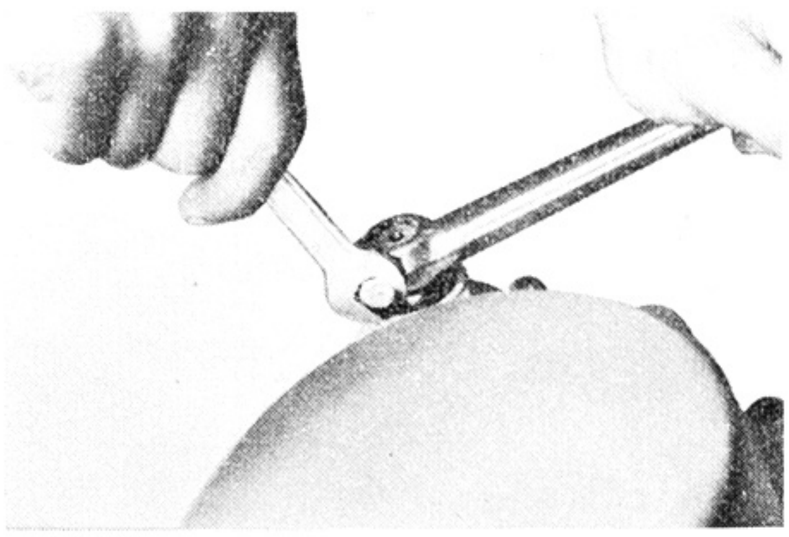


Fig. 3-7-1

b. Remove the pan-head screws from the crankcase cover (R), and take off the cover. (Figs. 3-7-2 and 3)

(The right crankcase cover may be removed with the oil pump mounted on it after disconnecting the oil deelivery pipes.)

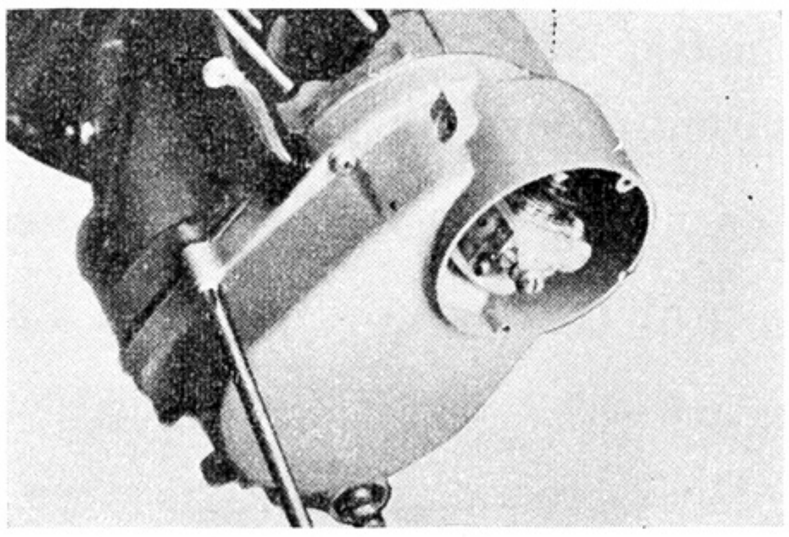


Fig. 3-7-2

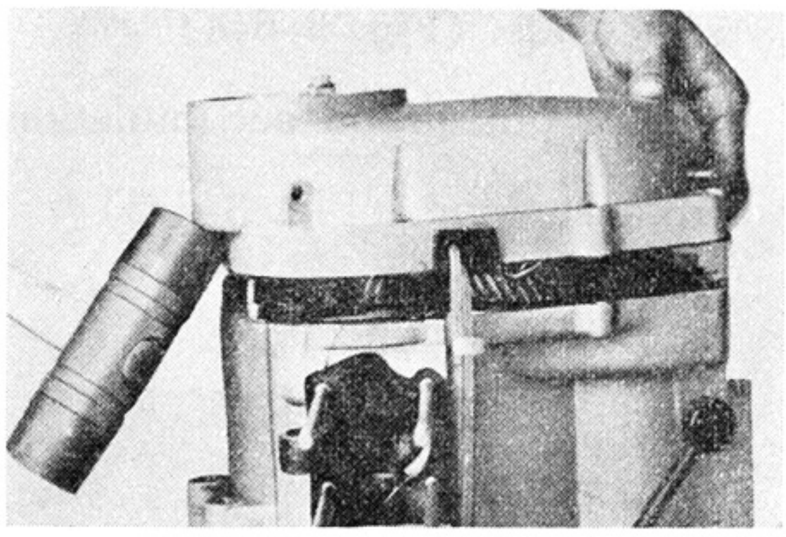


Fig. 3-7-3

c. Replace the crankcase cover gasket, if damaged. (Fig. 3-7-4)

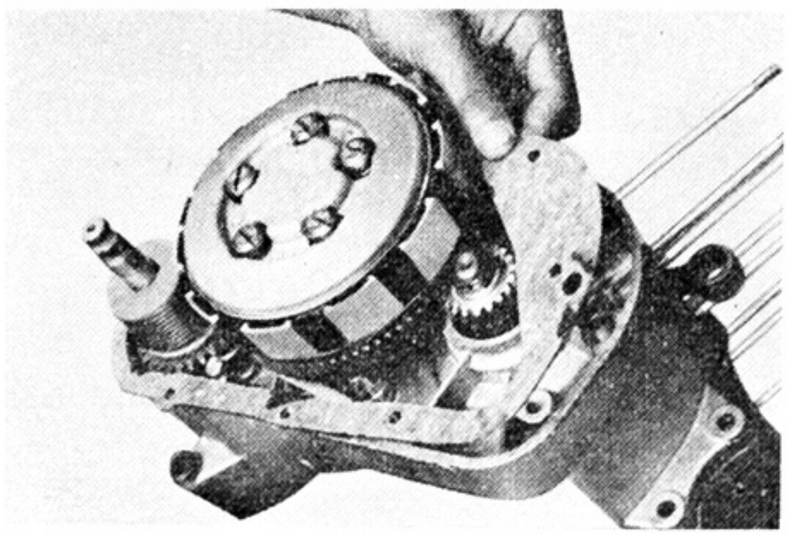


Fig. 3-7-4

2. Reinstallation

Coat the right crankcase sealing surface with gasket paste (YAMAHA BOND No. 5), lay the crankcase cover gasket over it, and then replace the right crankcase cover. (Fig.3-7-5) Be sure to apply the bond; otherwise, oil may leak.

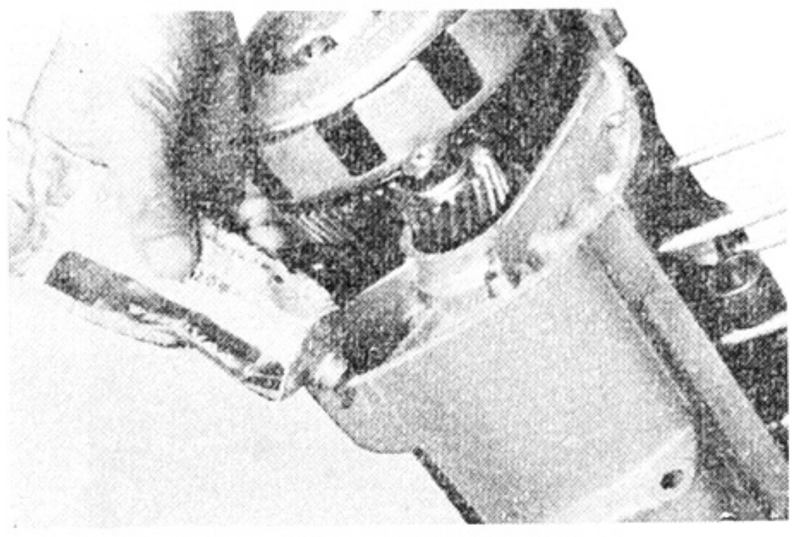


Fig. 3-7-5

3-8. Clutch

The wet clutch uses five moulded cork friction plates and five steel clutch plates in a housing mounted on the transmission main shaft. The housing is integrated with the large reduction gear, which is driven by the small reduction gear (primary driven gear). The primary drive gear has 16 teeth and the primary driven gear 53, to make the primary drive reduction ratio 3.313 : 1 (i. e. 53/16).

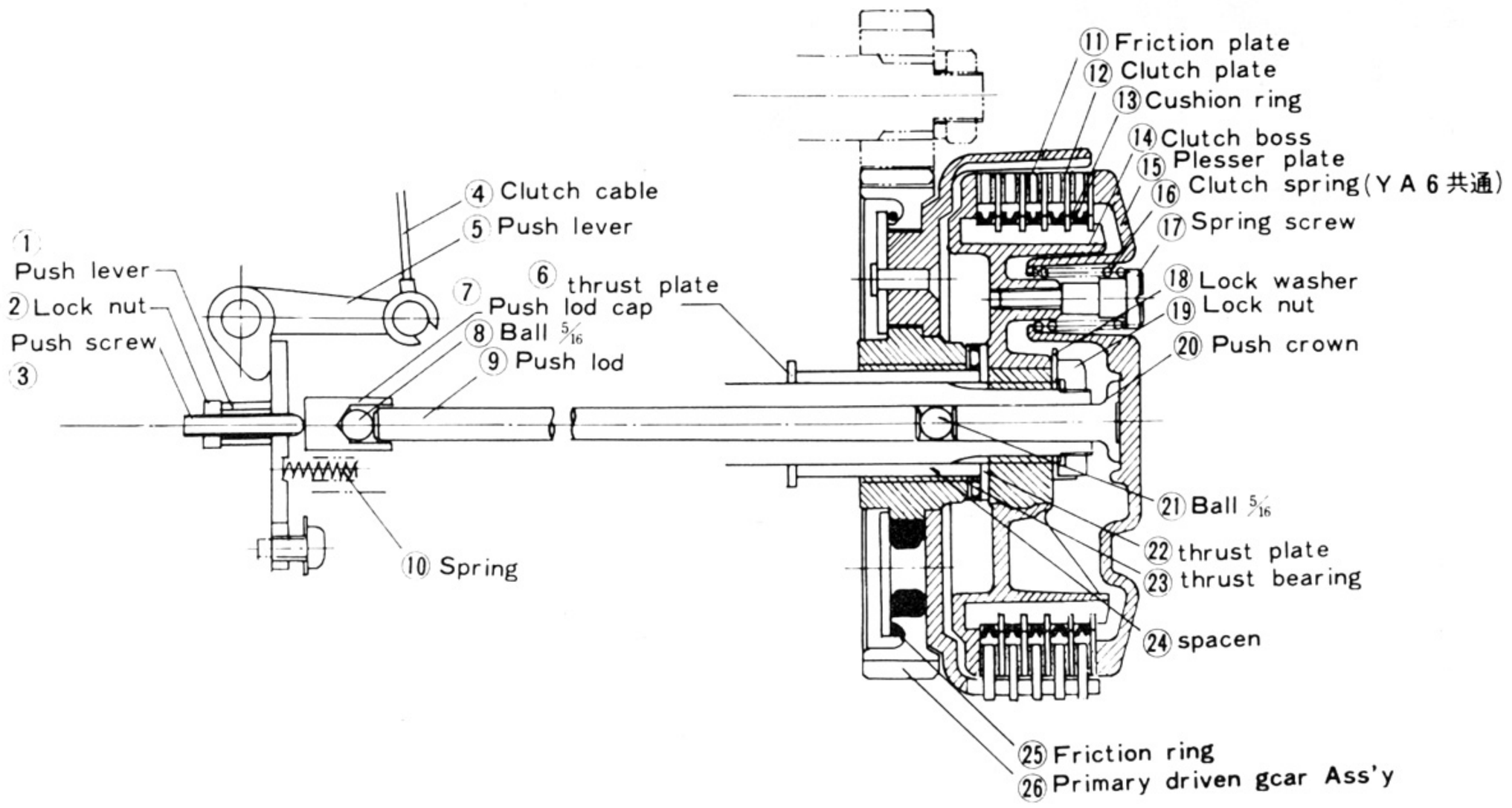


Fig. 3-8-1 Layout of Clutch Assembly

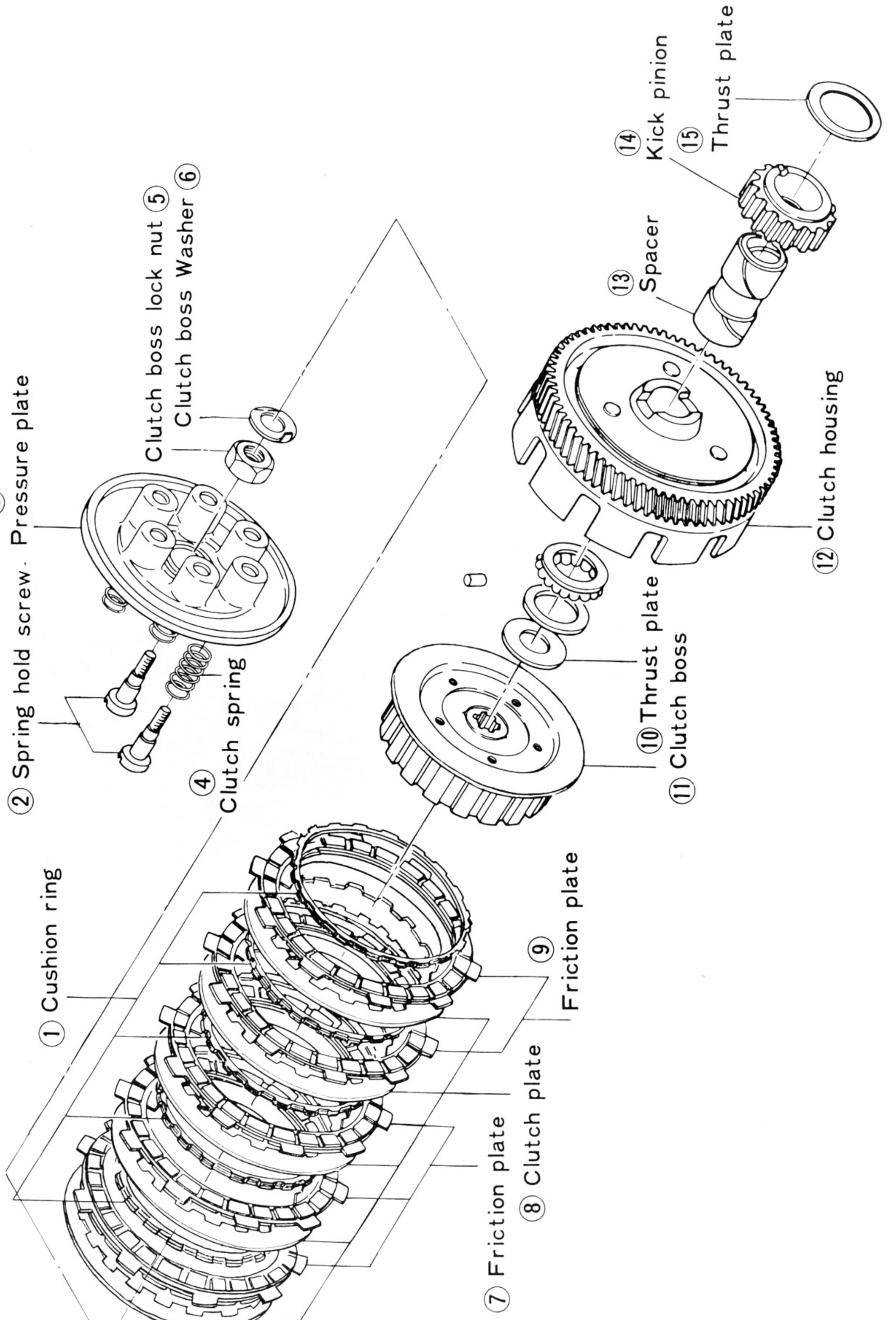


Fig. 3-8-2

1. Removing the Pressure Plate

Remove the five clutch spring screws, and remove the springs and pressure plate. (Fig. 3-8-3)

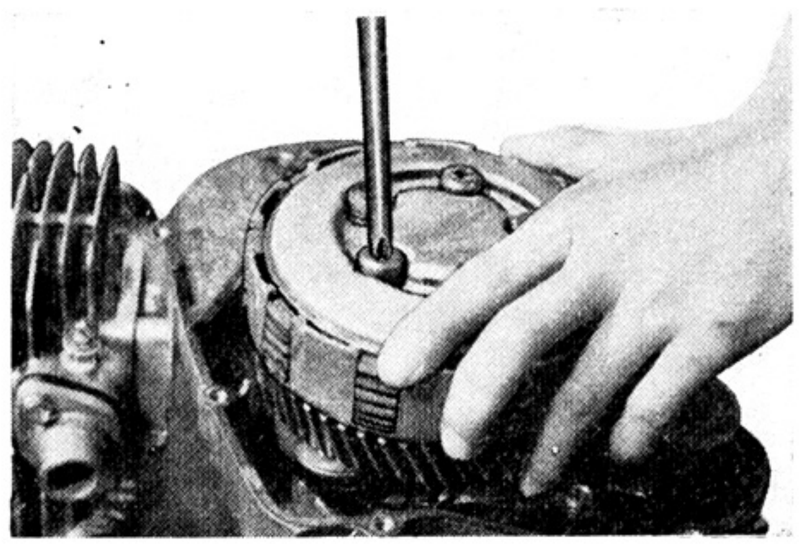
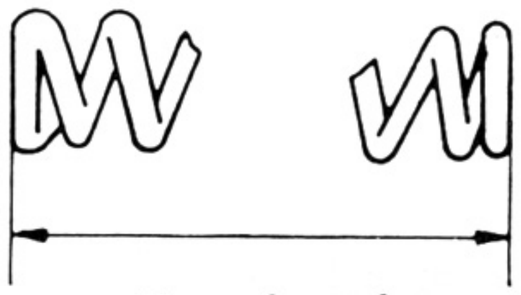


Fig. 3-8-3

2. Checking the Clutch Spring

Measure the free length of each clutch spring, and replace any spring more than 1.0 mm shorter than standard free length. (Figs. 3-8-4 and 5)



Standard 34.0 mm
(1.34 in.)

Free length

Fig. 3-8-4

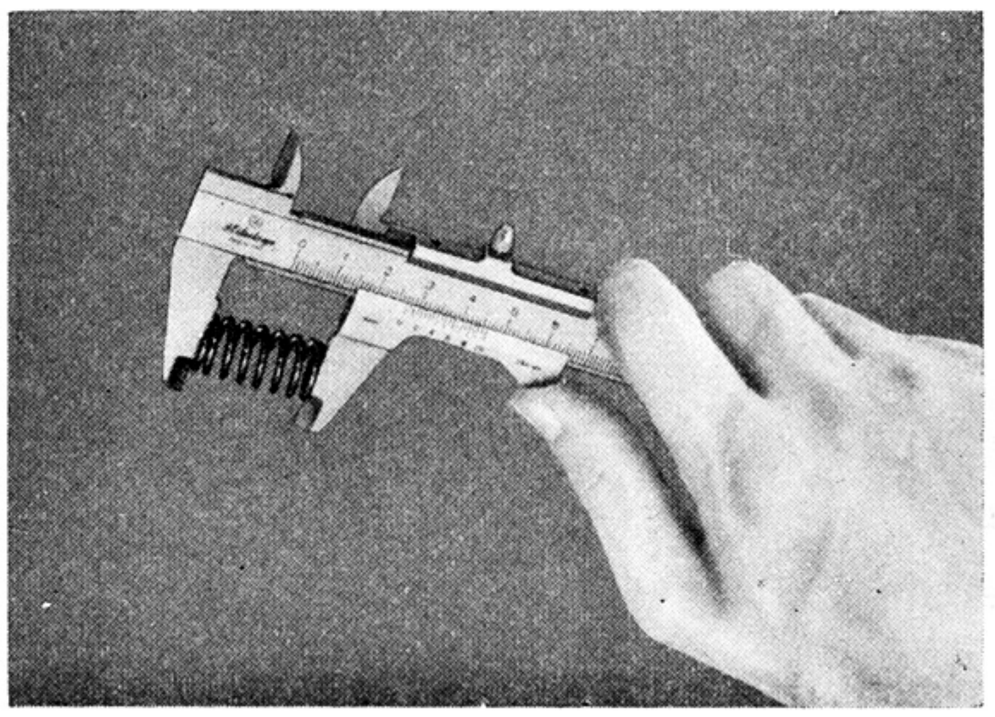


Fig. 3-8-5

3. Checking the Friction Plate

Friction plates are designed to wear, so plates worn more than 0.3 mm under standard thickness (4.0 mm) or showing uneven contact with the clutch plates should be replaced. (Figs. 3-8-6 and 7)

Standard 4.0 mm
(0.157 in.)

Fig. 3-8-6

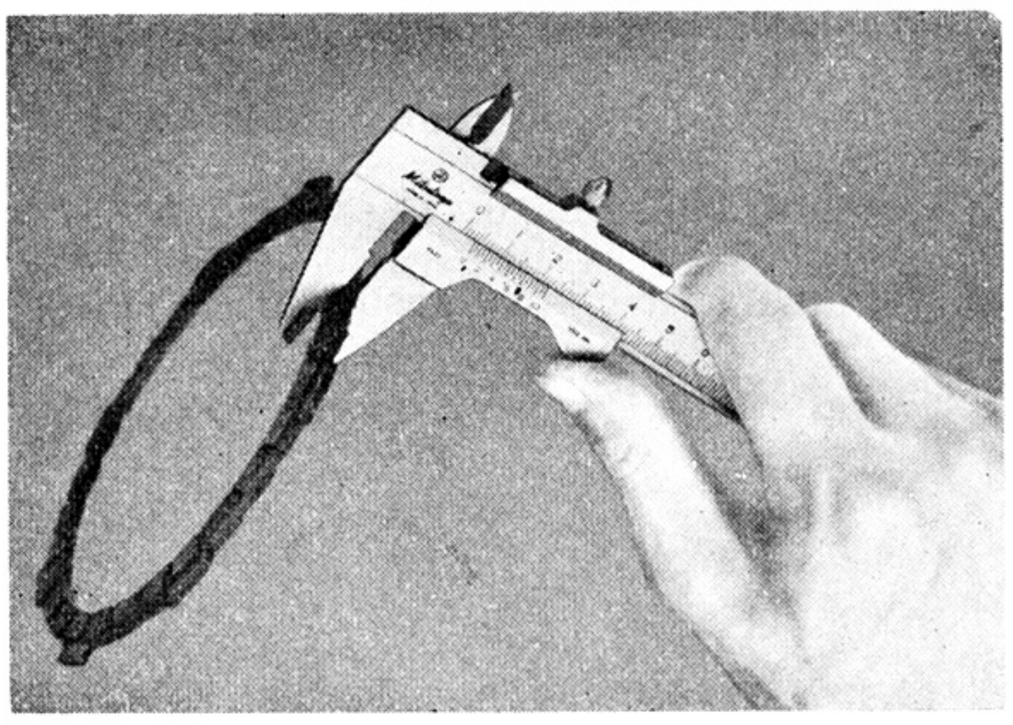


Fig. 3-8-7

4. Fitting the Cushion Rings

The cushion rings are installed between each clutch-friction plate pair to insure even engagement of the plates. When fitting cushion rings, be sure they are flat and not twisted. (Fig. 3-8-8)

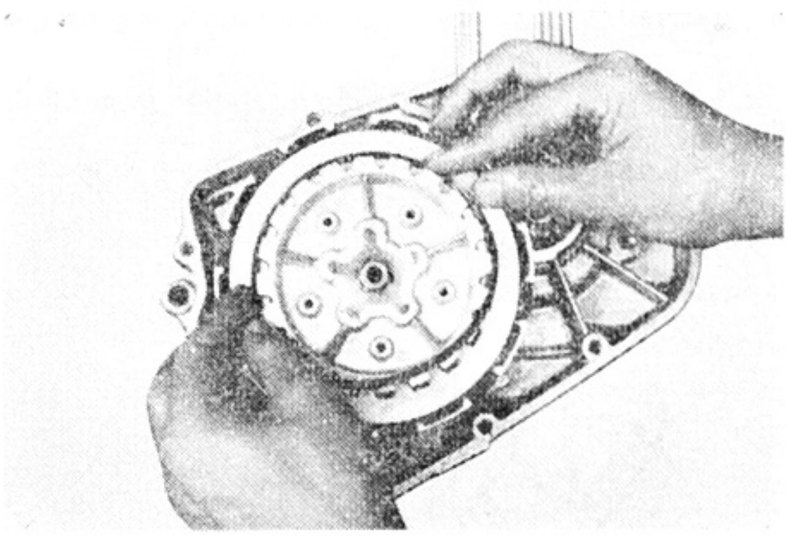


Fig. 3-8-8

5. Removing the Clutch Boss

Pull out push-rod A and straighten the bent edges of the clutch boss locking washer. Fit the YA 6 clutch holding tool over the clutch boss, remove the nut, and then the boss itself. (Figs. 3-8-9 and 10)

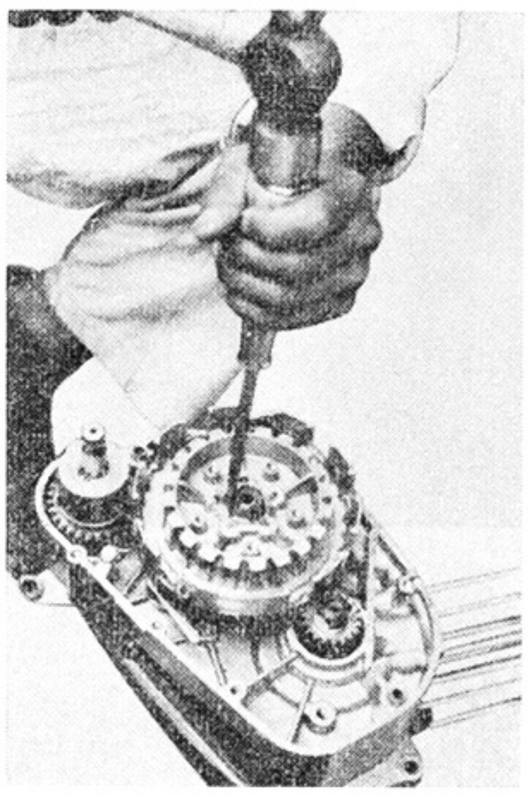


Fig. 3-8-9

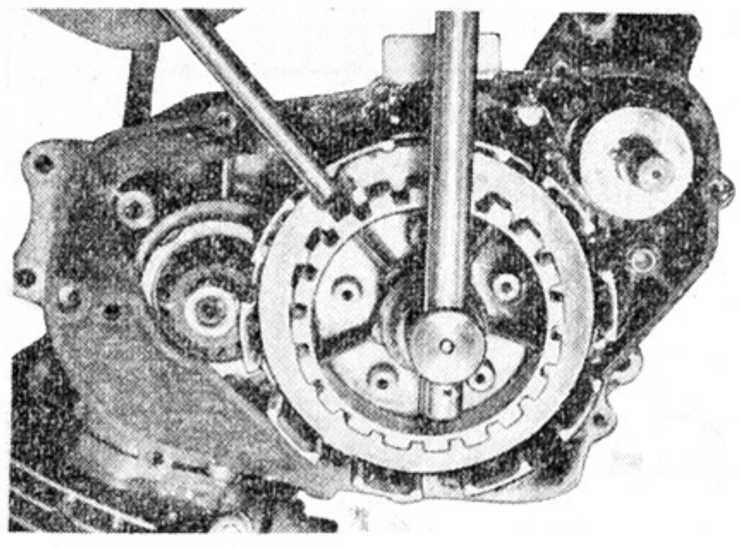


Fig. 3-8-10

6. Checking the Primary Driven Gear Ass'y

Insert the spacer in the primary driven gear boss, and check it for radial play or scratch that could impair clutch action. Correct it with an oilstone or fine sandpaper. Scratches on the spacer may result in excessive noise. (Fig. 3-8-11)

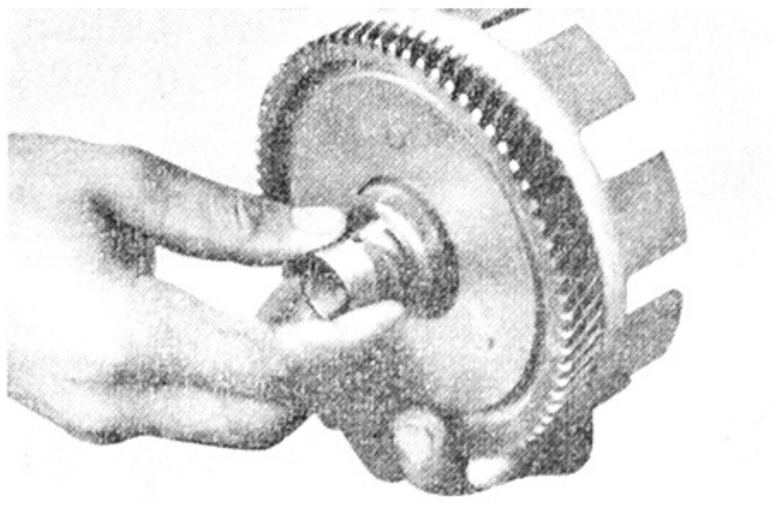


Fig. 3-8-11

7. Checking the Spacer

Place the spacer on the main axle, and check it for radial play. If play exisist, replace the spacer. (Fig. 3-8-12)

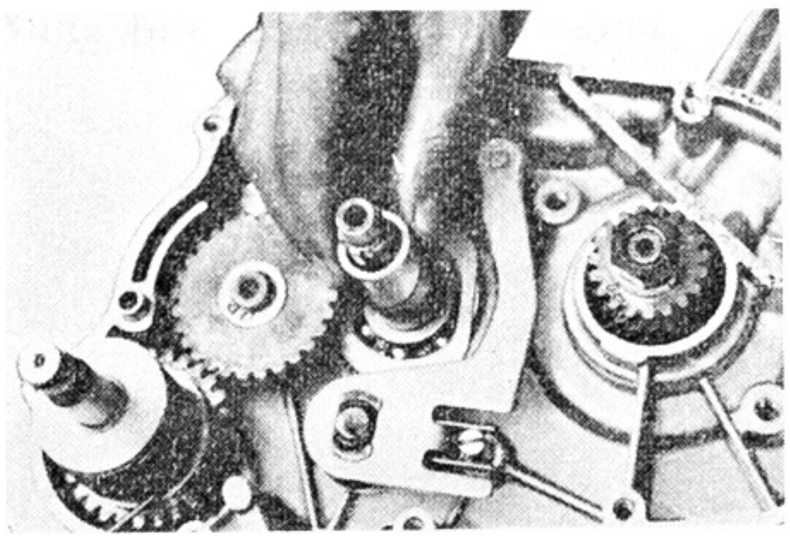


Fig. 3-8-12

8. Checking the Push-Rod B

Remove the push-rod B from the clutch boss and roll it over a surface plate. If the shaft is bent, straighten or replace it. (Fig. 3-8-13)

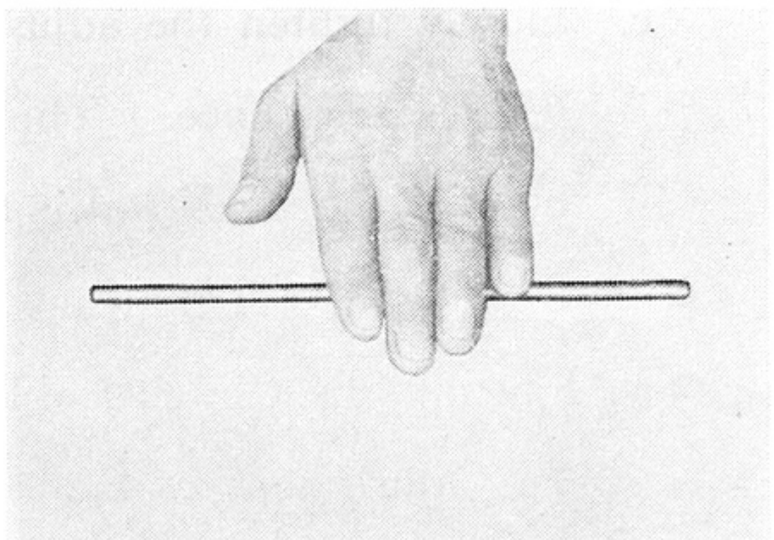


Fig. 3-8-13

9. Caution on Reassembling Clutch

On the clutch side of the primary driven gear there are washers and thrust bearing. If these washers and a thrust bearing are incorrectly fitted or omitted, the clutch boss will ride against the primary driven gear and prevent smooth clutching. Be sure the thrust bearing and washers are correctly installed when reassembling the clutch. (Figs. 3-8-1 and 2).

The thrust bearing is placed around the primary gear spacer. When installing the clutch boss, exercise care not to slip the thrust bearing from the space. Grease both surfaces of the thrust bearing to facilitate this operation.

10. Clutch Adjustment

The friction plate and clutch plate, which are component parts of the clutch, are liable to wear after years of use. The wear of these parts results in poor clutch action or clutch slippage. Replace or correct them if worn.

(1) Adjusting the Adjusting Screw. (Fig. 3-8-14)

a. Remove the dynamo cover located on the left side of the crankcase cover.

b. Loosen the adjusting screw lock nut as shown in Fig. 3-8-14.

c. Slowly tighten the adjusting screw until it feels resistance. This means that the play of the push rod is removed. Then, back it off a 1/4 turn. Tighten the lock nut.

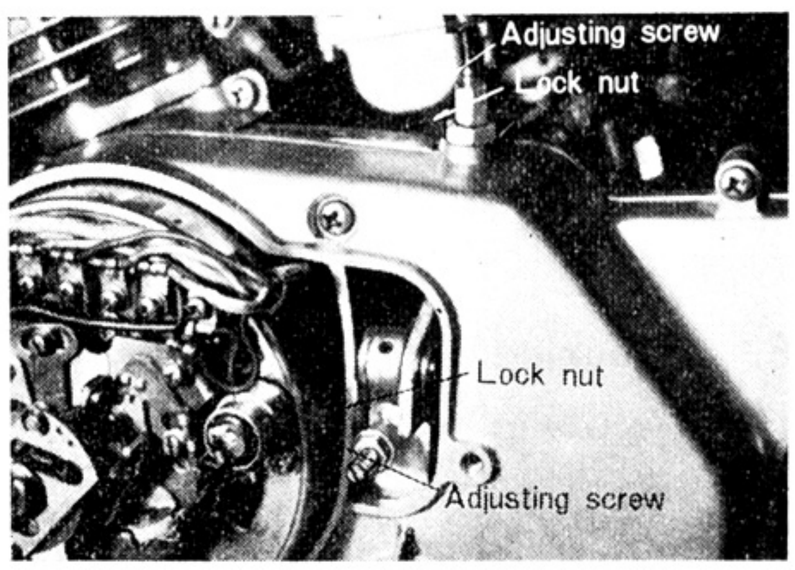


Fig. 3-8-14

(2) Adjusting the Clutch Cable

(This adjustment is made on the left upper part of the crankcase cover.) Refer to Fig. 3-8-14.

a. Loosen the clutch cable adjusting screw lock nut.

b. To reduce the play of the cable, loosen the adjusting screw, and to increase the play, tighten the screw.

Adjust clutch lever play to 2 - 3 mm. (Fig. 3-8-15)

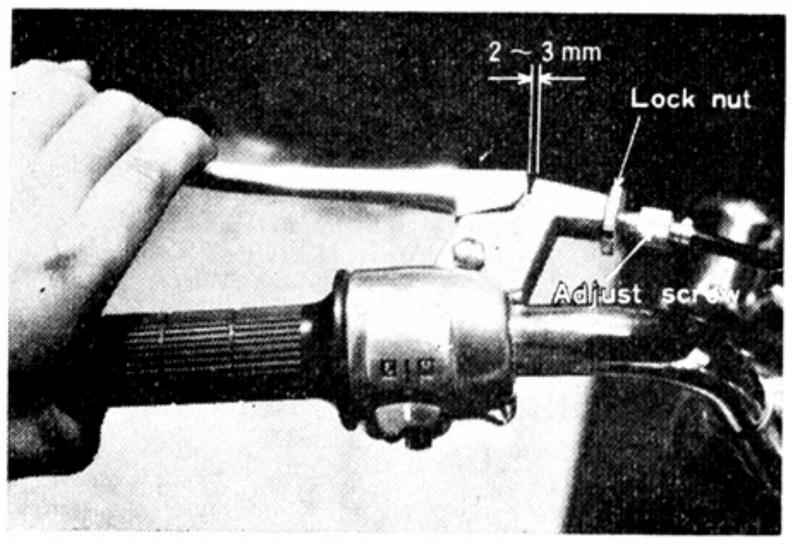


Fig. 3-8-15

c. Fully tighten the lock nut.

(Adjustment on the upper part of the clutch cable) Refer to Fig. 3-8-15.

a. Loosen the lock nut.

b. To decrease the play of the clutch cable, turn the cable adjusting screw clockwise, while to increase the play, turn the screw counterclockwise.

If the play is between 2 mm and 3 mm, the cable is adjusted properly.

3-9. Primary Drive Gear

1. Removal

a. Feed a rolled-up rag between the teeth of the primary drive gear and primary driven gear to lock them. (Fig. 3-9-1)

b. To remove the gear, use a slot-head screw driver in the manner shown in Fig. 3-9-2.

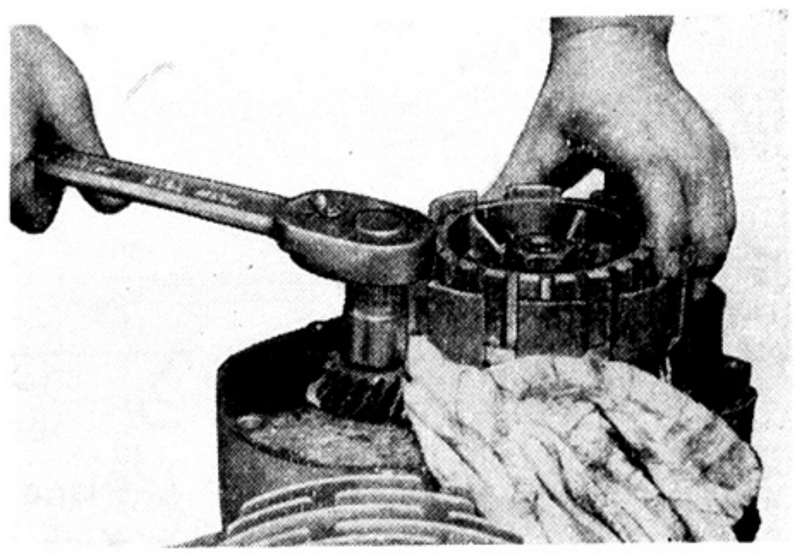


Fig. 3-9-1

2. Checking

Excessive backlash between gear teeth causes impact noise, while insufficient backlash results in a while.

To measure the backlash, use a dial gauge or a special gauge. For convenience of this measurement, numbers are marked on the surfaces of the primary drive gear and the primary driven gear. Make a combination of these two gears so that the total of numbers reaches a specified set value.

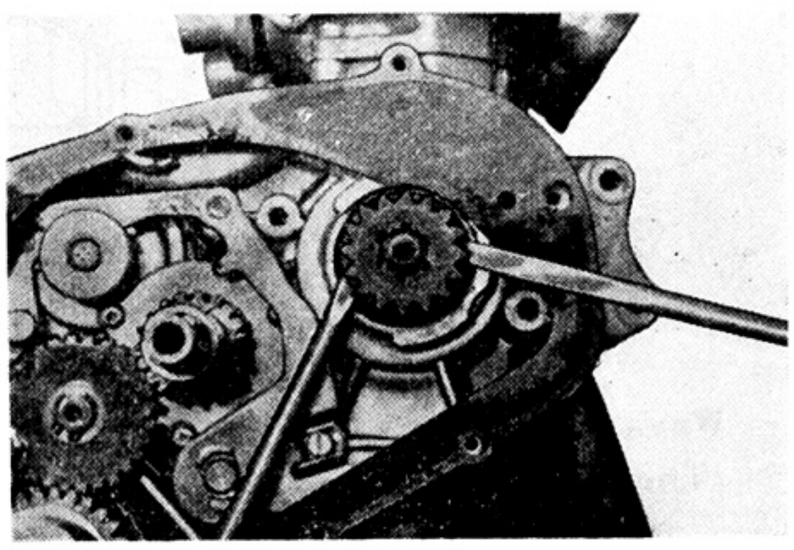


Fig. 3-9-2

Standard Value:

a.	Total of numbers	128±3
b.	Primary drive gear	80 – 88
c.	Primary driven gear	40 – 48

Check the gears for scratches, wear and shaft-to-hole fit, and replace worn parts. If the replacement of worn parts does not cure impact noise or while, adjust gear backlash by means of increasing or decreasing the standard value (total of numbers).

3-10. Distance Collar

Remove the distance collar from the crankshaft with your fingers or pliers.

When reinstalling the spacer, first put an adequate amount of grease in the lip cavity of the crankshaft oil seal.

Be sure to install the collar with its chamfered end inward. (Fig. 3-10-1)

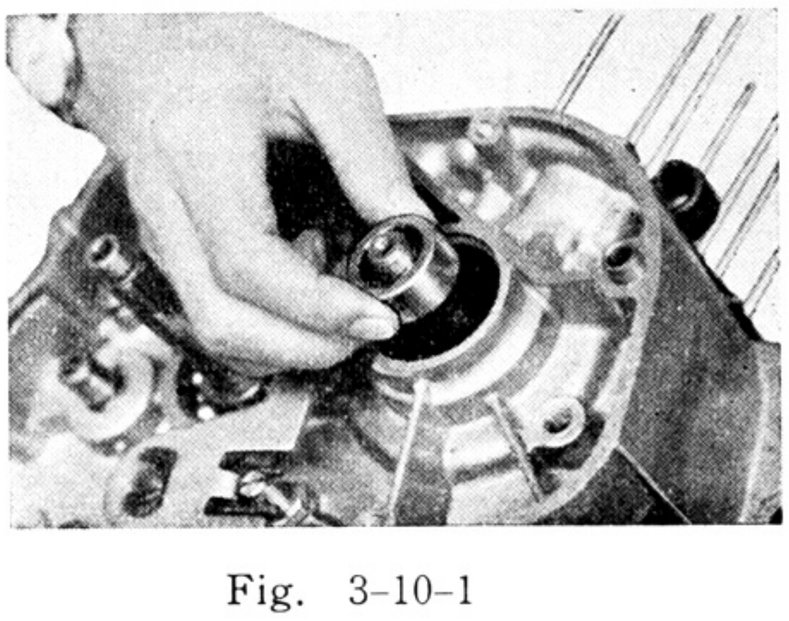
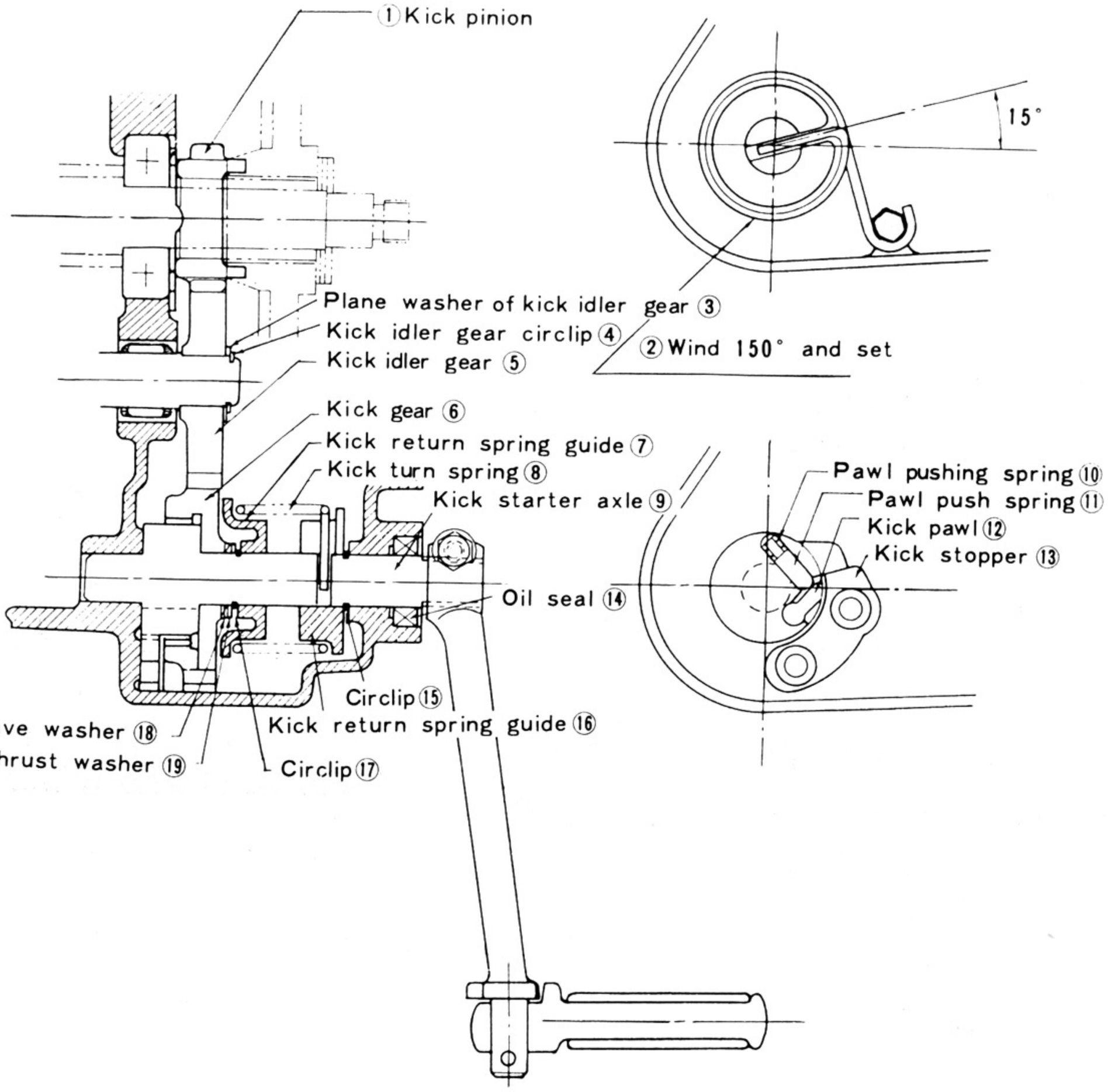


Fig. 3-10-1

3-11. Kick Starter



1. Kick pinion
2. Kcik idle gear plain washer
3. Kick idle circlip
4. Kick idle gear
5. Kick gear
6. Kick return spring guide
7. Kick return spring
8. Kick starter shaft
9. Oil seal
10. Wave washer
11. Thrust washer
12. Circlip
13. Kick return spring guide
14. Circlip
15. Kick crank
16. Wind 150° and set.
17. Pawl push spring
18. Pawl push pin
19. Lock pawl
20. Kick stopper

Fig. 3-11-1

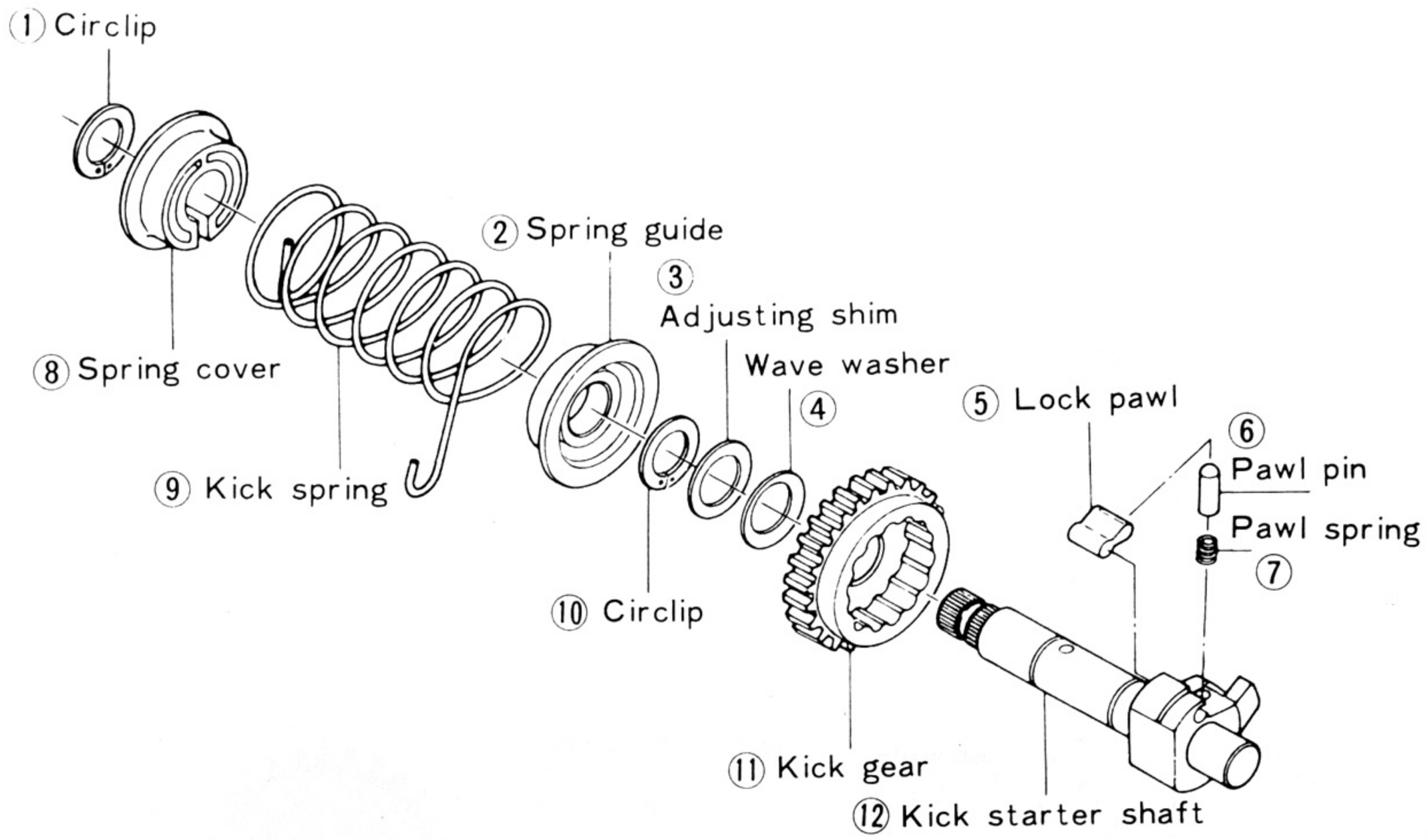


Fig. 3-11-2

Operation :

The primary coupled kick-starter system used on the YAMAHA 180 YCS1 (C) enables the rider to kick-start his stalled machine by simply squeezing the clutch lever and then kicking the starter crank, without shifting the transmission back to neutral. Kicking down the starter crank turns the kick gear mounted on the kick starter shaft. The kick gear turns the kick idler gear which is free-mounted on the drive shaft, and the kick idler gear turns the kick pinion.

The kick pinion engages the dogs on the primary driven gear. The driven gear then turns the primary drvie gear (mounted on the crankshaft) which turns the crankshaft and starts the engine. When the engine is running, and the kick starter ratchet mechanism has turned the starter shaft back to normal position, the kick pawl is held away from the inner face of the kick gear by the kick stopper.

1. Removal

The kick starter system can be removed as an assembly. (Fig. 3-11-3)

If the kick starter slips, disassemble it and check the following parts.

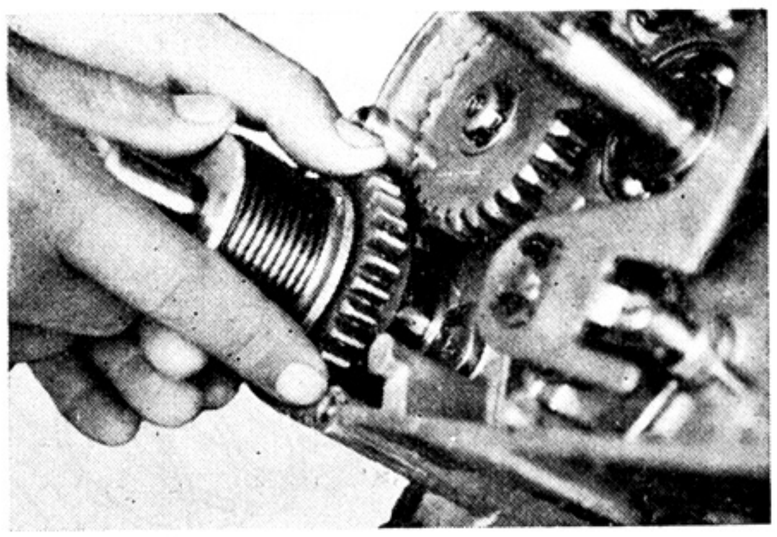


Fig. 3-11-3

2. Checking

a. Kick Gear

The inner surface of the kick gear is sedrated like an internal gear.

If these internal teeth are worn, chipper, or otherwise deformed, the kick pawl will slip during each starting cycle. A kick gear with excessively worn teeth should be replaced. (Fig. 3-11-4)

Fig. 3-11-4

b. Kick Pawl

A kick pawl with a worn tip also causes slippage, and should be replaced. (Fig. 3-11-5)

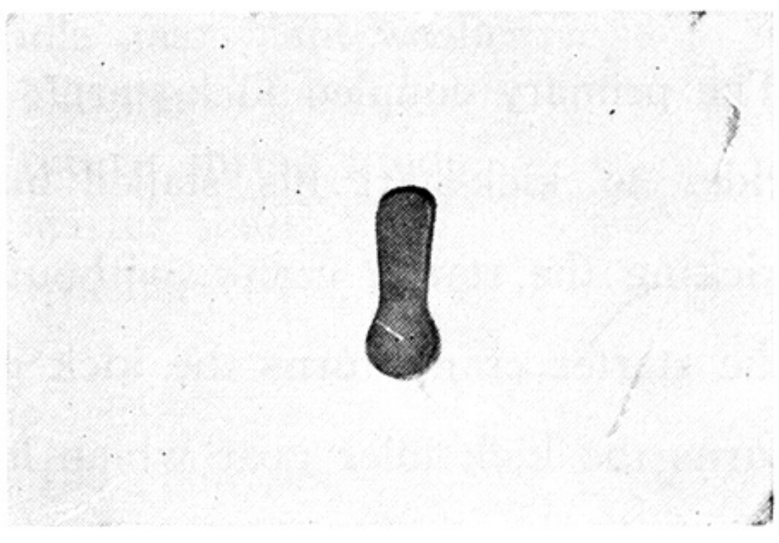


Fig. 3-11-5

c. Pawl Push Pin and Spring

Foreign material such as metal chips, wedged between the pawl pin and the wall of the pin hole, or between the pawl pin and its spring, will cause kick starter slippage and/or failure. To detect foreign material, put the spring and pawl pin in the kick starter shaft pin hole, Then depress the pawl pin with your finger to check its movement. (Fig. 3-11-6)

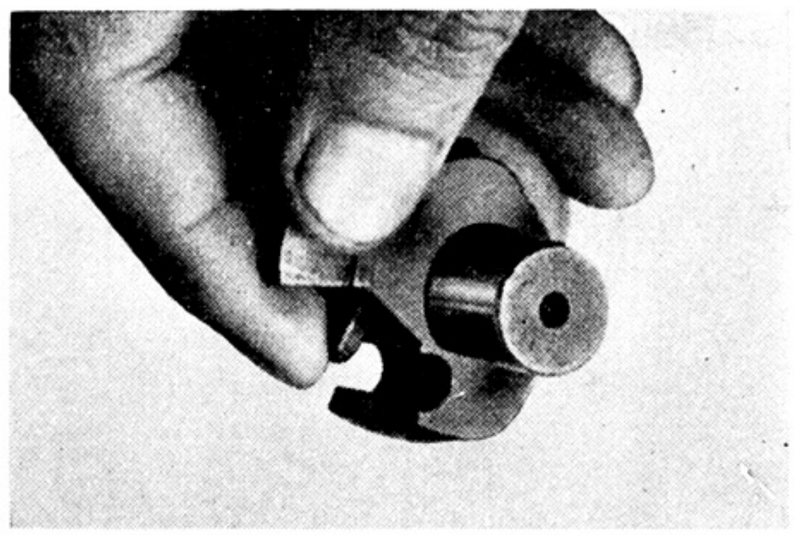


Fig. 3-11-6

3. Reinstallation

Reassemble the kick starter ass'y, and then reinstall it in the crankcase. Depress the kick pawl and turn the kick starter shaft so the pawl seats against the kick stopper.
Then wind up the kick spring clockwise, and hook its long end on the kick spring boss of the crankcase. (Fig. 3-11-7)

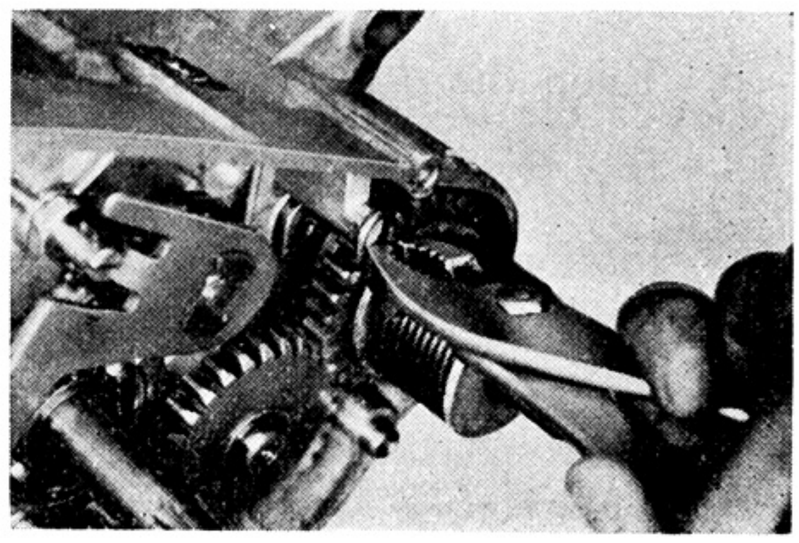


Fig. 3-11-7

4. Removing the Kick Idler Gear

Remove the circlip retaining the idler gear with a pair of circlip pliers. Remove the thrust washers, and then slide the gear off the drive shaft. (Fig. 3-11-8)

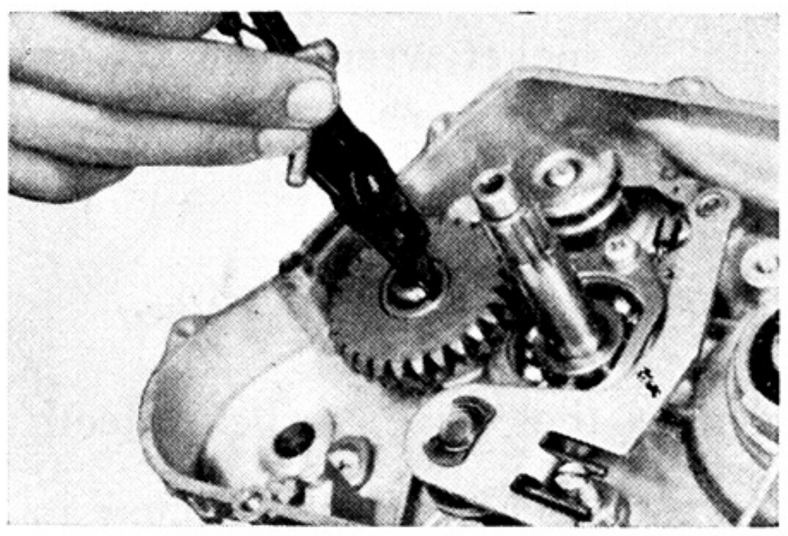


Fig. 3-11-8

3-12. Drive Sprocket

1. Removal

a. Strainghten the bent edge of the locking washer with a chisel. (Fig. 3-12-1)

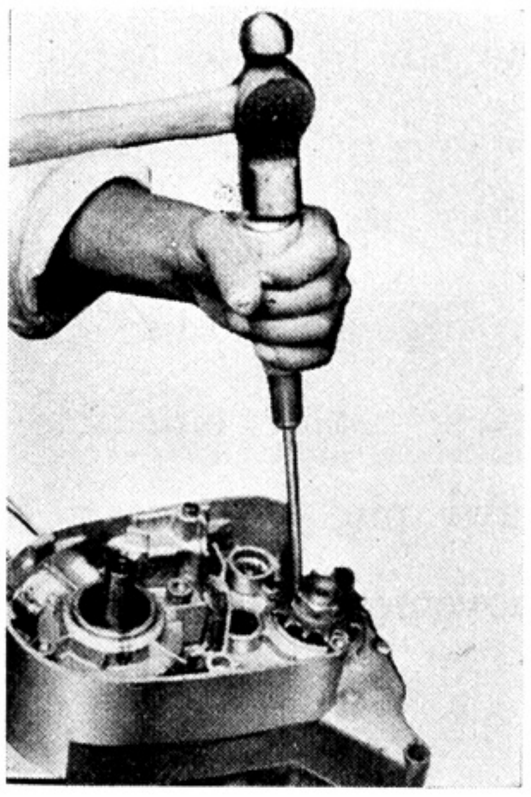


Fig. 3-12-1

b. Keep the drive sprocket from turning with the flywheel magneto holding tool, then loosen the sprocket nut. (Fig. 3-12-2)

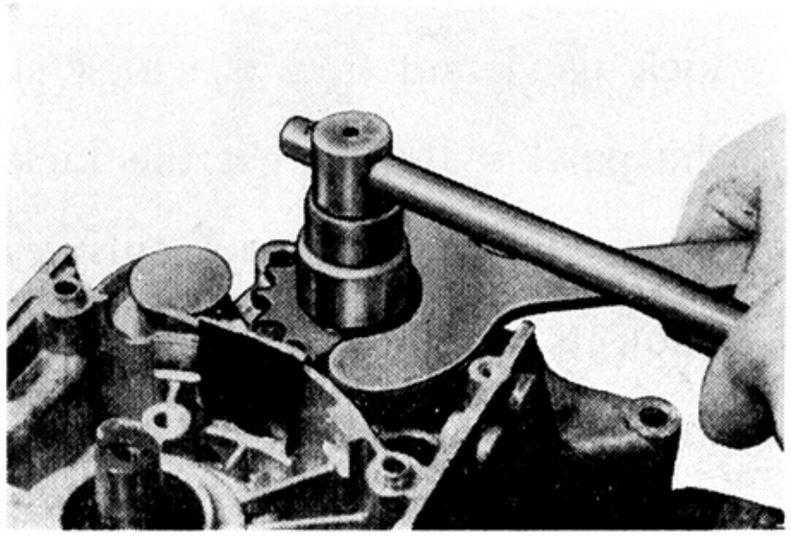


Fig. 3-12-2

c. If no flywheel magneto holding tool is available, shift the transmission to low gear, fit a socket wrench on the sprocket nut, and hit the handle of the wrench with a hammer so the impact will loosen the nut.

2. Checking Sprocket Wear

As the drive sprocket teeth wear, excessive chain noise will develop. A worn sprocket should be replaced becuse its continued use will only quicken chain wear. (Fig. 3-12-3)

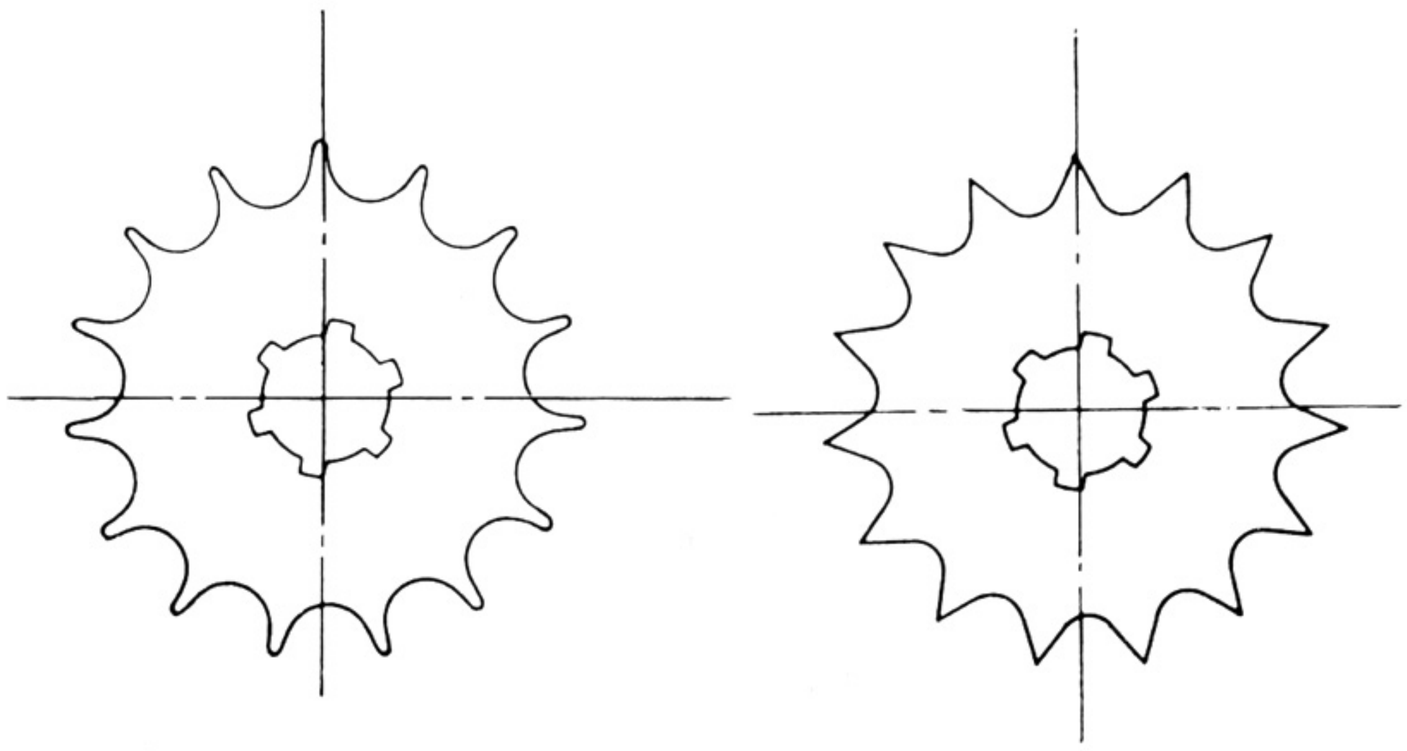


Fig. 3-12-3

3-13. Shifting Mechanism

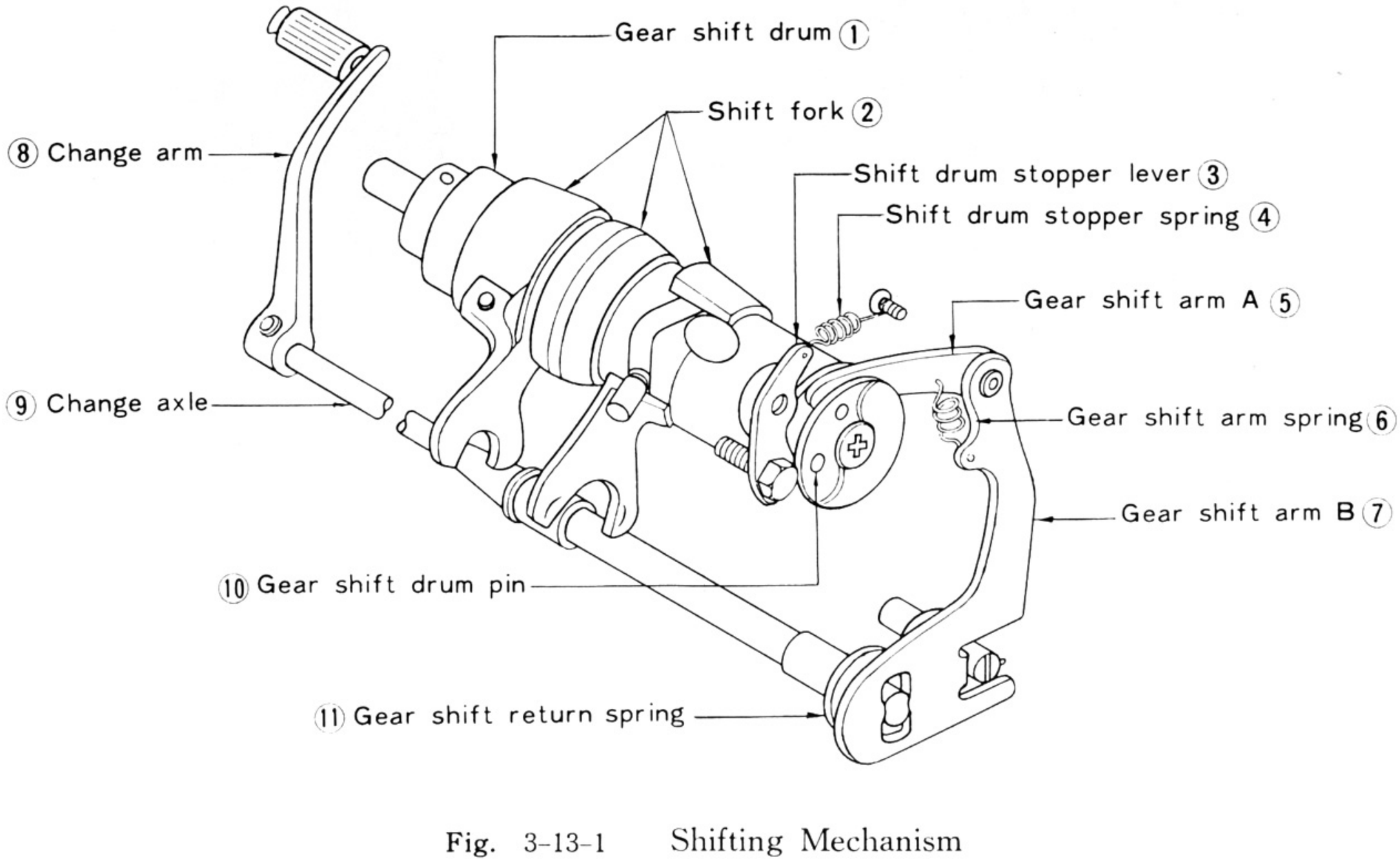


Fig. 3-13-1 Shifting Mechanism

When the gear shift lever is depressed, the gear shift moves the gear shift arm A back and forth, and at the same time, the gear shift arm A pushes the gear shift drum pins mounted on the gear shift drum, thus turning the gear shift drum.

The gear shift drum is equipped with five gear shift drum pins, and designed to make a 1/5 turn each time the gear shift lever is depressed. In other words, one full turn of the drum will shift the transmission through five stages; low, second, third, fourth and top. The gear shift pins are held by the disc so that the stopper plate may secure each position of the five stages.

The outer surface of the gear shift drum is provided with slots, along which the shift forks travel back and forth when shifting gears.

The neutral position is looted between the low and second gear shift drum pins, and the stopper mechanism is located on the left side of the shift drum.

1. Removing the Gear Shifter Shaft Ass'y

To Remove the "A" gear shift arm, remove the circlip and washer, and lift up the "A" gear shift arm fram the shifter drum and remove it from the right side of the engine. (Figs. 3-13-2 and 3)

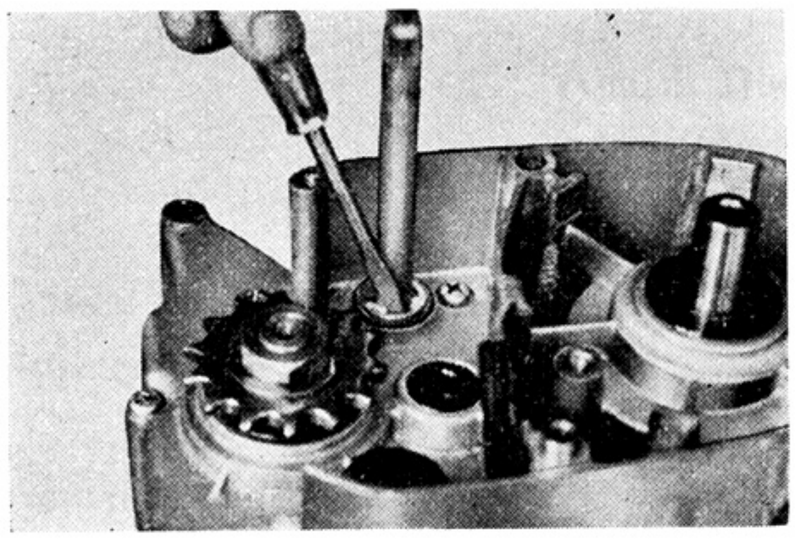


Fig. 3-13-2

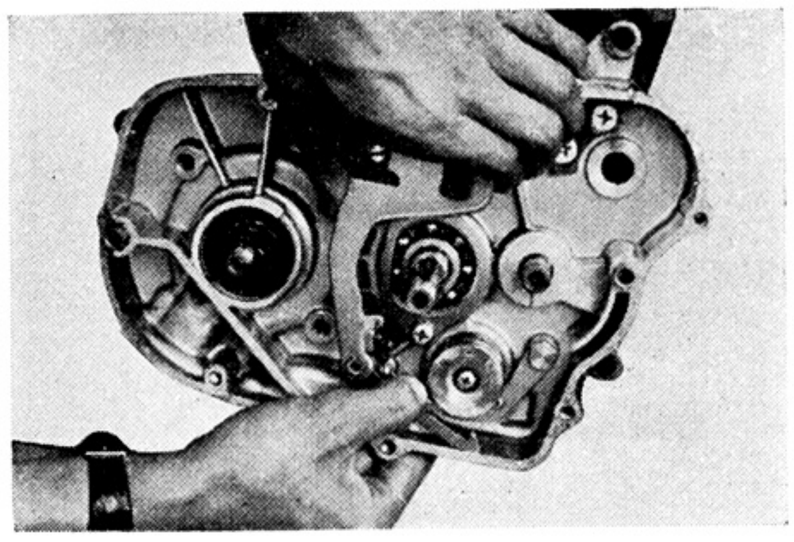


Fig. 3-13-3

2. Checking Gear Shift Parts

a. Checking the gear shift return spring

Check the gear shift return spring for fatigue or damage. A broken or fatigued gear shift return spring will impair the returning action of the shifting action of the shifting system.

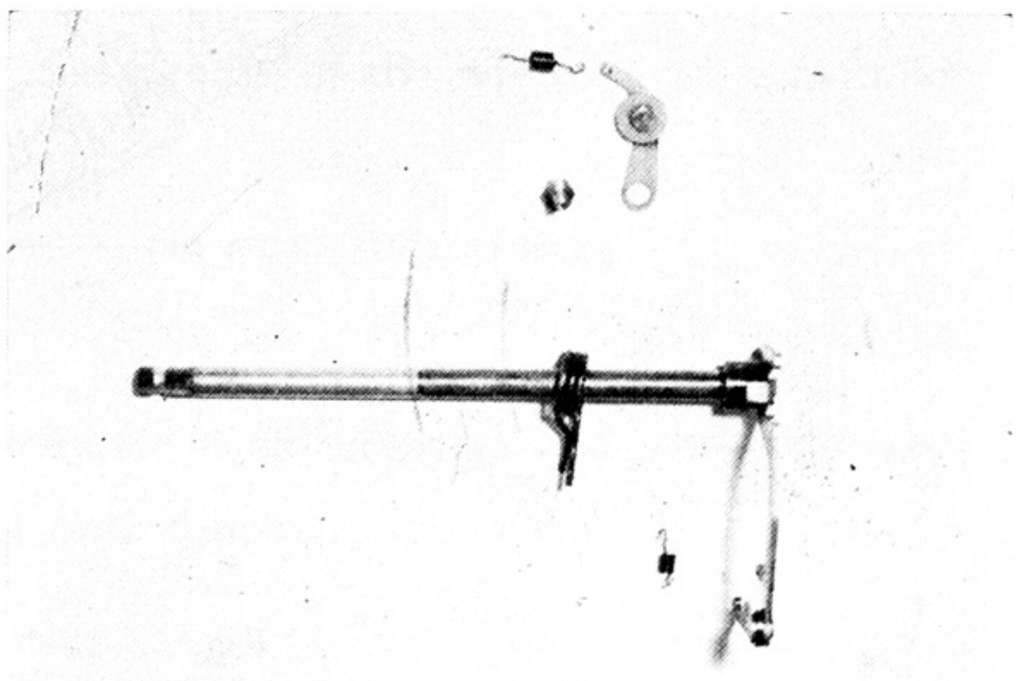


Fig. 3-13-4

b. A broken or fatigued gear shift arm spring will result in shifting failures.

3. Gear Shift Arm

a. Removal

First remove the mounting bolt and remove springs one by one.

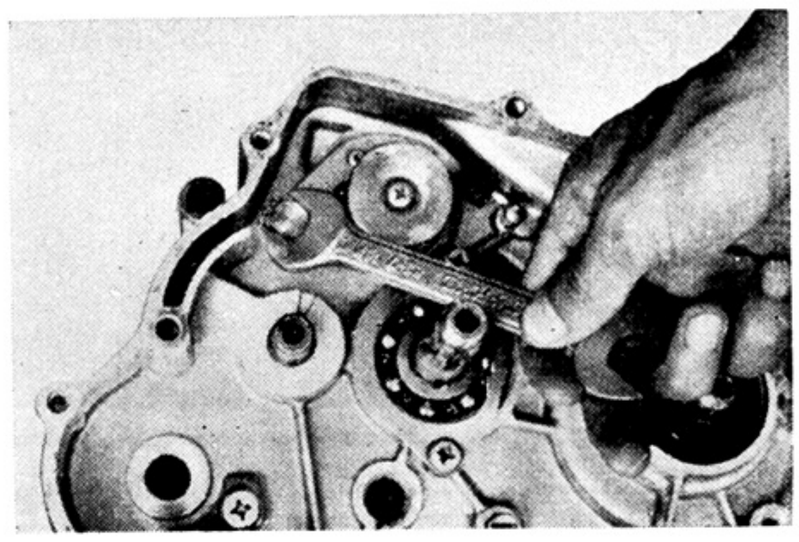


Fig. 3-13-5

b. Checking the Gear Shift Arm Spring

Refer to Fig. 3-13-1.

A fatigued or broken gear shift arm spring may let the shift arm slip from one shifter drum pin to another. Check the spring for proper tension and replace it if weak or broken.

4. Reconditioning

If shifting is made in a wrong sequence (e. g., slipage or shifting half-way), adjust the gear shift return spring stop screw to correct shift arm actions. (Fig. 3-13-6)

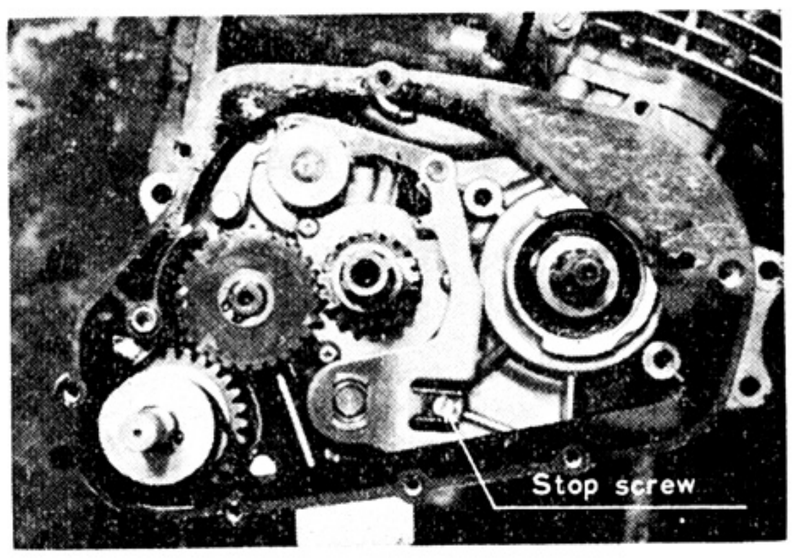


Fig. 3-13-6

3-14. Disassembling the crankcase

1. Splitting

The crankcase may be splitted from either the left or right side. However, to facilitate the subsequent servicing operations, the splitting tool should be installed on the right half of the crankcase.

a. Remove the pan head screw on the left side crankcase. (Fig. 3-14-1)

b. Install the crankcase splitting tool on the right case and alternately tap the transmission main shaft and the side af the right half with a soft-tip hammer, so that the right half will split. (Figs. 3-14-2 and 3)

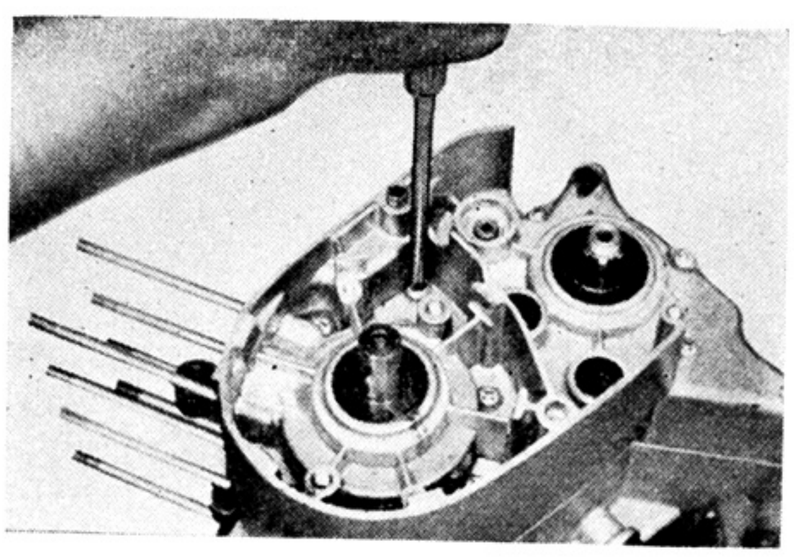


Fig. 3-14-1

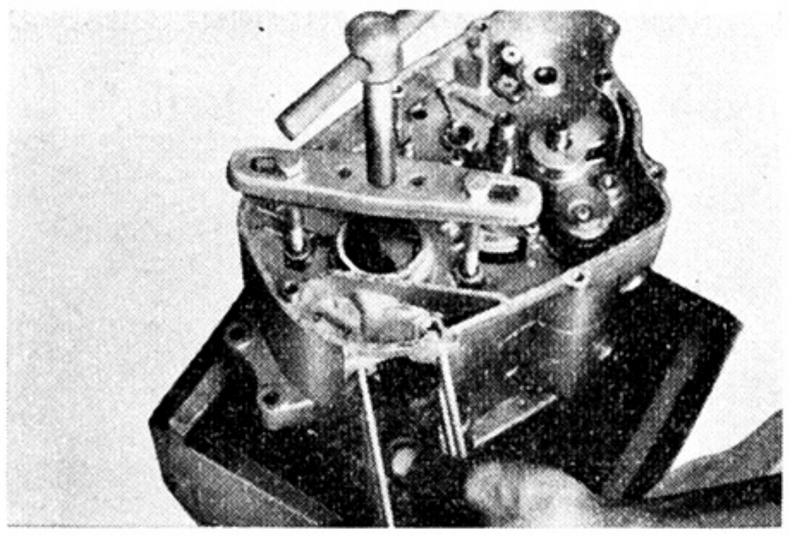


Fig. 3-14-2

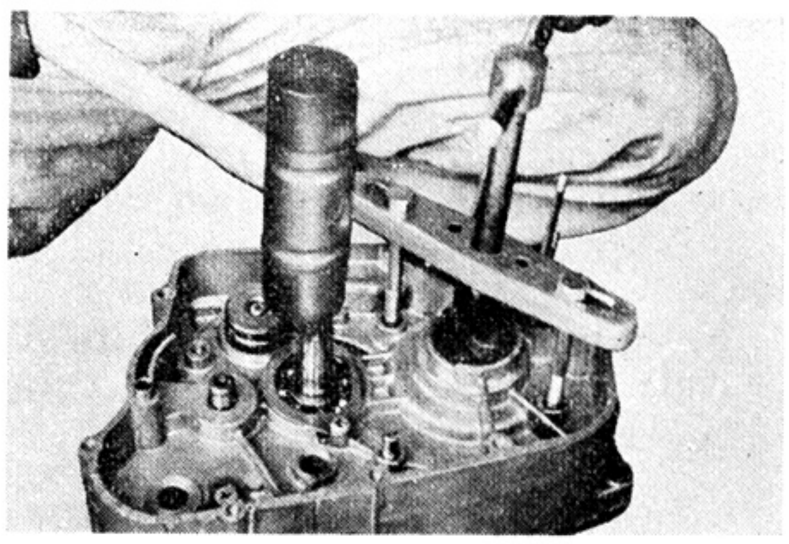


Fig. 3-14-3

Note: 1. Fully tighten the bolts of the crankcase separating tool, while keeping the body horizontal.

2. Position the connecting rod at top dead center, while taking care not to let the rod contact the case.

2. Reassembling

When reassembling the crankcase, be sure to apply YAMAHA BOND No. 5 to the mating surfaces of the crankcase. (Fig. 3-14-4)

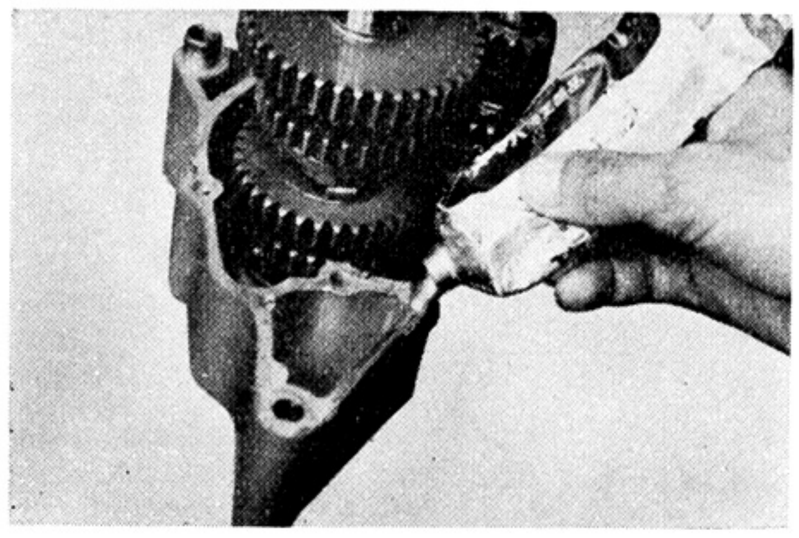


Fig. 3-14-4

3-15. Transmission Ass'y

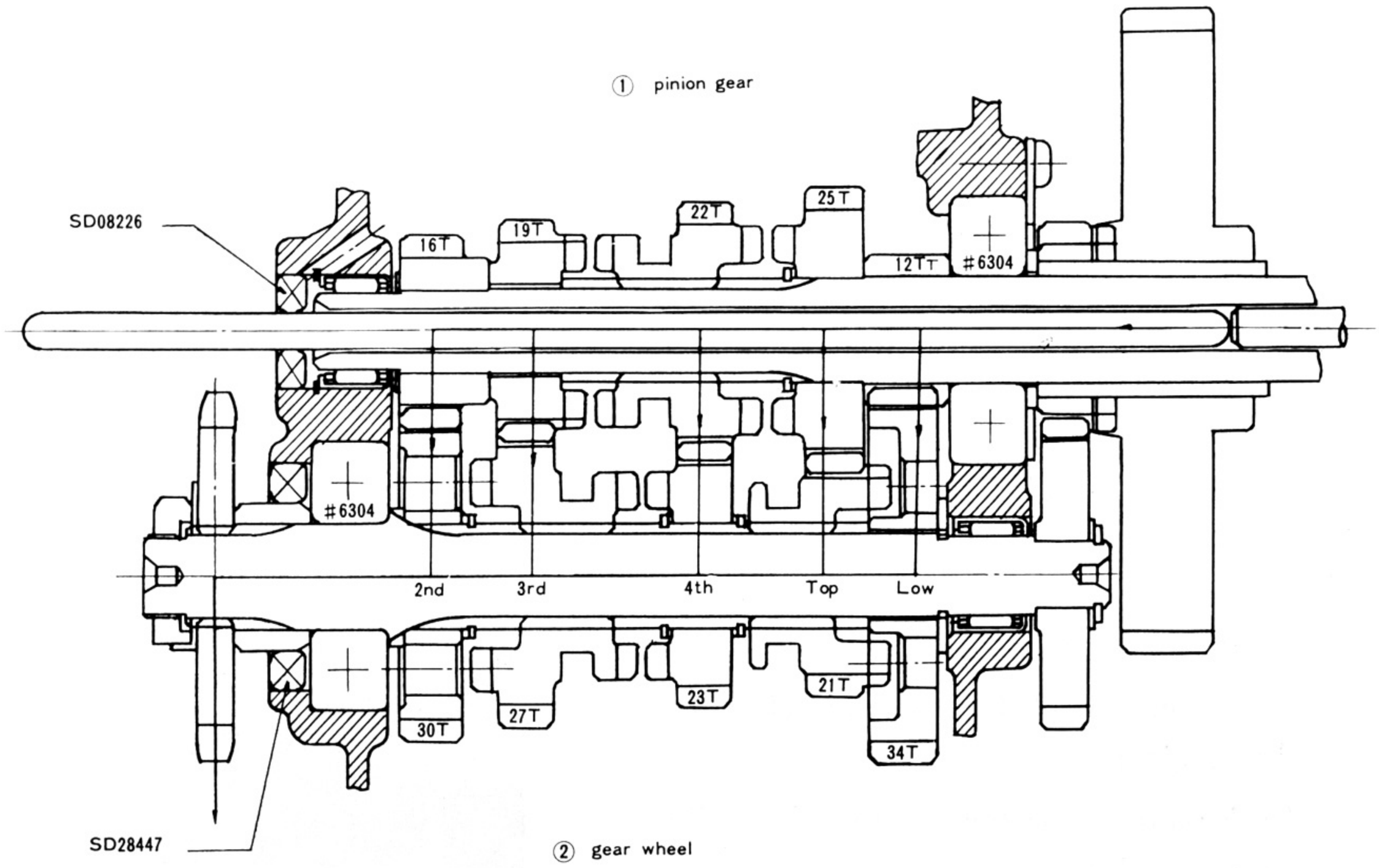


Fig. 3-15-1 Layout of Transmission Gears

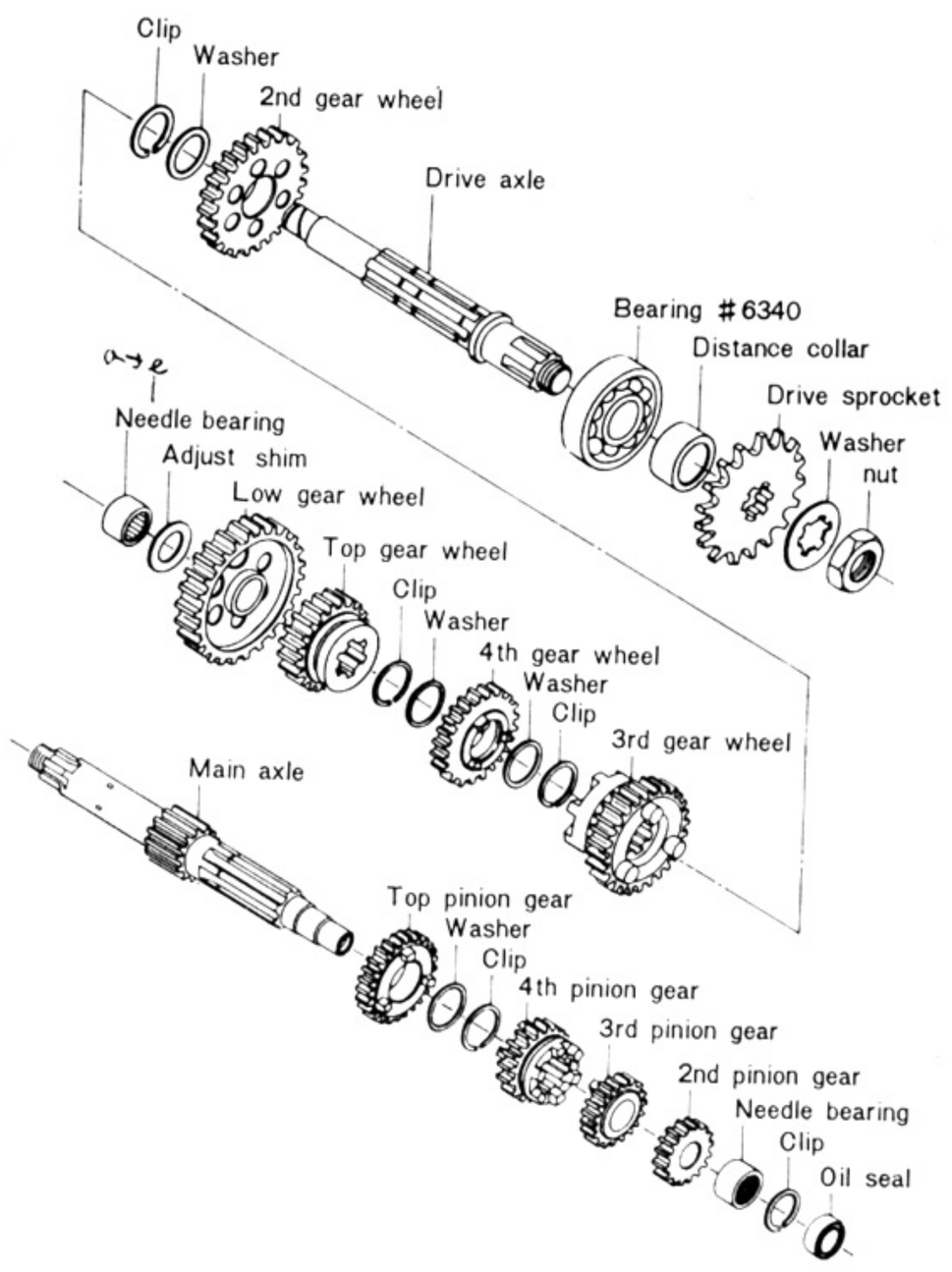


Fig. 3-15-2 Exploded View of Transmission

For details of assembly, arrangement and parts of the transmission, refer to Figs. 3-15-1 and 2.

The primary reduction ratio is 53/16(3.313), and the secondary reduction ratio 37/15 (2.467).

Therefore, the total reduction ratios will be : YCS1-C=40/15(2.667)

	Primary reduction	Transmission gear reduction	Secondary reduction	Total (YCS-1) reduction ratio
Low	3.313 (53/16)	2.833 (34/12)	2.467 (37/15)	23.151
2 nd	〃 〃	1.875 (30/16)	〃 〃	15.320
3 rd	〃 〃	1.421 (27/19)	〃 〃	11.611
4 th	〃 〃	1.045 (23/22)	〃 〃	8.542
Top	〃 〃	0.840 (21/25)	〃 〃	6.864

1. Removal

a. Rmove the shifte rdrum mounting bolt from the left side of the crankcase. (Figs. 3-15 -3 and 4)

b. Remove the neutral stopper system. (Figs. 3-15-5 and 6)

c. Remove the gear ass'y and the shifter drum as a unit. (Fig. 3-15-7)

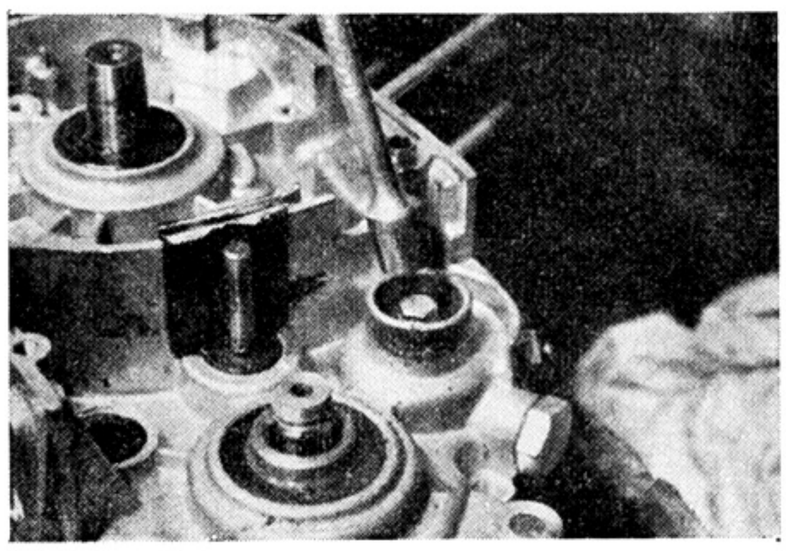


Fig. 3-15-3

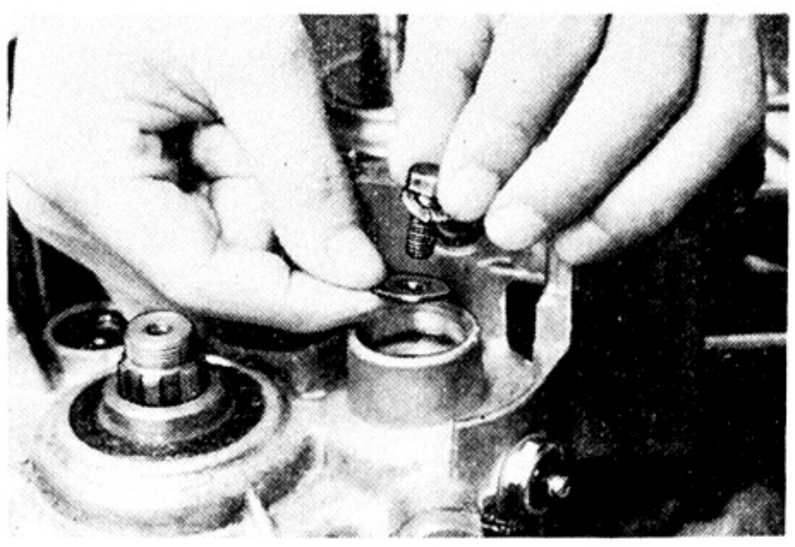


Fig. 3-15-4

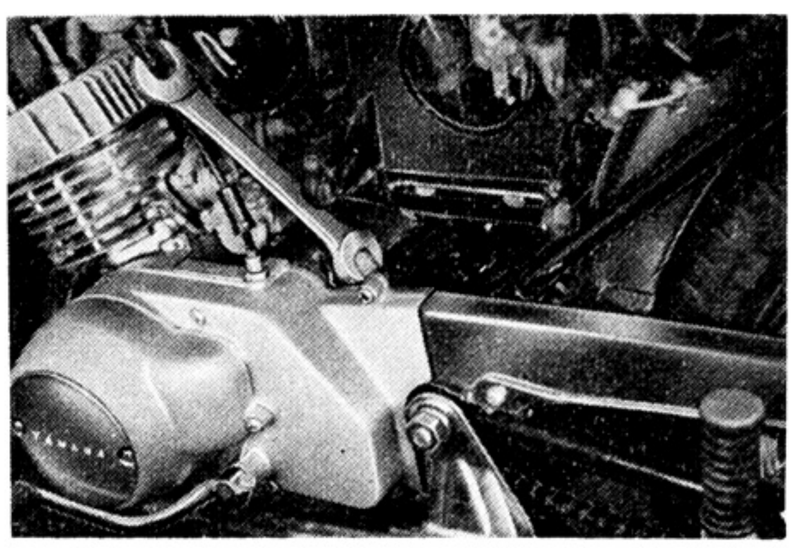


Fig. 3-15-5

Fig. 3-15-6

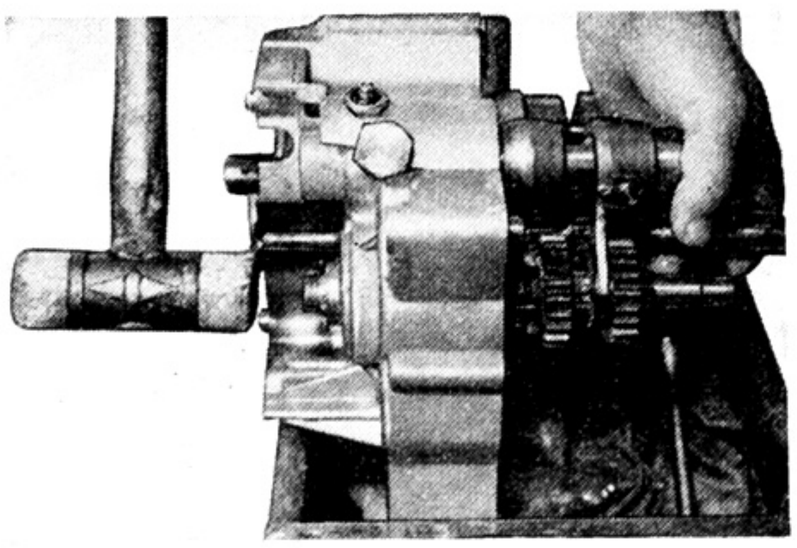


Fig. 3-15-7

2. Caution on Reinstallation

a. Reinstalling the Gear Ass'y and Shifter Drum Integrate both gear ass'y and shifter drum into one assembly, and mount it in the crankcase (L). Remember that the gear ass'y and shifter drum can not be installed separately. (Fig. 3-15-8)

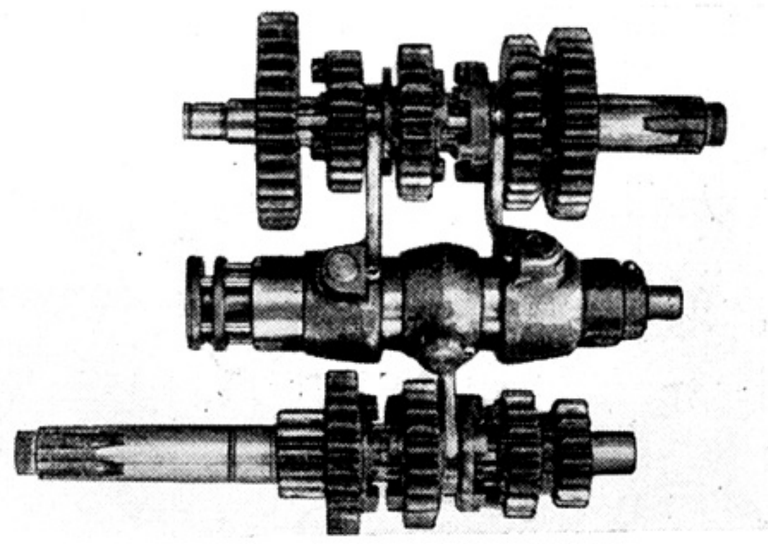


Fig. 3-15-8

b. Caution on Reassembling the Crankcase
The following measures should be taken not to bend the shift forks.

○Never reassemble the crankcase halves, with the transmission in low gear. Otherwise, the top pinion dog may batter against pinion teeth, and causes the shift fork to bend.

3-16. Crankshaft

Of all the engine parts, the crankshaft requires the highest degree of accuracy in engineering.

The crankshaft oil seal in the YAMAHA 180 YCS1 (C) is a solid aluminium, labyrinth type, which is superior to the conventional type in resistance to heat, oil and wear.

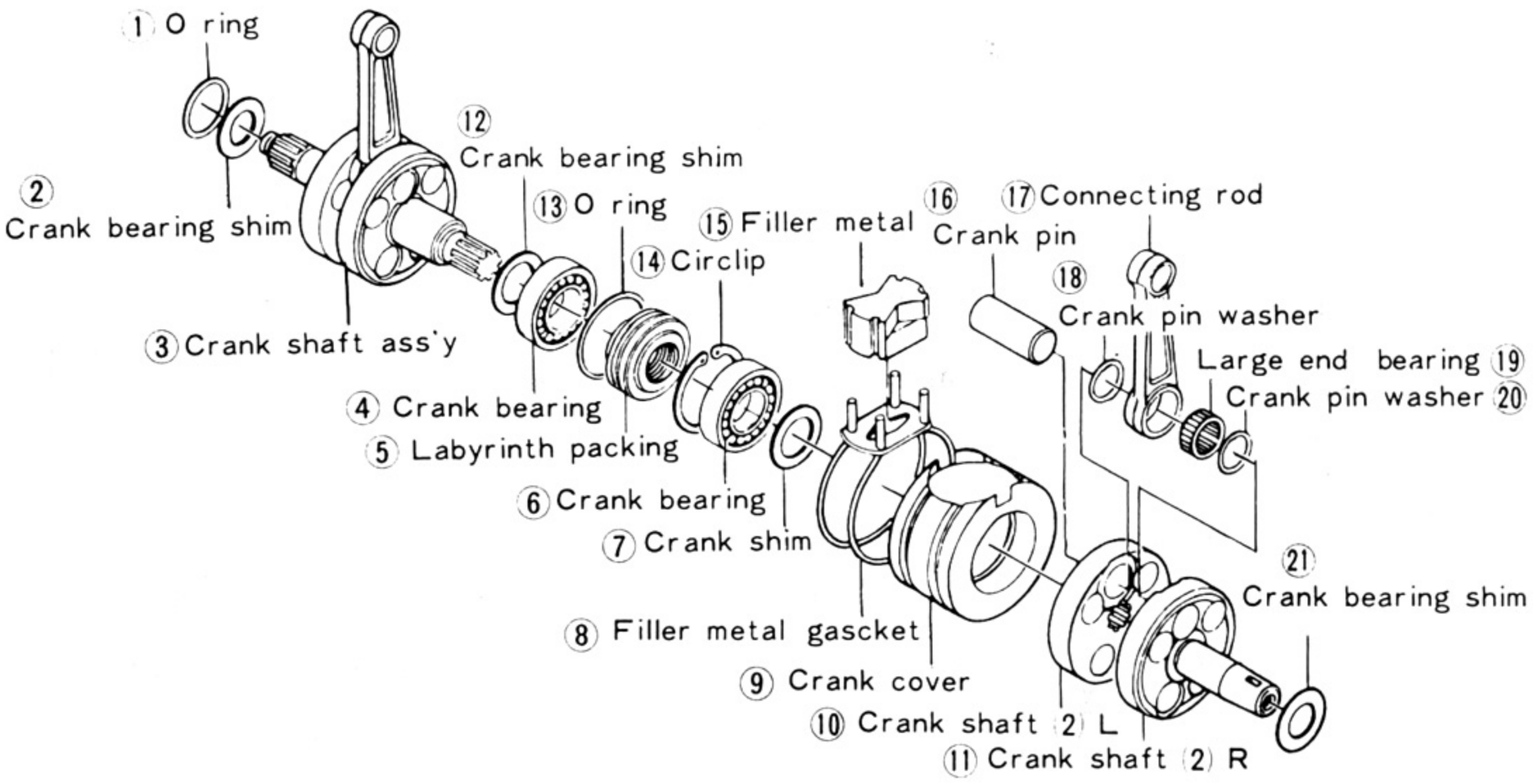


Fig. 3-16-1 Crankshaft Ass'y Component Parts

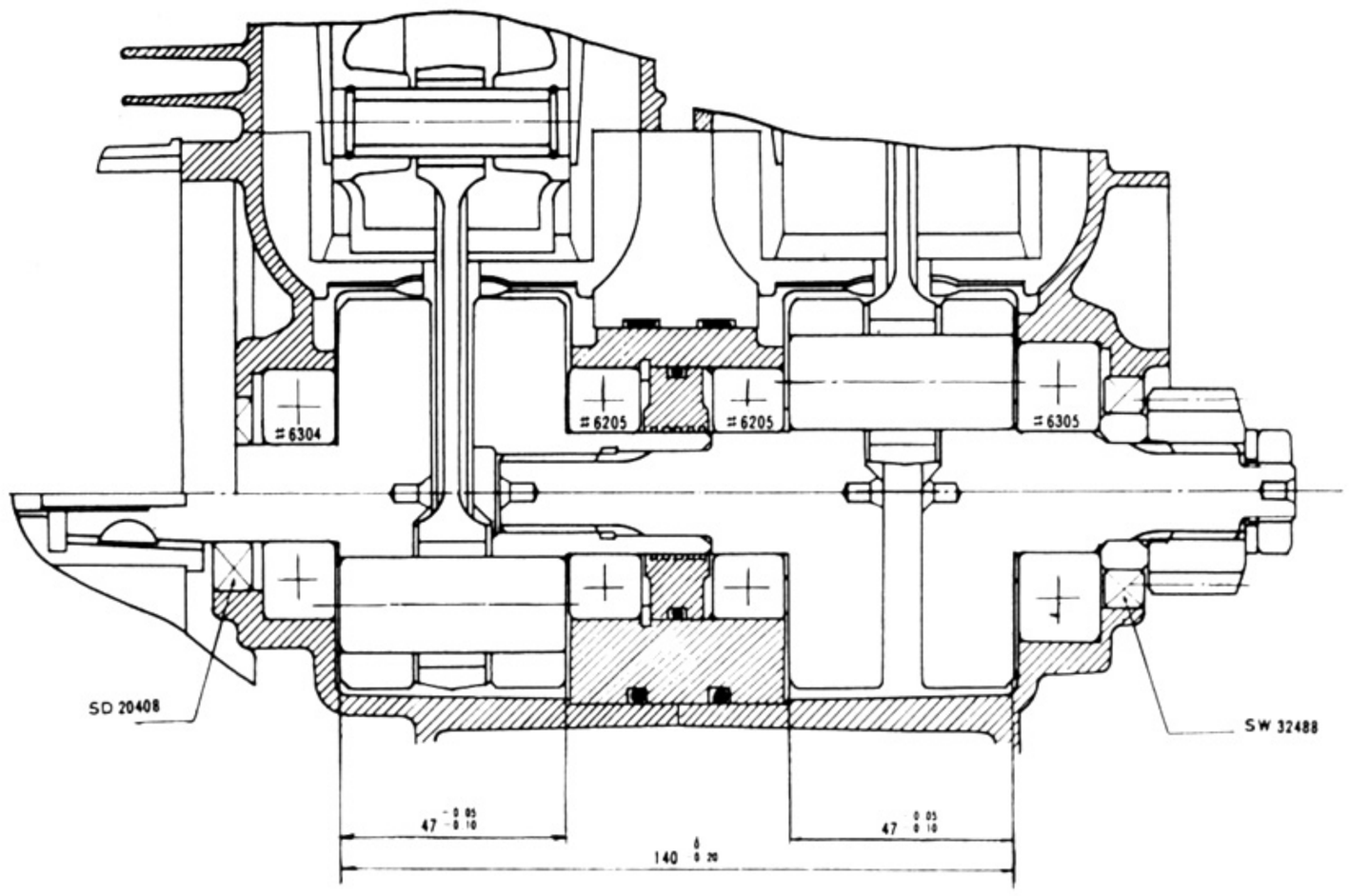


Fig. 3-16-2 Assembled Crankshaft Dimentions

1. Removing the Crankshaft Ass'y

a. Remove the crankshaft ass'y, with the crankcase separating tool. (Fig. 3-16-3)

○Screw the separating tool bolts into the crankcase, and keep the crankcase horizontal.

○Pull the connecting rod up to top dead center so it will not hit the crankcase, and keep it there by inserting a thrust bearing between the end of the crankshaft and the center bolt of the dividing too.

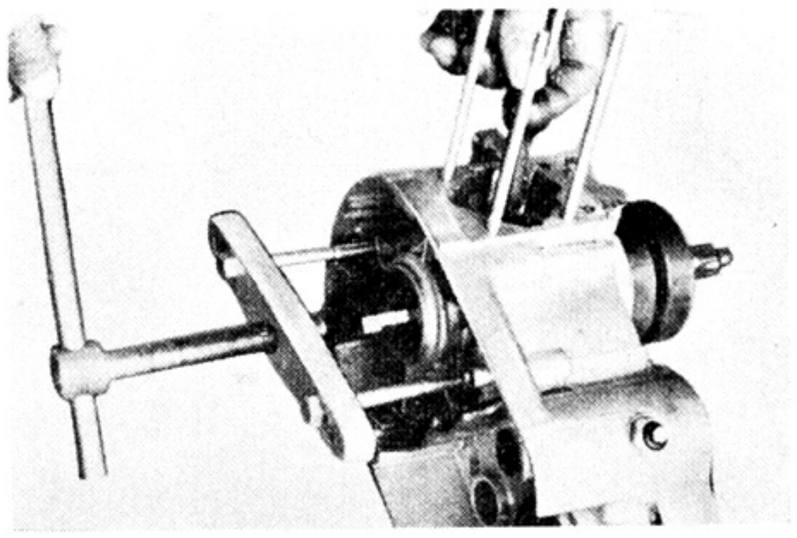


Fig. 3-16-3

2. Disassembling the Cranksahft Ass'y

To disassemble the crankshaft ass'y, usė a set of spccial tools as shown in Fig. 3-16-4, and follow the same steps as in the case of the YD and YDS series motorcycles.

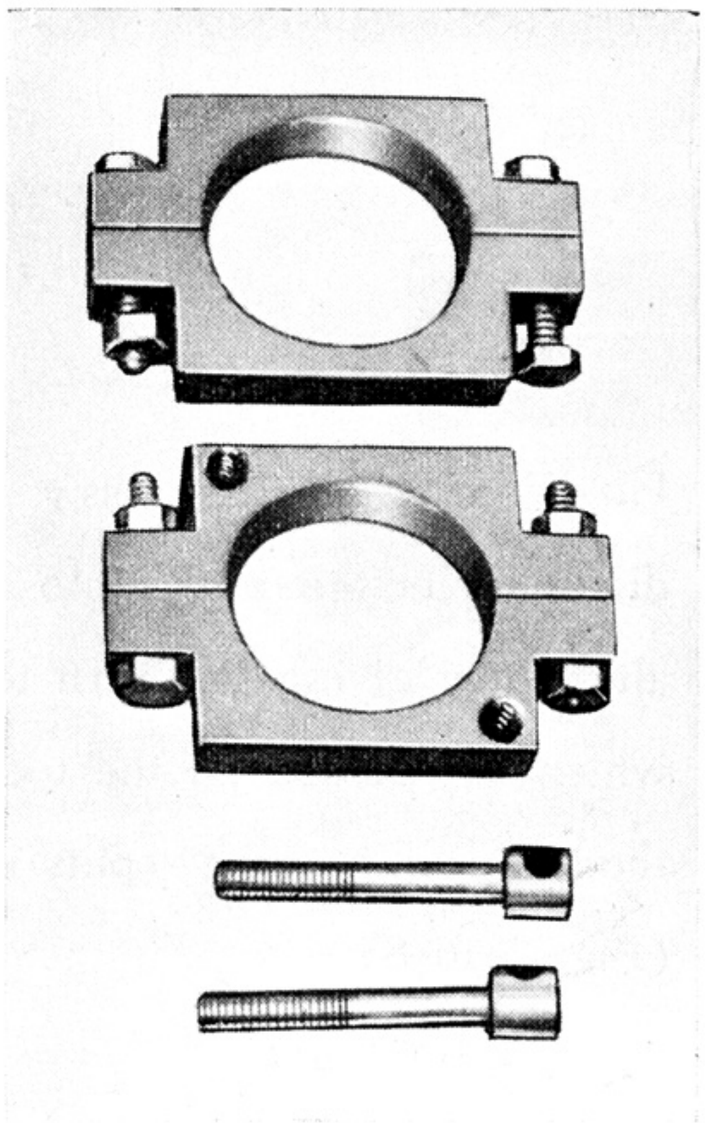


Fig. 3-16-4

a. Insert the tool (1) into the gap between the crank web and the crank cover. (Fig. 3-16-5)

Then install the tool (2) in the same manner as above on the other half of the crankshaft.

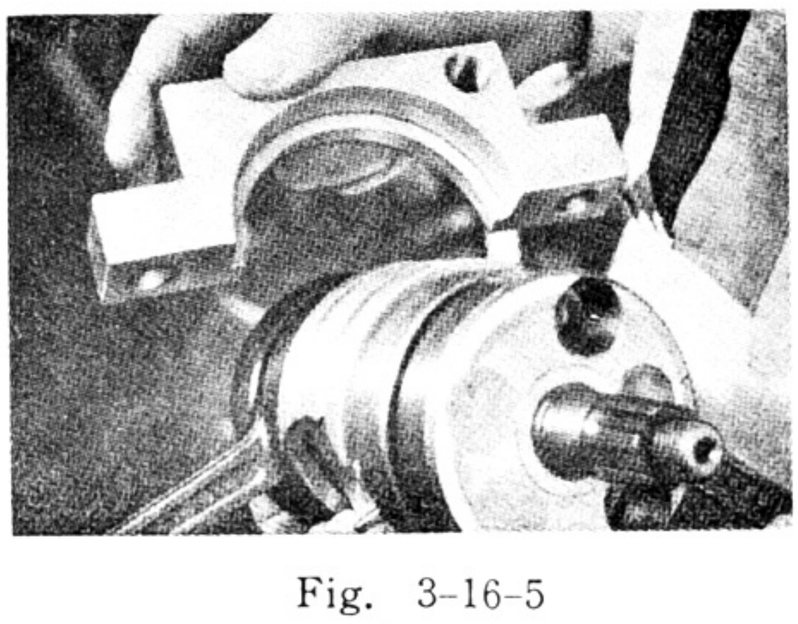


Fig. 3-16-5

b. Fully tighten the bolts of each tool (1) and (2). (Fig. 3-16-5)

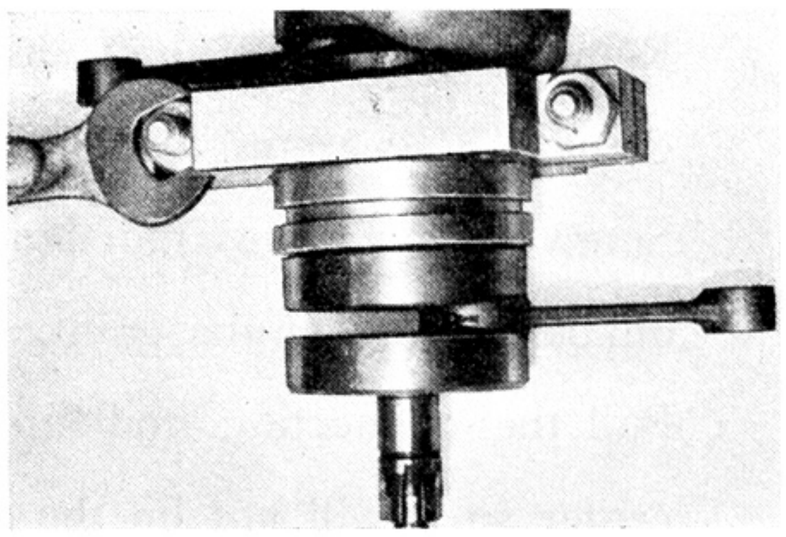


Fig. 3-16-6

c. Fig. 3-16-7 shows the tools installed on the crankshaft ass'y. (Fig. 3-16-7)

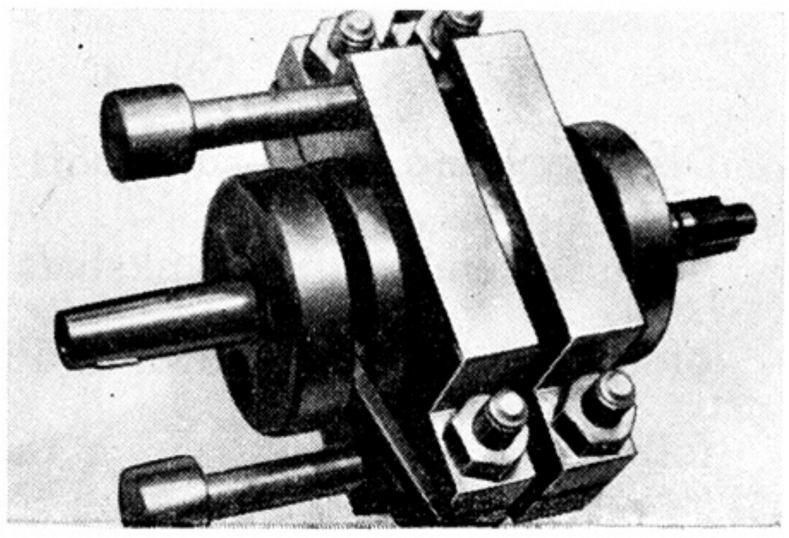


Fig. 3-16-7

d. Hold the crankshaft ass'y in a vice, and disassemble the ass'y into two parts by alternately giving one turn to each bolt (3) which is installed on the tool (2), so that the crankshaft ass'y splits into two parts. (Fig. 3-16-8)

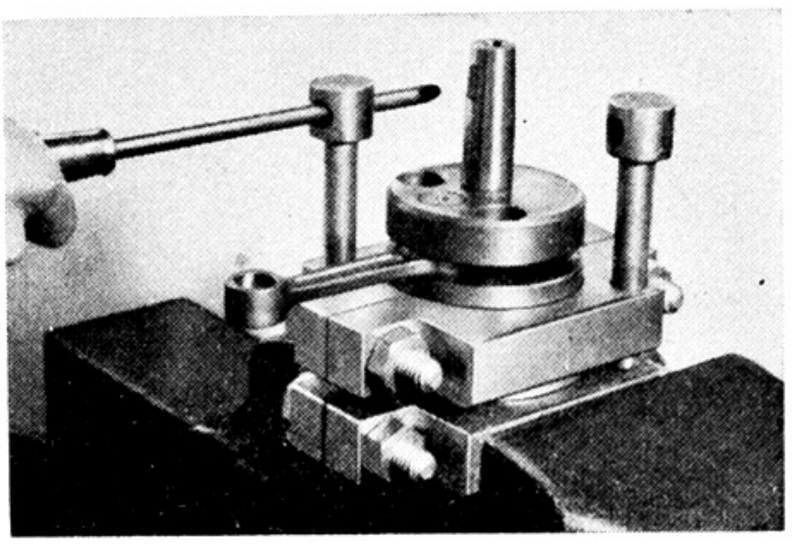


Fig. 3-16-8

e. Fig. 3-16-9 shows the disassembled crankshaft ass'y. To remove the crank cover and bearing, use a press.

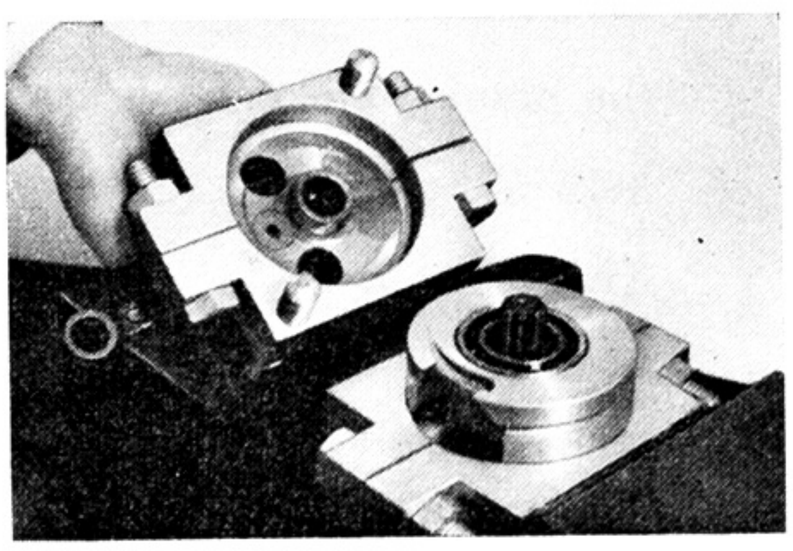


Fig. 3-16-9

f. Remove the crankshaft pin in the manner as shown in Fig. 3-16-10. (For this purpose, use the jigs as shown in Fig. 3-16-11)

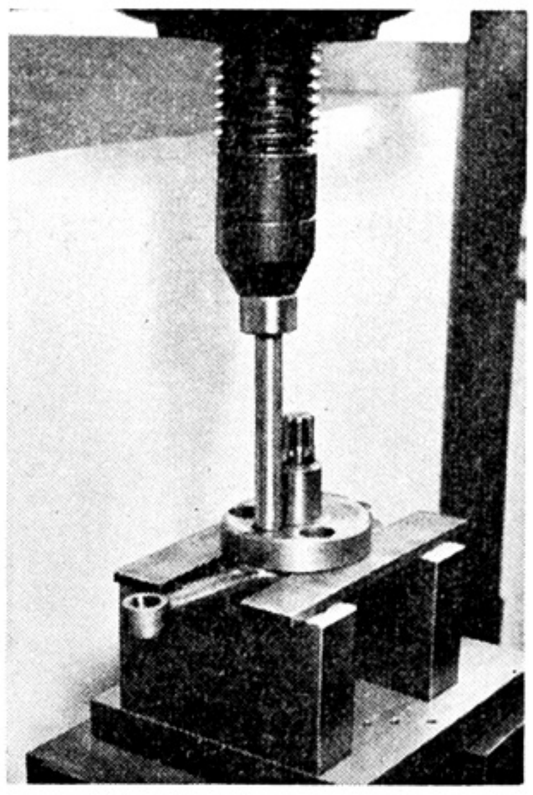


Fig. 3-16-10

3. Reassembling the Crankshaft Ass'y

To reassemble the crankshaft ass'y use a set of special jigs as shown in Fig. 3-16-11.

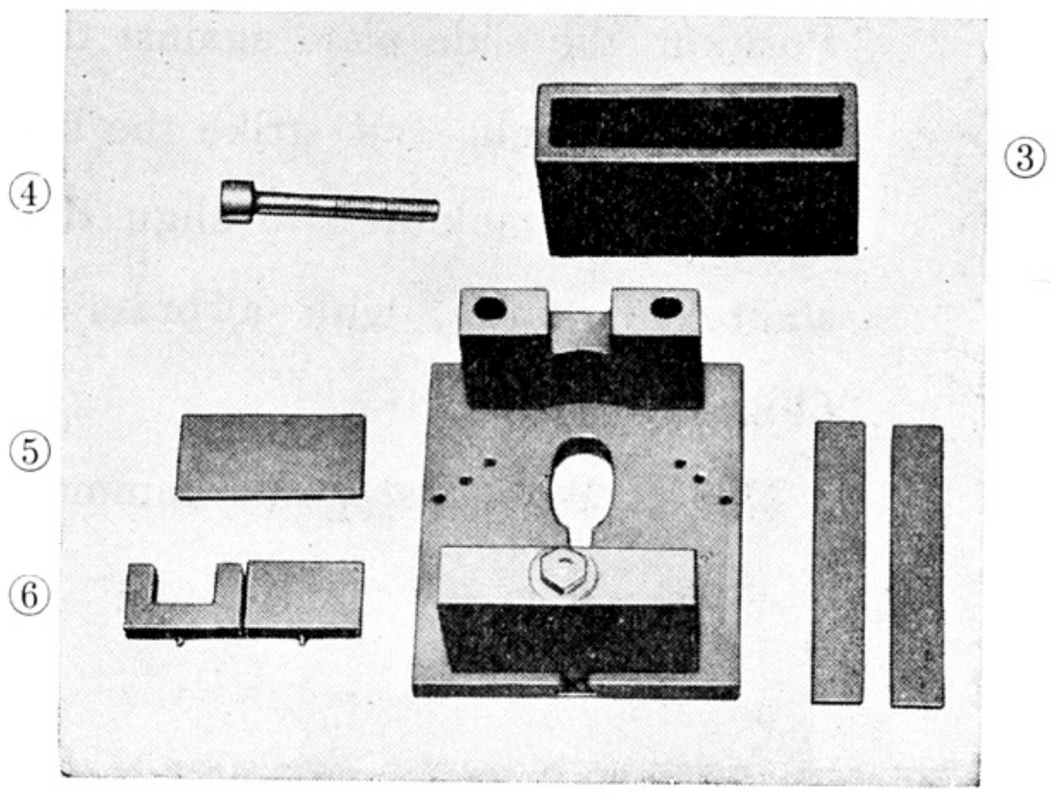


Fig. 3-16-11

a. Install Tool No. 6 (used to align the crankshaft ass'y) on Tool No. 1. (Fig. 3-16-12)

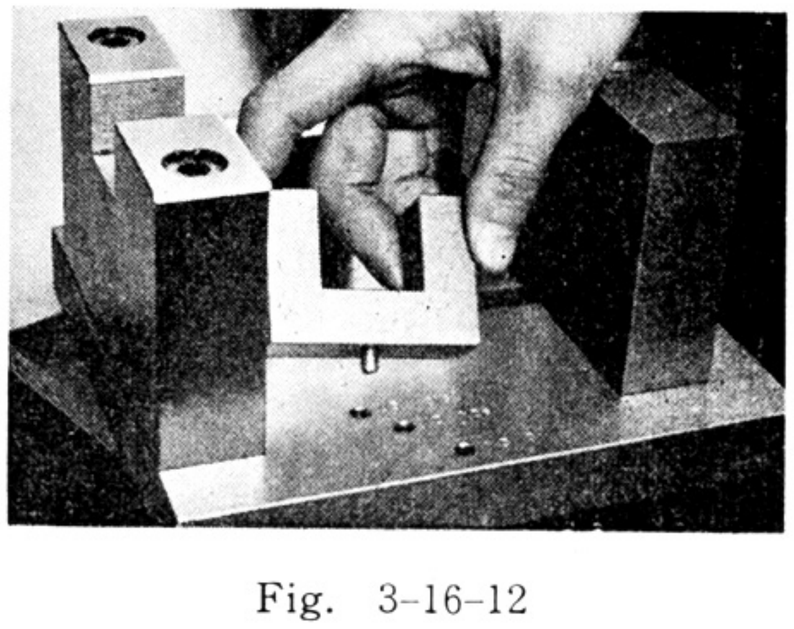


Fig. 3-16-12

b. Press the crank pin onto one end of the crankshaft, and install the crankshaft in Tool No. 1. Then install the connecting rod on the shaft. (Fig. 3-16-13)

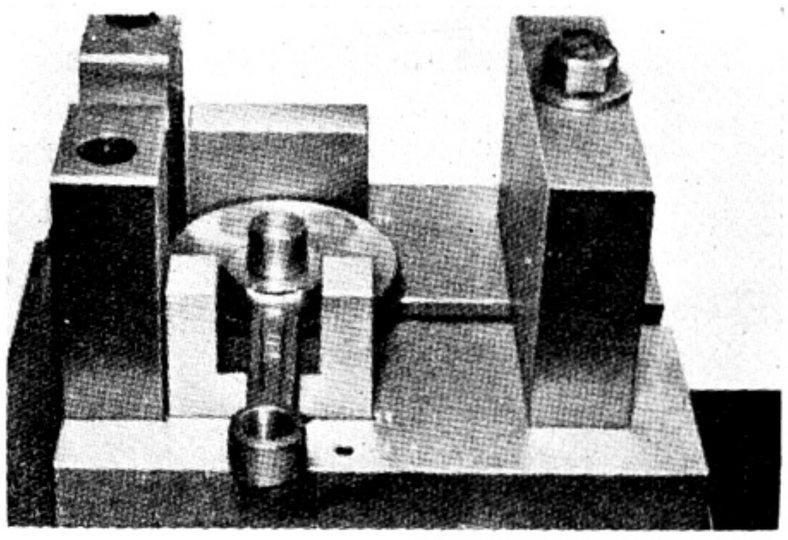


Fig. 3-16-13

c. Join another half of the crankshaft to the above crankshaft and press the crank pin onto the crankshaft end. (press the crank pin half way.)

Position the slide plate against the rim of the crank web, and strike the slide plate toward the crank web to align the crankshaft temporarily, with a brass hammer. (Fig. 3-16-14)

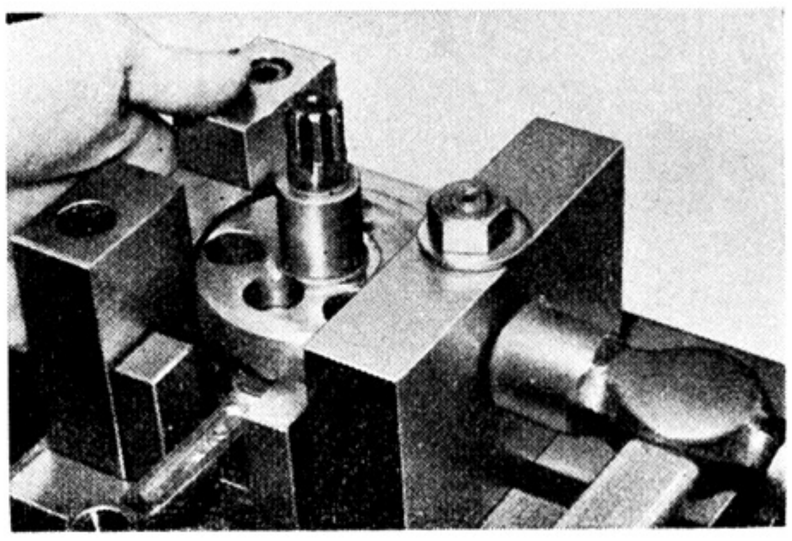


Fig. 3-16-14

Note: When using the hammer, keep the slide plate bolt lock nut loose.

d. Then tighten the lock nut fully.

(Fig. 3-16-15)

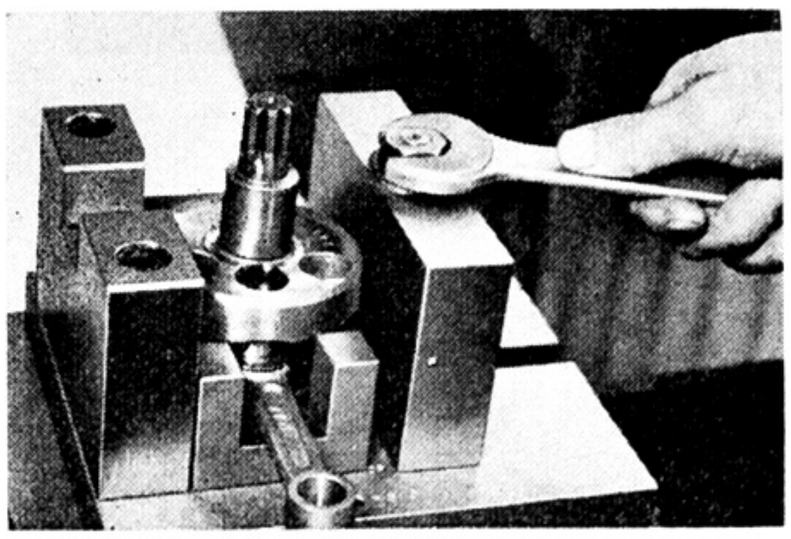


Fig. 3-16-15

e. Place Tool No. 2 on the face of the crank web, and press the crank downward with a hand press until Tool No. 2 comes to contact with the top of Tool No. 6. Then continue pressing until the pressure load reaches 5 - tons. (Fig. 3-16-16)

(Pressure should be applied in the center line of the crank pin. Fig. 3-17-17)

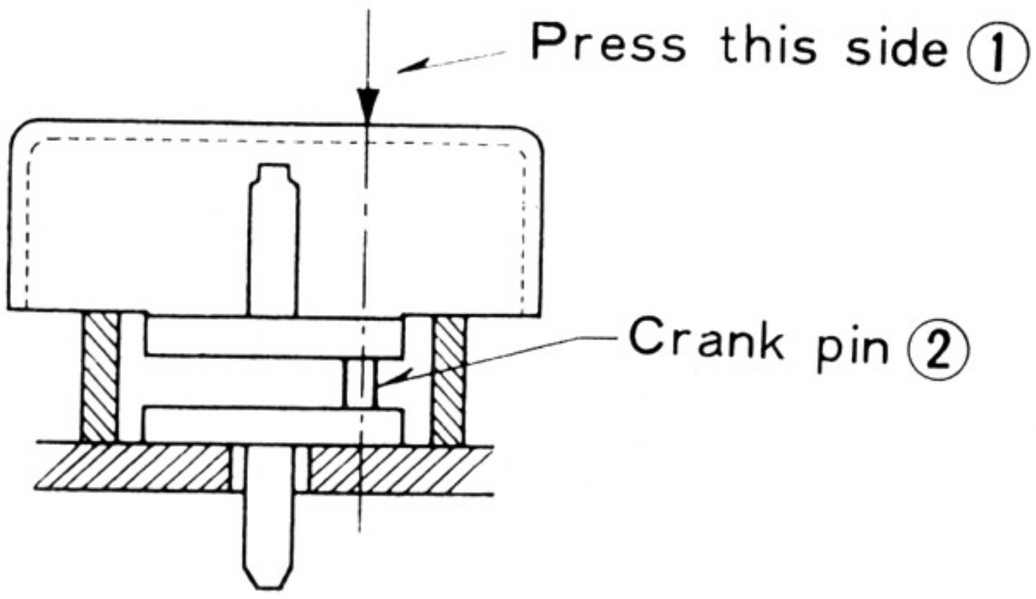


Fig. 3-16-17

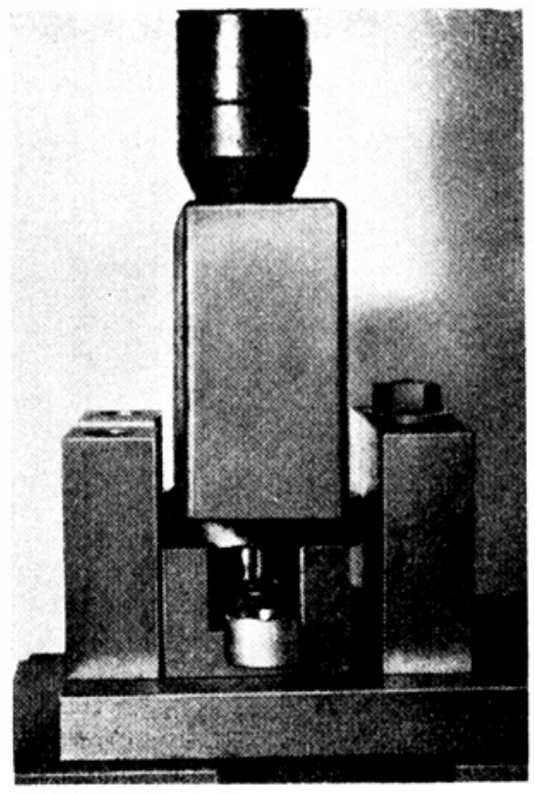


Fig. 3-16-16

d. After assembling each half of the crankshaft ass'y, complete the whole crankshaft ass'y.

First install the crank cover on one half of the crankshaft ass'y, then join the other half by using a hand press. In this case, insert Tool No. 5 into the gap between the crank webs beforehand as shown in Fig. 3-16-18, in order to prevent the upper crank cover from going out of alignment. (Fig. 3-16-18)

Then align the whole crankshaft ass'y.

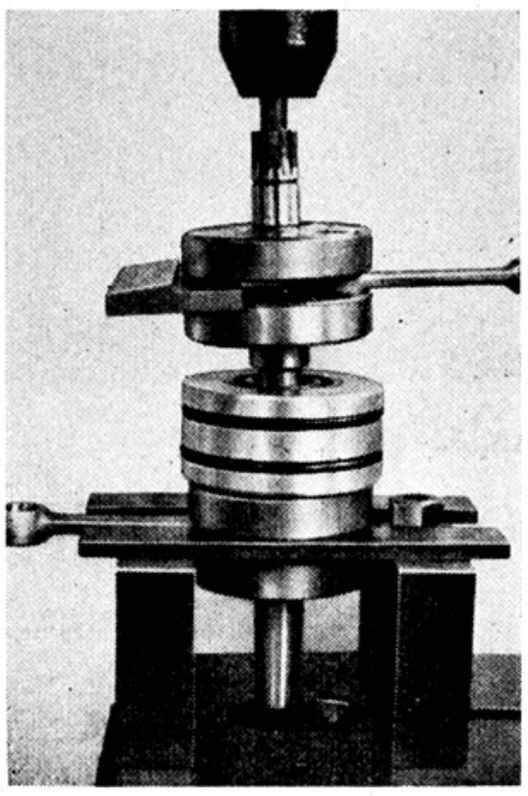


Fig. 3-16-18

4. Centering the Crankshaft Ass'y

a. Place the crankshaft ass'y on the or in V blocks, and check for alignment. (Fig. 3-16-19)

If eccentricity exceeds specified limits, align the crankshaft ass'y.

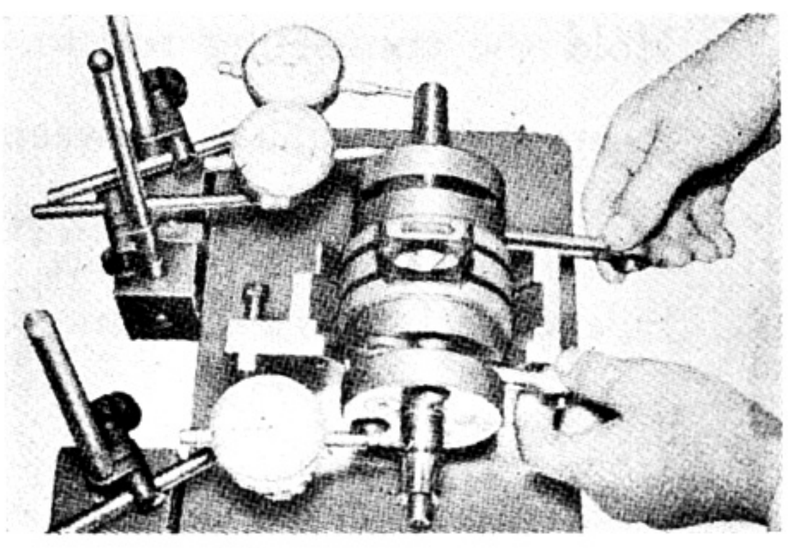


Fig. 3-16-19

b. Drive a wedge into the gap between the crank webs by using a brass hammer, and correct crank web runout. (Figs. 3-16-20 and 21)

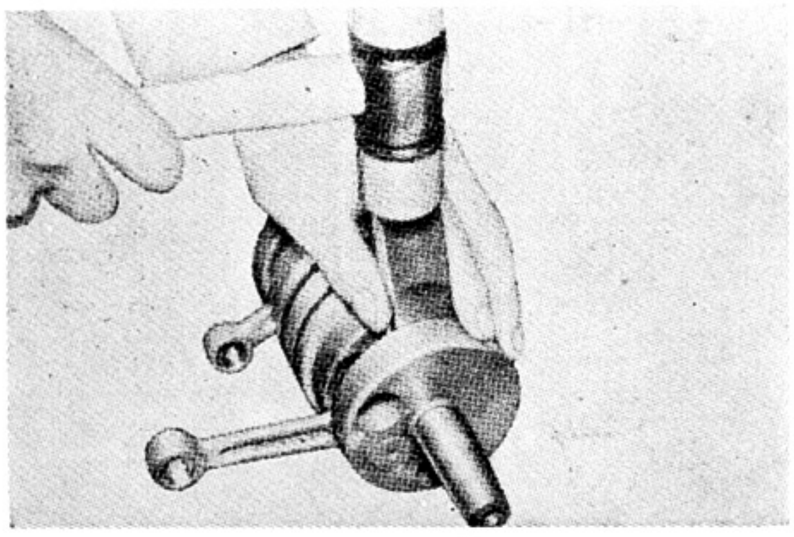


Fig. 3-16-20

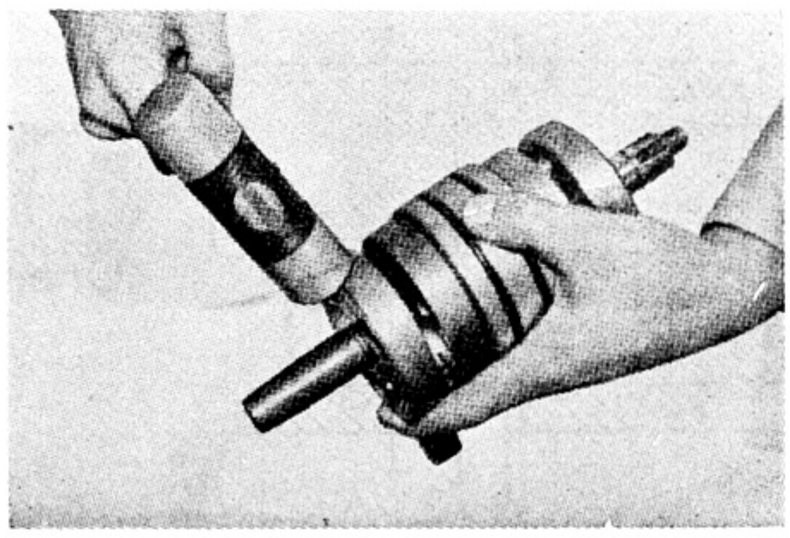


Fig. 3-16-21

5. Accuracy of the Crankshaft Ass'y

a. Axial Play of the Connecting Rod Small End

(Measure the wear of the crank pin and bearing at the large end of the connecting rod.)

As shown in Fig. 3-16-22, pinch the connecting rod small end, and check for axial play.

Axial play limits :

(1) Axial play should be 2 mm or less. (Use a dial gauge.) If the play is more than 2 mm, disassemble the crankshaft and replace defective parts.

(2) After reconditioning, axial play should be between 0.8 mm and 1.0 mm.

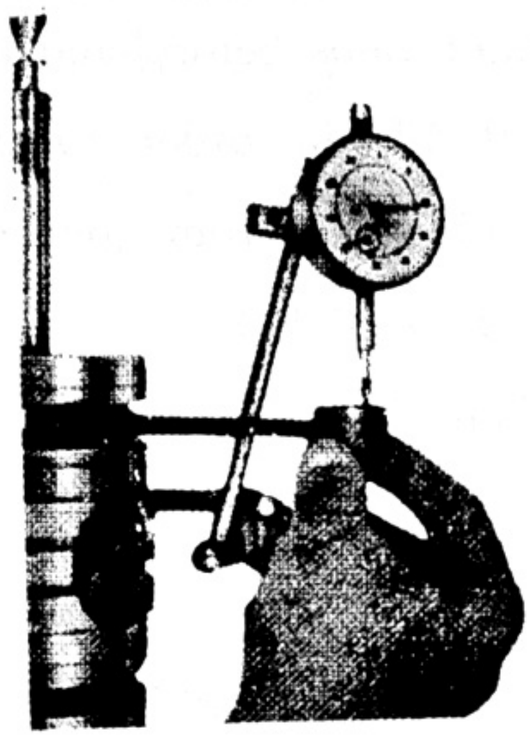


Fig. 3-16-22

b. Checking the Connecting Rod for the Large End Side Play (Fig. 3-16-23)

Hold the connecting rod to one side and insert a feeler gauge between the large end and the crank web.

Side Play Limits : 0.1 mm – 0.3 mm

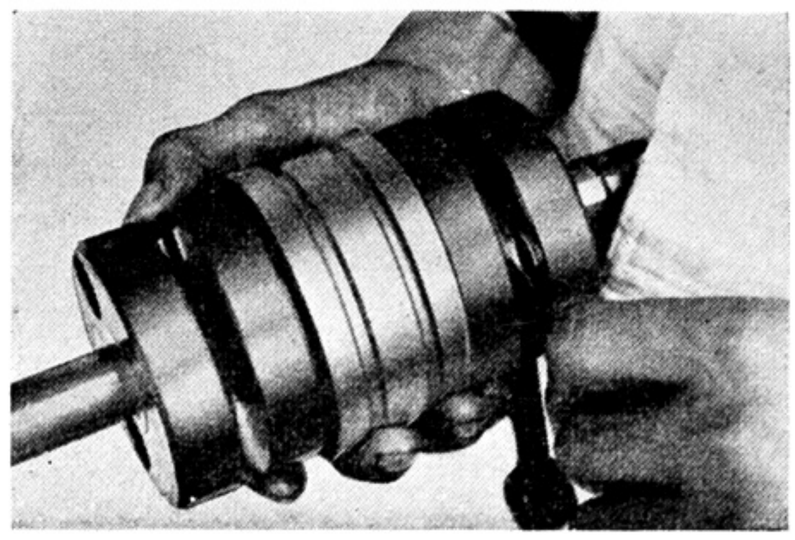


Fig. 3-16-23

c. Overall Length and Runout of the Crankshaft (Fig. 3-16-24)

Limits :

(1) Overall length of the Crank

A ..... 47 $^{-0.05}_{-0.10}$

B ..... 130 $^{-0}_{-0.2}$

(2) Runout of the Crankshaft

0.05 mm or less

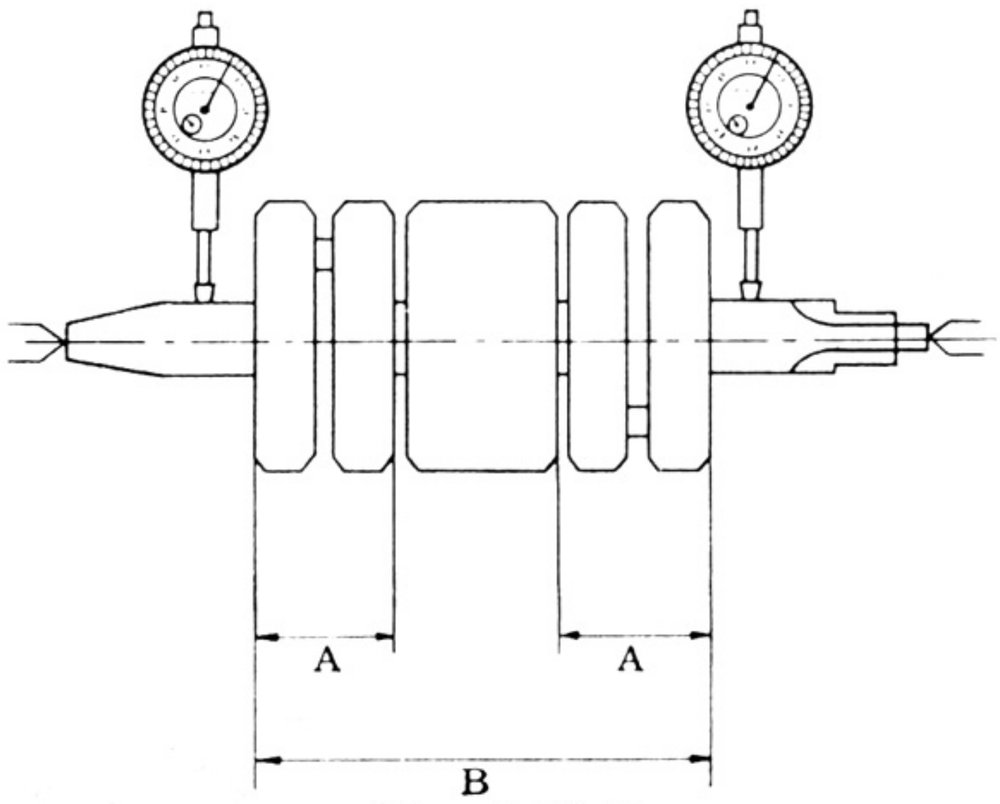


Fig. 3-16-24

6. Reinstalling the Crankshaft Ass'y

Put shims on both ends of the crankshaft, and install the crank shaft assembly by using the crankshaft installing tool (same tool as used for YA 6). Hold the connecting rod at top dead center with one hand while turning the handle of the installing tool with the other. (Fig. 3-16-4)

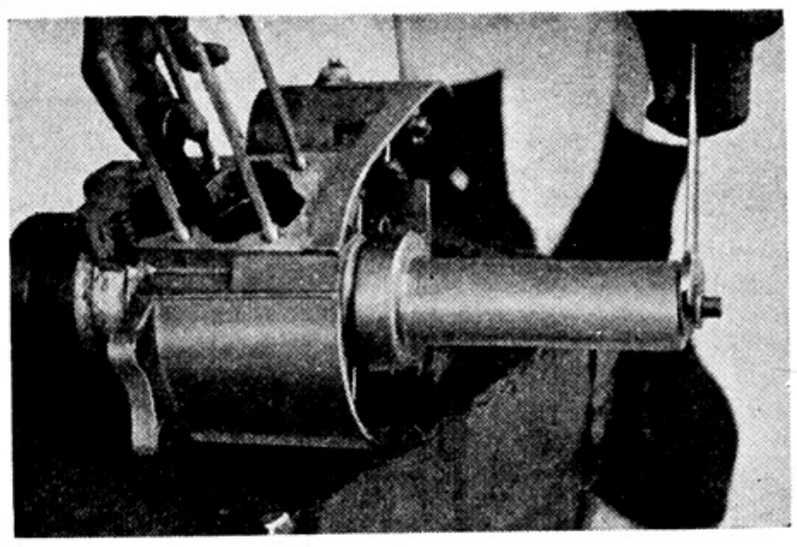
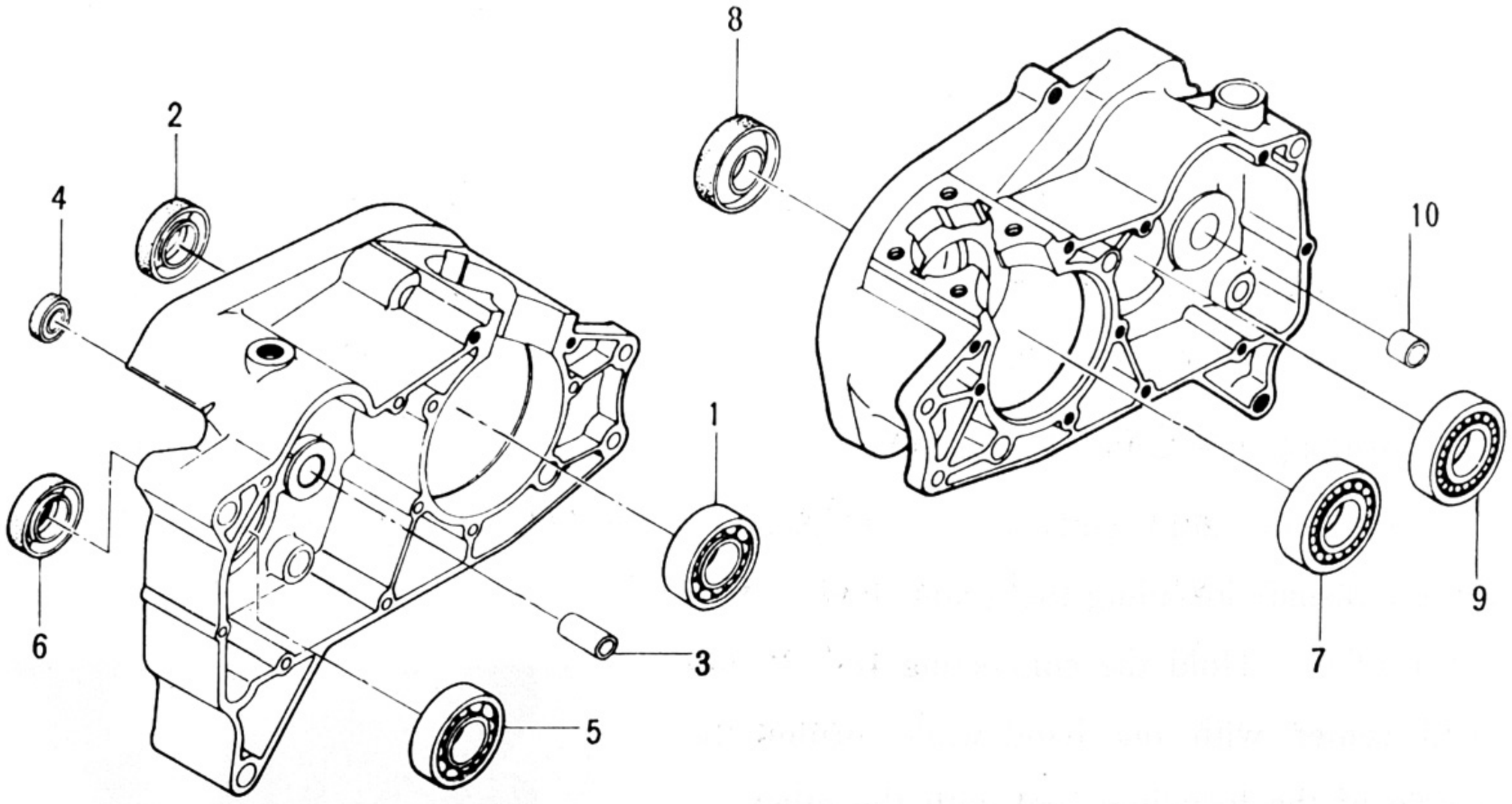


Fig. 3-16-25

3-17. Bearings and Oil Seals



1. Bearing (6304)
2. Oil seal (SD 20408)
3. Needle bearing
4. Oil seal (SD 08226)
5. Bearing (#6304)
6. Oil seal (SD 28447)
7. Bearing (#6305)
8. Oil seal (SW 32488)
9. Bearing (#6304)
10. Needle bearing (SD 20408)

Fig. 3-17-1 Installation Position of Bearings and Oil Seals

1. Removal and Reinstallation

Ideally, the crankcase should be heated to approximately 120°C to easily remove or install oil seals and bearings, but the fellowing procedure is satisfactory.

a. Removal

1) Pry the oil seals out of place with a slot-head screw driver. (Fig. 3-17-2)
When overhauling the engine, replace the oil seals.

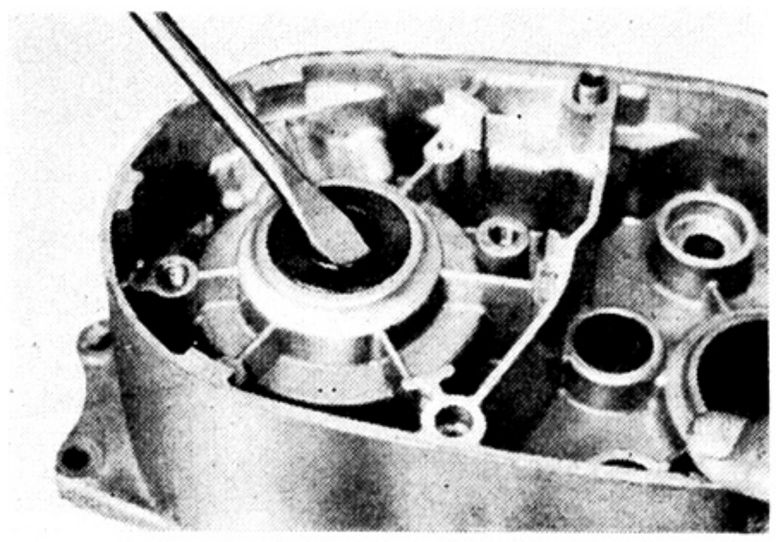


Fig. 3-17-2

2) Remove the bearings with the bearing removing tool. (Fig. 3-17-3)

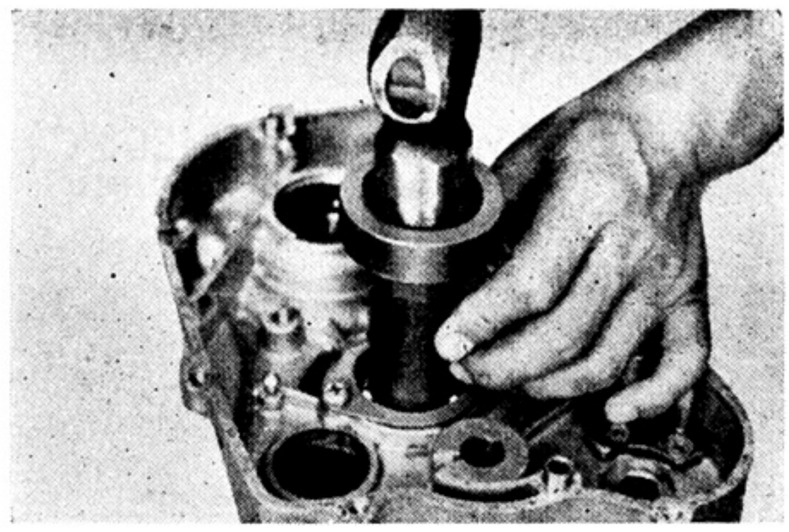


Fig. 3-17-3

b. Reinstallation

Install all bearings and oil seals, with their stamped maker's mark or numbers facing outward.

Pack all bearings with an adequate amount of grease before installation.

3-18. Carburetors

The YAMAHA Sports 180 YCS1 (YCS1-C) engine is equipped with a pair of AMAL type, MIKUNI VM 18 SC (VM20SC) carburetors.

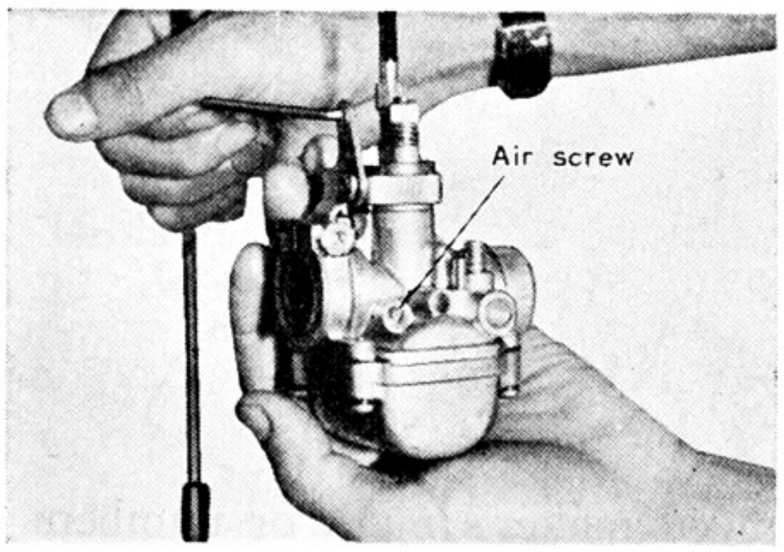
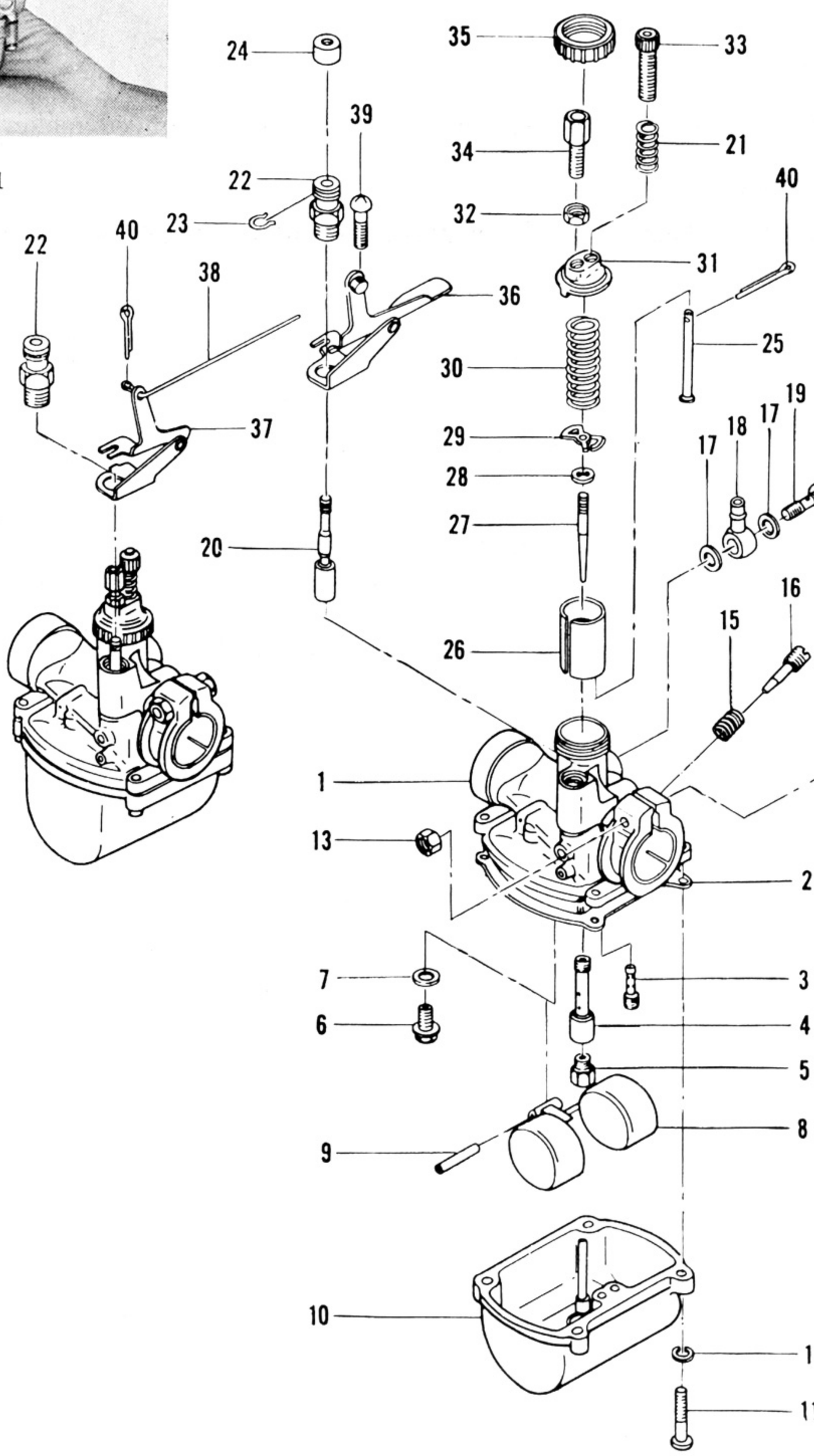


Fig. 3-18-1



8-1. Mixing chamber
2. Float chamber gasket
3. Pilot jet
4. Needle jet
5. Main jet
6. Float valve Ass'y
7. Float valve seat gasket
8. Float
9. Float pin
10. Float chamber
11. Pan-head screw
12. Spring washer
13. Nut
14. Screw
15. Adjusting screw spring
16. Air adjusting screw
17. Fiber gasket
18. Banjo connection
19. Banjo bolt
20. Starter plunger
21. Adjusting screw
22. Plunger cap
23. Clip
24. Plunger rubber cap
25. Idle screw rod
26. Throttle valve
27. Jet needle
28. Needle clip
29. Circlip
30. Throttle valve spring
31. Mixing chamber top
32. Nut
33. Adjusting screw
34. Cable adjuster
35. Mixing chamber cap
36. Starter lever (R)
37. Starter lever (L)
38. Rod
39. Pan-head screw
40. Cotter pin

1. Checking the Carburetor

a. Float

If fuel leaks into the float while the engine is running, the float chamber fuel level will rise and make the combustion mixture too rich. Shake the float so you can feel or hear any gasloine inside. Replace the float if it is deformed or lcaking.

b. Float Valve

Replace the float valve if its seating end is grooved or scratched. Check the float valve spring for fatigue. Depress the flont valve with your finger, and make sure it properly seats against the valve seat when released.

If the float valve spring is weakened, fuel may overflow, flooding the float chamber while the machine is running at certain speeds, or over a certain type of road.

c. Overflowing

If fuel overflows, check the carburetor as described in a and b above. If neither a nor b cures the overflowing, it may be caused by dust or dirt in the fuel preventing the float valve from seating properly. Remove the dust or dirt in the fuel. (Figs. 3-18-3 and 4)

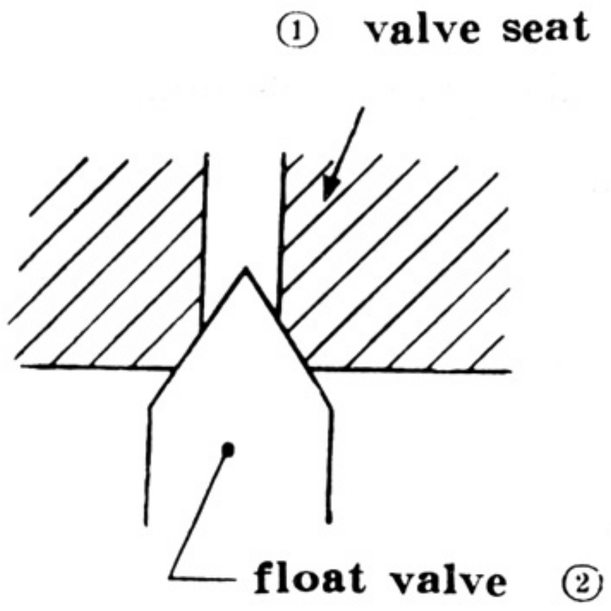


Fig. 3-18-3

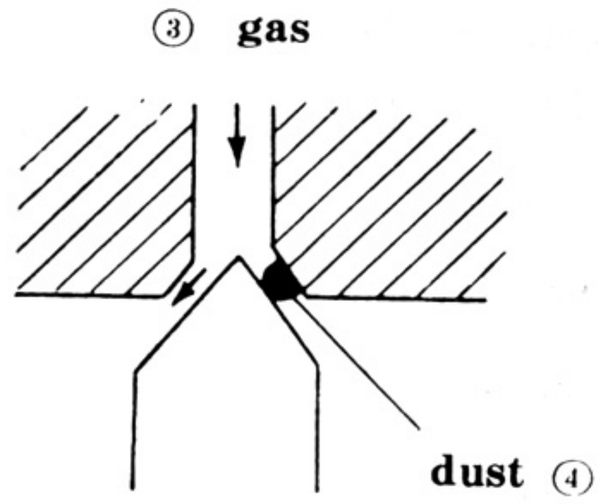


Fig. 3-18-4

d. Cleaning the Carburetor

Disassemble the carburetor, and wash all its parts in clean gasoline. Blow all air and fuel passages in the carburetor with compressed air.

All jets and other delicate parts should be cleaned by blowing compressed air through them, because wire or other hard, pointed cleaning tools may damage their precision-machined surfaces. (Fig. 3-18-5)

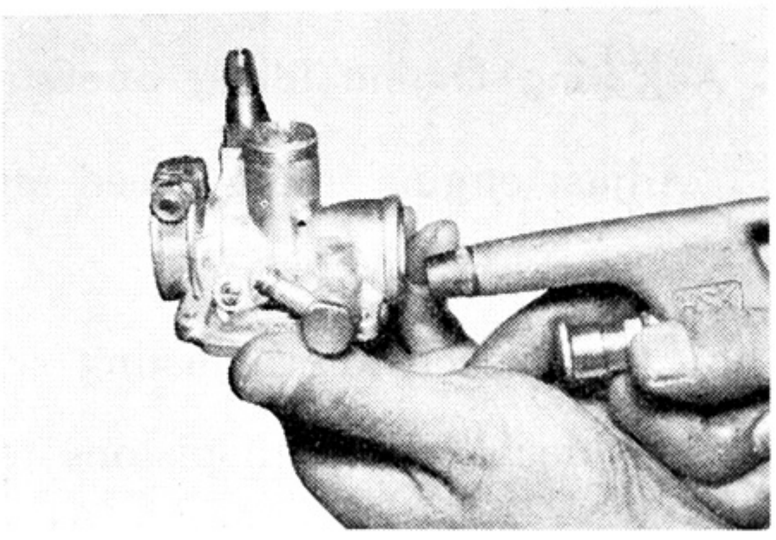


Fig. 3-18-5

2. Adiusting Oil Levels

The fuel level of the carburetor is strictly checked out before delivery of the machine, but it may fluctuate because of a worn needle valve or a deformed float arm.

If the fuel level rises above the specified level, an air-fuel mixture becomes too rich. If the fuel level is below the specified level, the mixture becomes lean.

Any incorrect fuel level should be adjusted in the following way.

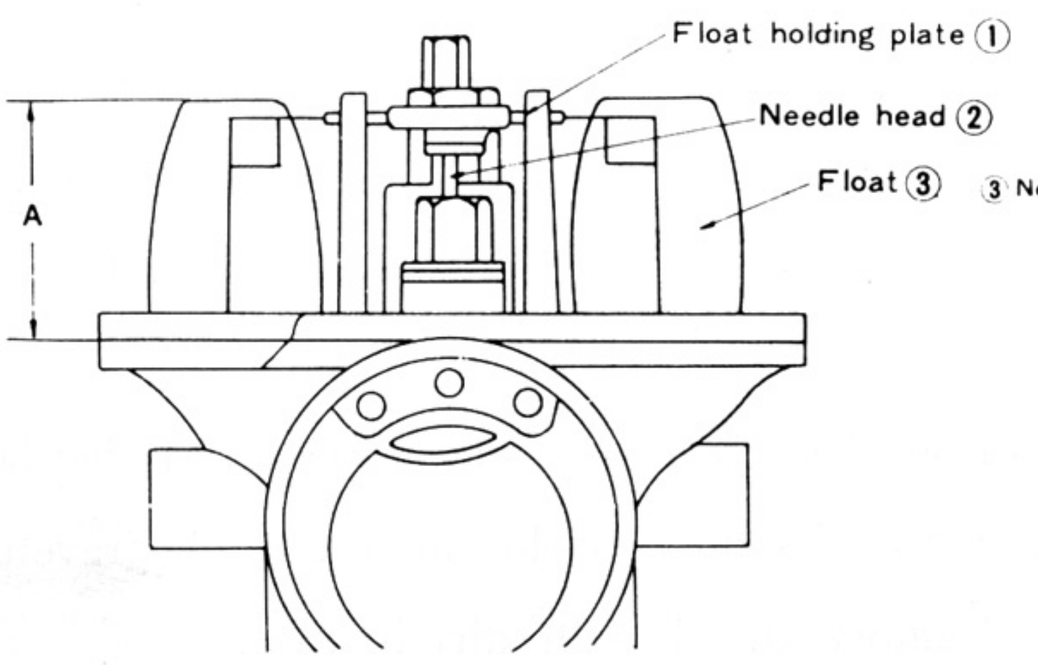


Fig. 3-18-6

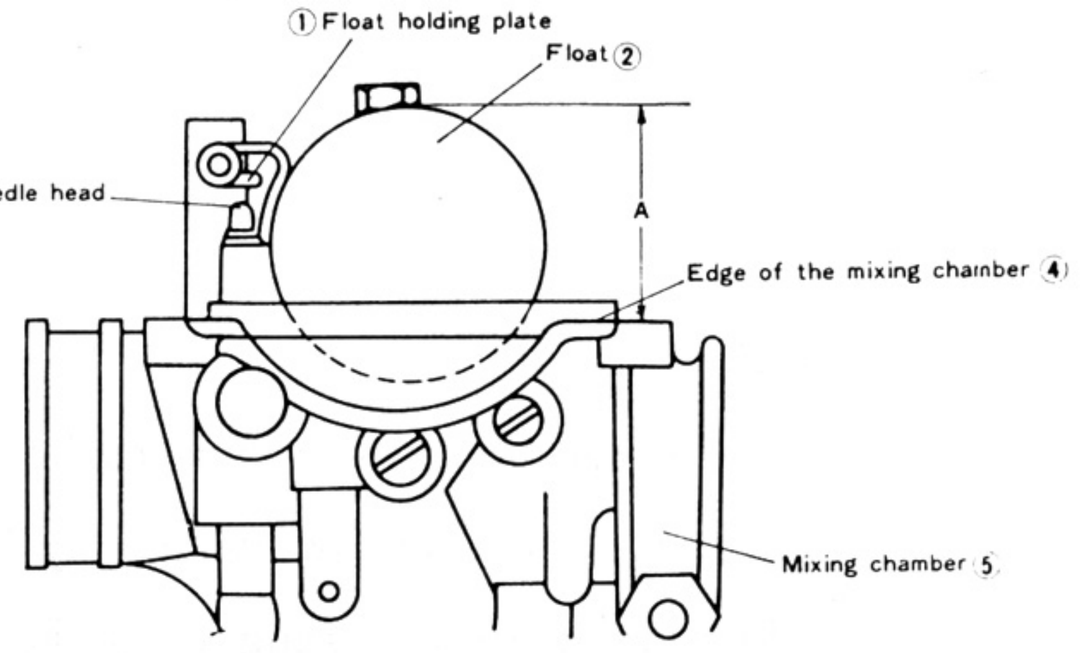


Fig. 3-18-7

a. Remove the float chamber body, and invert the mixing chamber body. Slowly push the float downward with your fingers until the float contacts with the top of the float needle.

b. Then measure the height (A in Fig. 3-18-6) from the top of the float to the float chamber gasket seat.

   Standard measurement: 21.5 mm. (0.847 in.)

c. If the A measures less than the standard value, stretch the bellows a little so that a correct measurement is obtained. If more than the standard, bend the tang until the correct measurement is obtained.

3. Adjusting Engine Idling Speed

Adjust engine idling speed after the engine is fully warmed up.

a. Start the engine.

b. Turn each idle adjusting screw (stop screw) to increase engine speeds a little.

   Note: Make both pistons to stroke at the same speed.

   (Use an engine tachometer.)

c. Slowly open the air passge by turning the pilot air screw, and set the screw when engine speeds reach maximum. Both carburetors should be adjusted.

d. Then back off the throttle stop screw to reduce engine speeds, and turn the pilot air screw to right or left.

When engine speeds reach maximum, set the screw.

Repeat this procedure two or three times, and correct idling speeds can be obtained.

4. Carburetor Setting

	Model	YCS1		YCS1-C	
		General	High land	General	High land
1.	M.J. (Main jet)	#65	#55	#65	#50
2.	N.J. (Needle jet)	0-0	0-0	N-6	N-6
3.	D.N. (Jet needle setting the step where J.N. clip is fitted)	4D3-3	4D2-3	4D10-3	4D10-3
4.	C.A. (Throttle valve cutaway)	3.0	3.0	2.5	2.5
5.	P.J. (Pilot jet)	20	20	30	30
6.	A.S. (Air screw setting-the number of turns the A.S. is backed off from a lightly seated position)	2.0	2¼	2.0	2¼
7.	G.S. (Starter jet)	40	40	40	40
8.	Idling Speeds (RPM)	1,100-1,200	1,100-1,200	1,050-1,200	1,050-1,200

3-19. Air Cleaner

1. Removal

a. Remove the side covers, both right and left.

b. Remove the air cleaner mounting bolt, and take out the air cleaner case cap. (Fig. 3-19-1)

c. The filter element is of the split type. (Fig. 3-19-2)

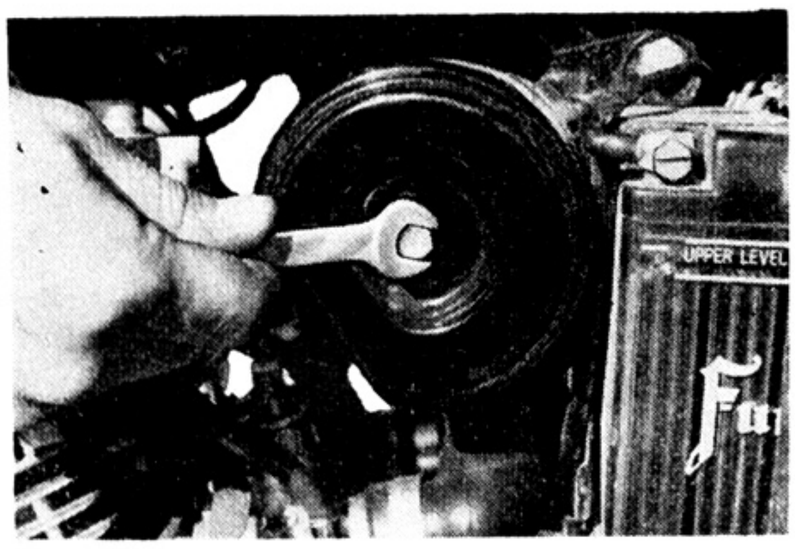


Fig. 3-19-1

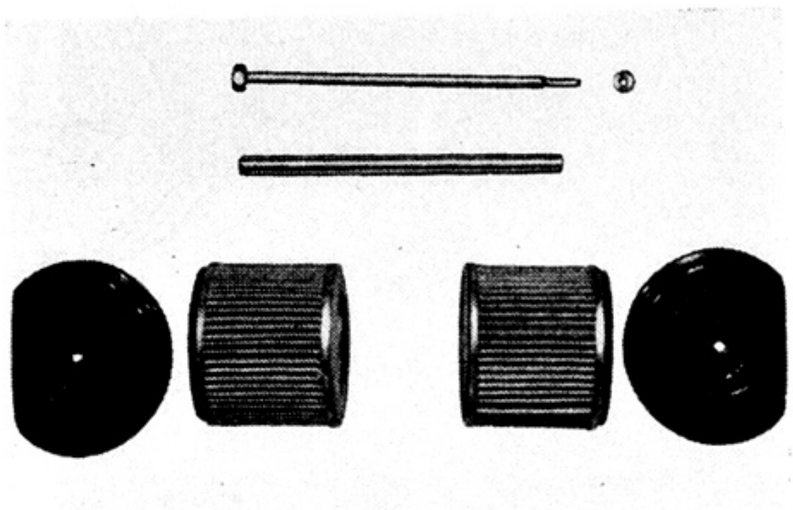


Fig. 3-19-2

2. Cleaning

Clean the filter element with compressed air.

Because the element is made of filter paper, it should never be exposed to water or oil.

If the element is excessively dirty, it may be cleaned with gasoline.

Chapter 4.
Chassis

The YAMAHA 180 YCS1 (C) is built to be as durable as a 250-cc class motorcycle, yet it is as light as a 125-cc class. All the features assure the superior qualities of maneuverability and running stability.

The chassis is of a steel pipe diamond frame structure. The YCS1 (C) has successfully reduced the number of members of the frame, thereby attaining a well-balanced stress distribution. The unique design of the chassis has resulted in lighter weight as well as in improved rigidity and strength.

4-1. Front Wheel

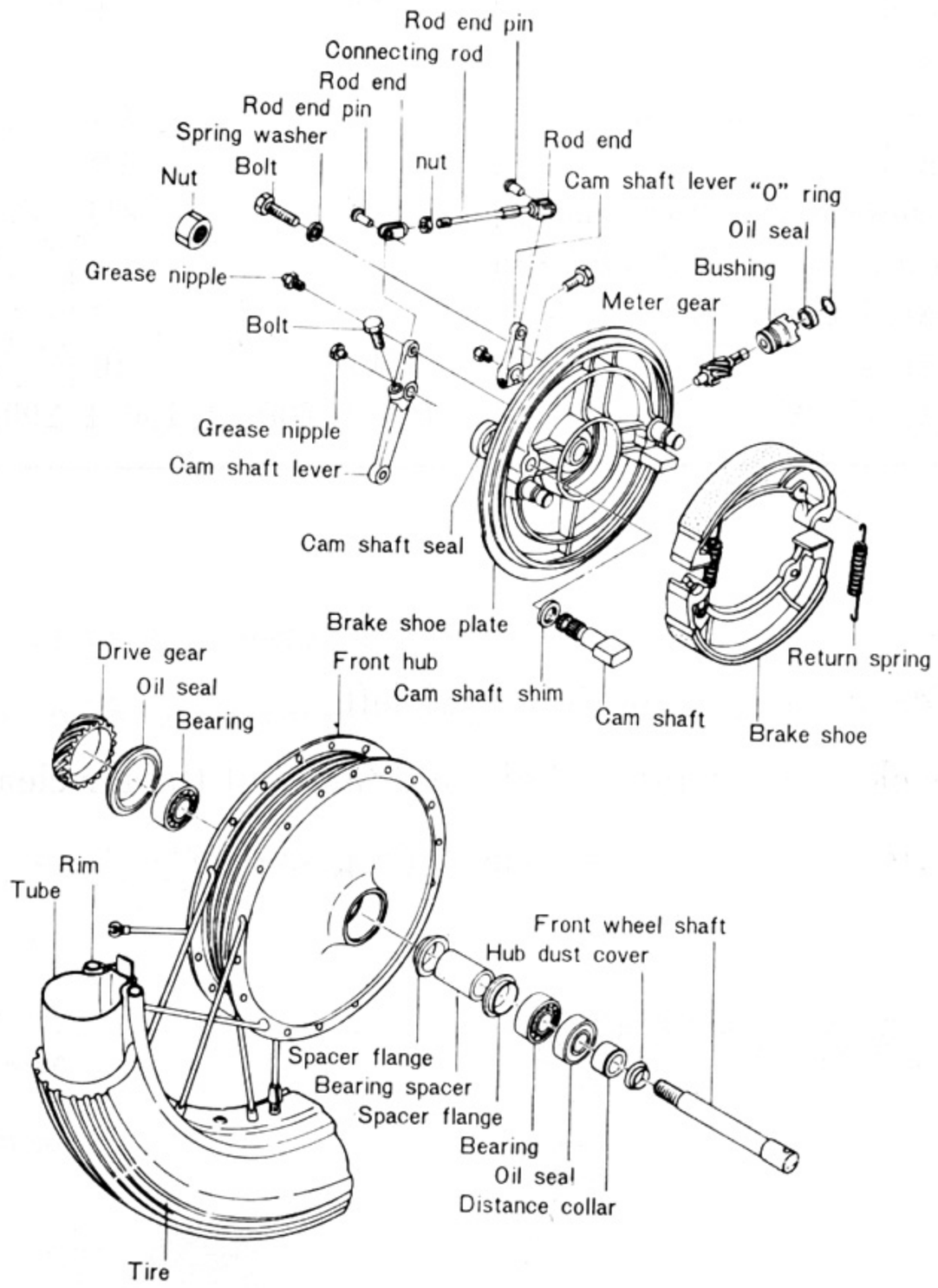


Fig. 4-1-1 Layout of Front Wheel

1. Removal

a. Disconnect the brake cable from the front brake shoe plate, and remove the speedometer cable. (Fig. 4-1-2)

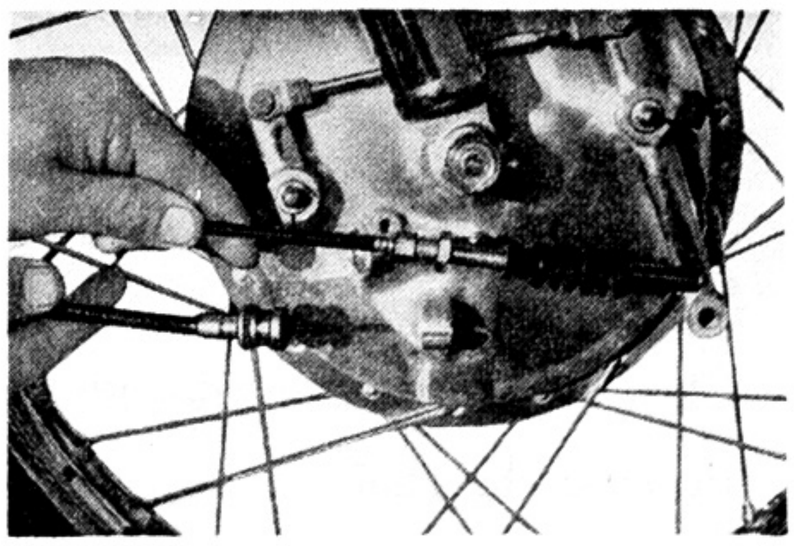


Fig. 4-1-2

b. Remove the front wheel shaft nut. (Fig. 4-1-3)

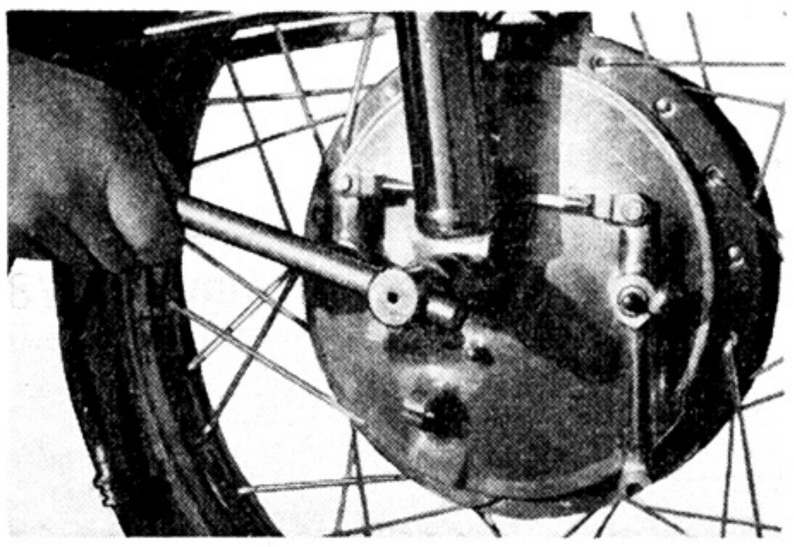


Fig. 4-1-3

c. Loosen the front wheel shaft lock bolt. (Fig. 4-1-4)

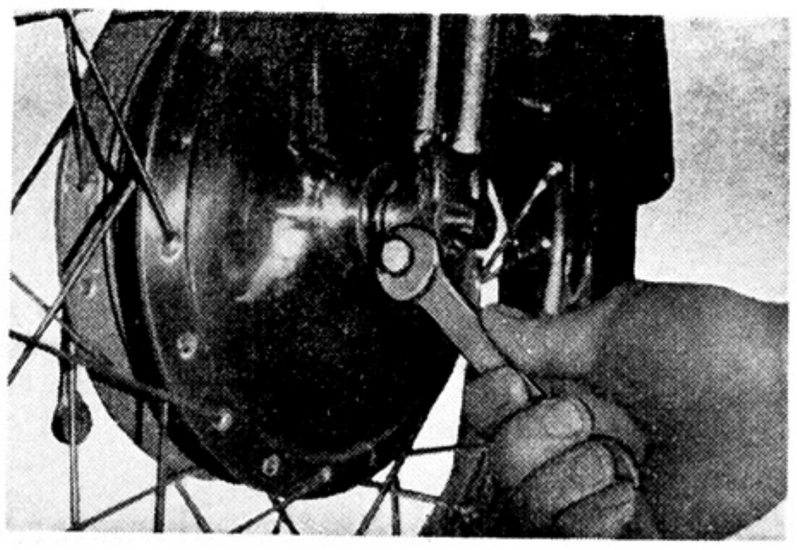


Fig. 4-1-4

d. Pull out the shaft. (Fig. 4-1-5)

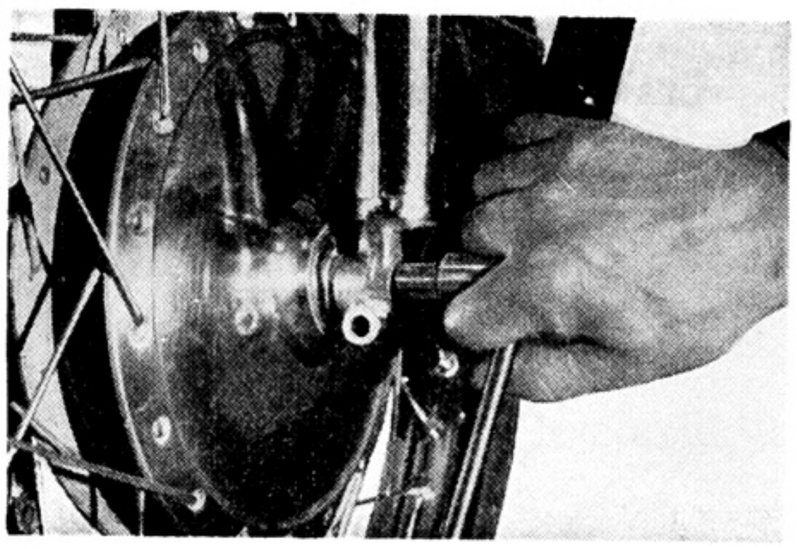


Fig. 4-1-5

e. Remove the front wheel ass'y. (Fig. 4-1-6)

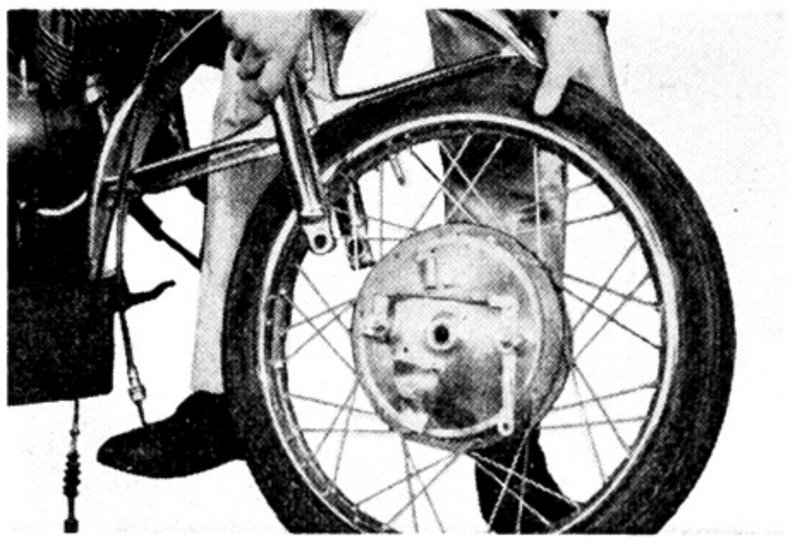


Fig. 4-1-6

2. Checking

a. Runout of the Rim

Measure the runout of the rim with a dial gauge as shown in Fig. 4-1-7.

Runout limits: 2 mm (0.0787 in.) or less

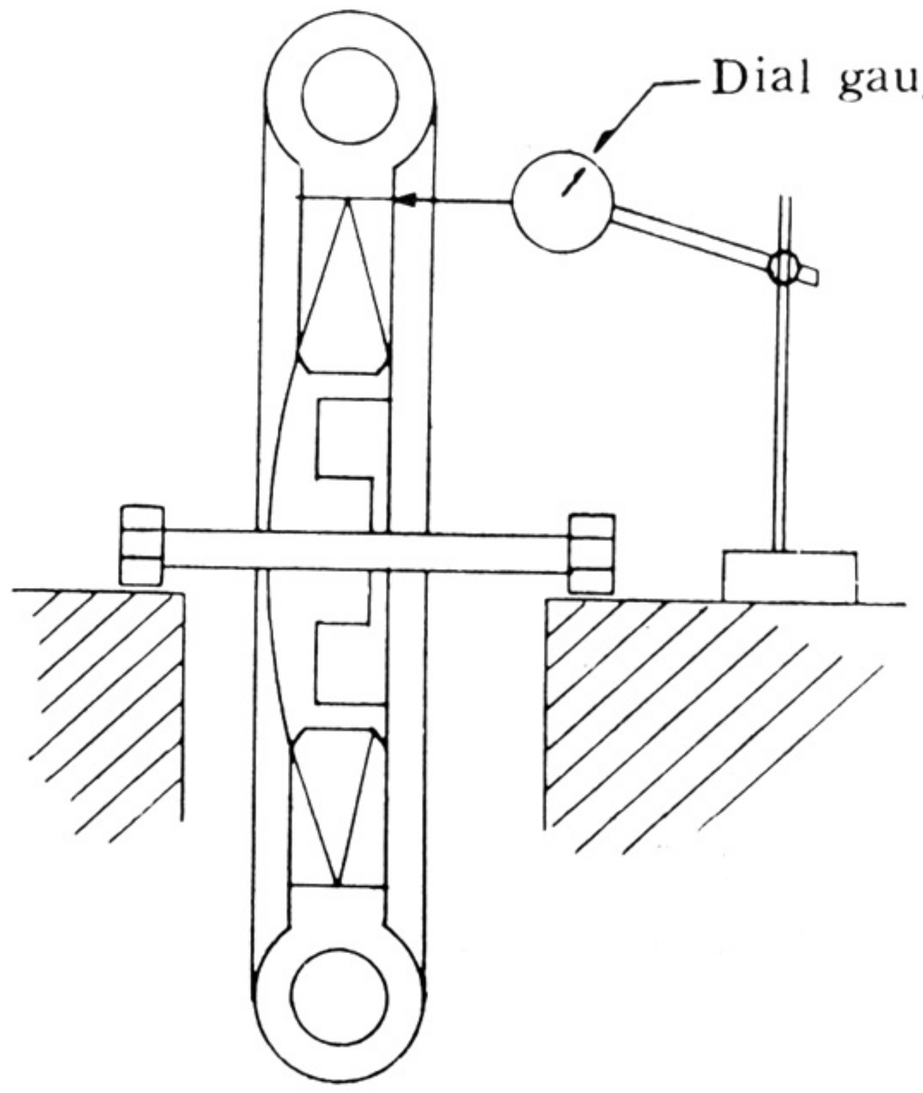


Fig. 4-1-7

b. Brake Shoe

Measure the outer diameter of the brake shoe with sliding calipers. If it measures less than 175 mm, replace it. (6.9 in.)

Smooth out any rough surfaces of the brake shoe with a file or sandpaper.

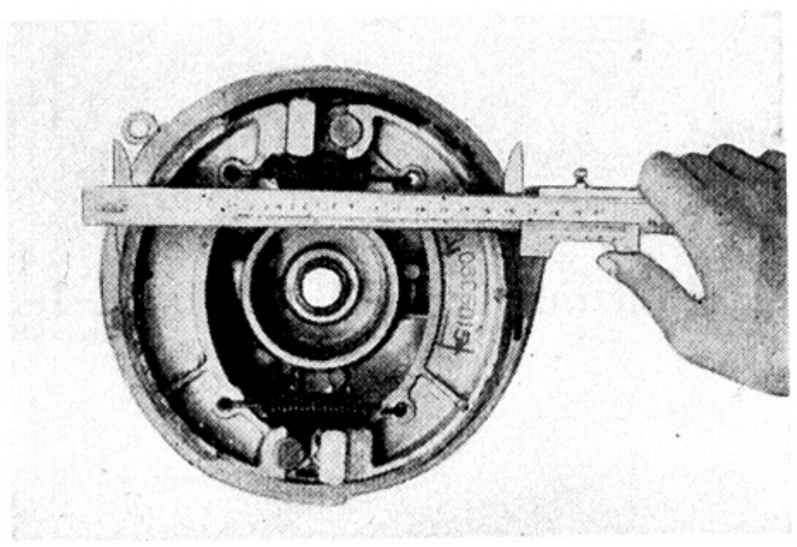


Fig. 4-1-8

c. Brake Drum

Oil or glaze on the inner surface of the brake drum result in ineffective braking performance or abnormal noise. Clean the surface with a rag, or smooth it out with sandpaper. (Fig. 4-1-9)

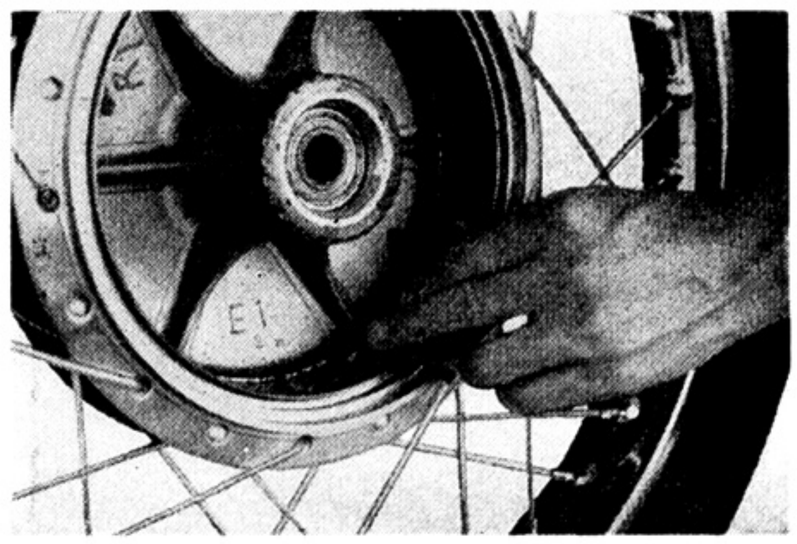


Fig. 4-1-9

4-2. Rear Wheel

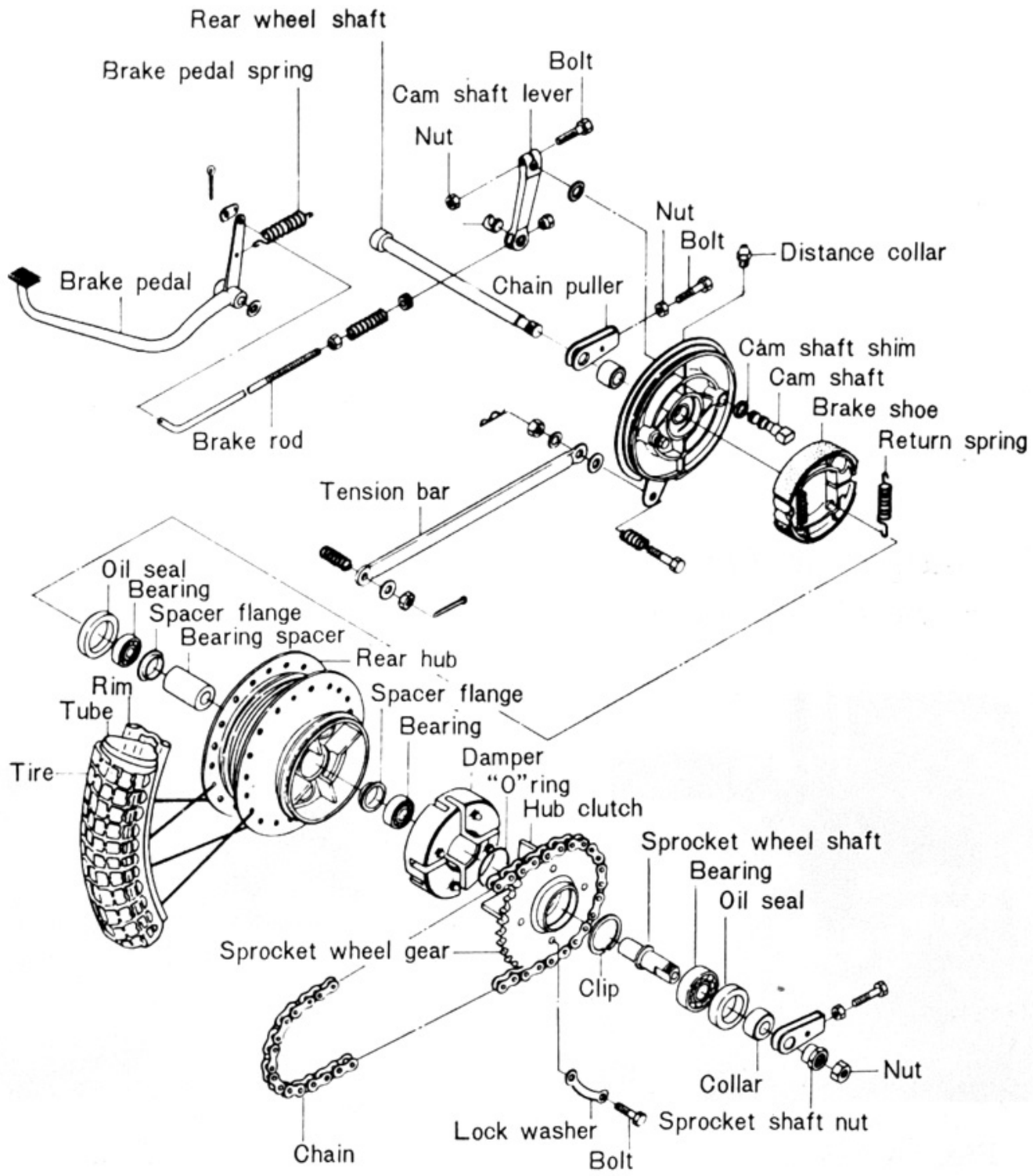


Fig. 4-2-1 Layout of Rear Wheel

1. Removal

a. Remove the tension bar (anchor bar) and brake rod from the rear brake shoe plate. (Figs. 4-2-2, 3 and 4)

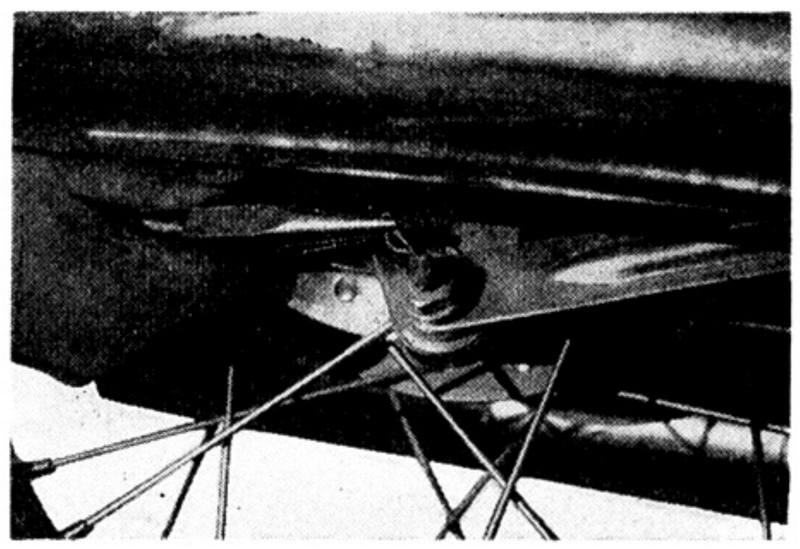


Fig. 4-2-3

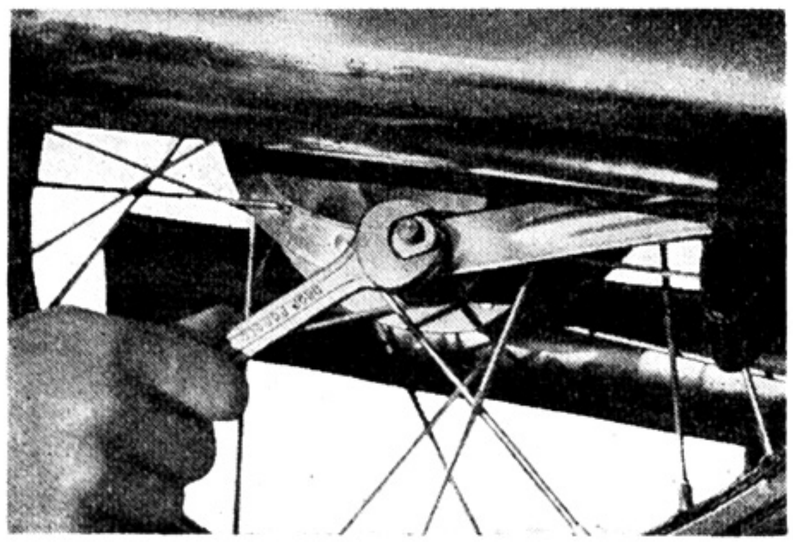


Fig. 4-2-2

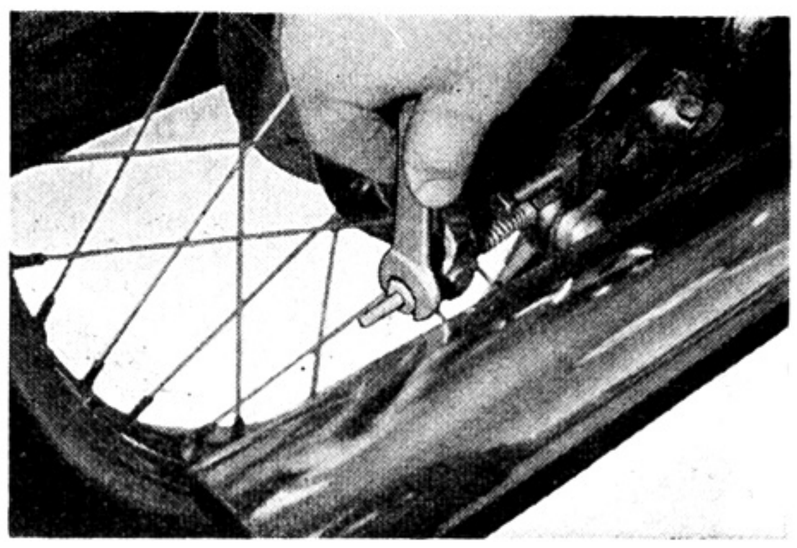


Fig. 4-2-4

b. Remove the rear wheel shaft nut, and pull out the shaft. (Figs. 4-2-5 and 6)

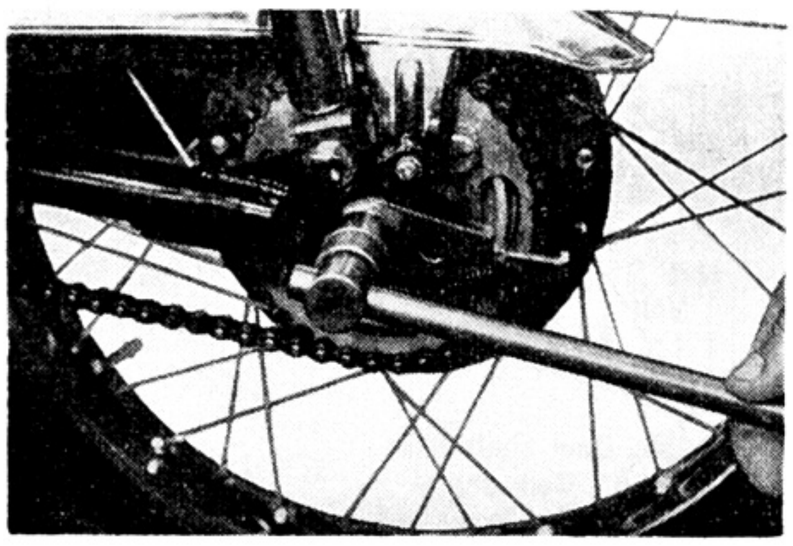


Fig. 4-2-5

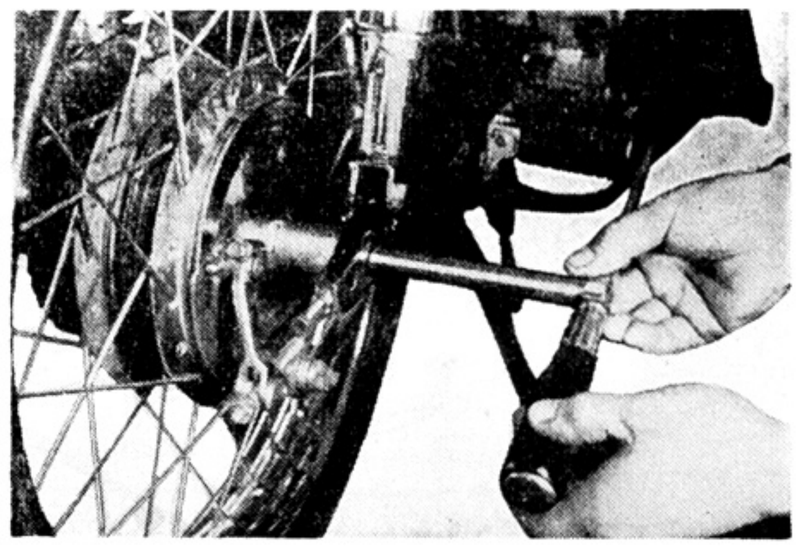


Fig. 4-2-6

c. Remove the distance collar. (Fig. 4-2-7)
d. Remove the rear wheel ass'y. (Fig. 4-2-8)

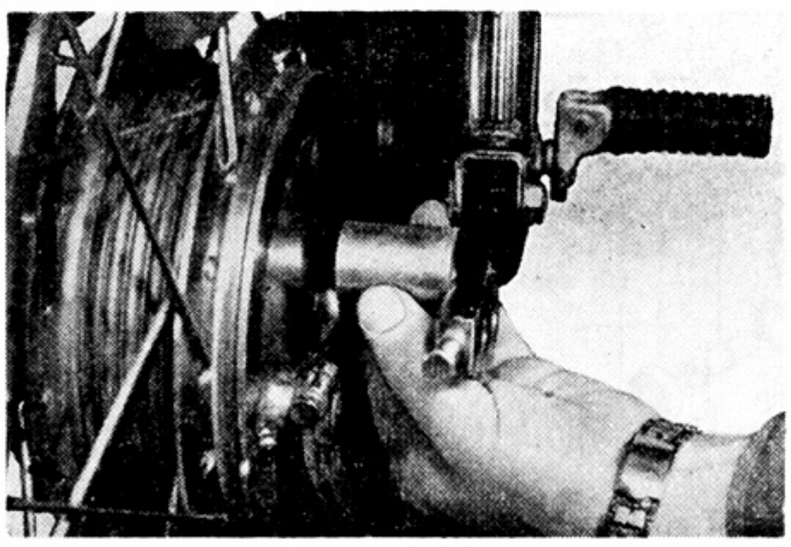


Fig. 4-2-7

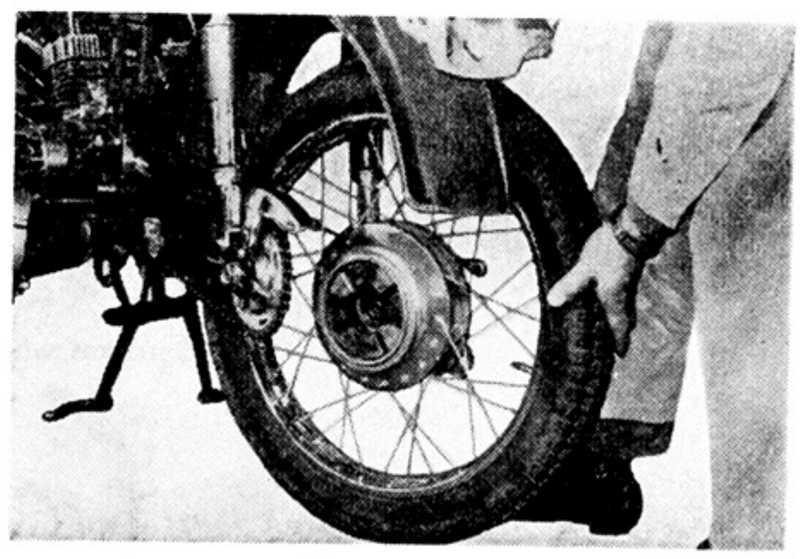


Fig. 4-2-8

2. Checking

a. Runout of the Rim

Check the rim in the same manner as in the case of the front wheel. Runout limits - 2 mm or less

b. Brake Shoe

Check the brake shoe in the same manner as in the case of the front wheel.
Minimum outer diameter - 145 mm (5.3 in.)

c. Brake Drum

Check the brake in the same manner as in the case of the front wheel.

4-3. Rear Arm

1. Checking

If play exists on the rear arm shaft, the wheel will shake from side to side while the machine is running, impairing running stability.
Check the rear arm for play by shaking it, as shown in Fig. 4-3-1. If excessive play exists, replace the rear arm bushing.

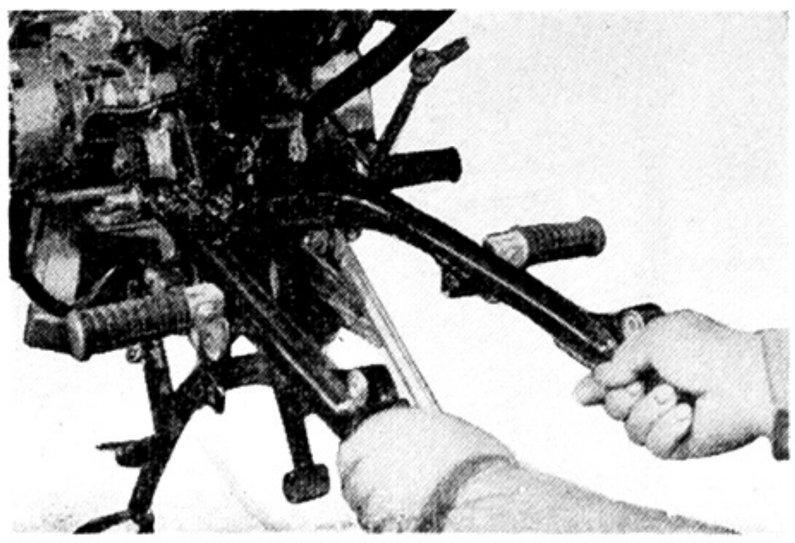


Fig. 4-3-1

4-4. Fuel Tank

The fuel tank is designed to split into the body and side covers (chrome-plated). in order to minimize damage to the tank when machine is involved in an accident.

1. Removal

a. Side Cover (chrome-plated)

1) Remove the knee grip rubber and the emblem plate. (Fig. 4-4-1)

2) Remove the two side cover mounting bolts, and remove the cover. (Figs. 4-4-2 and 3)

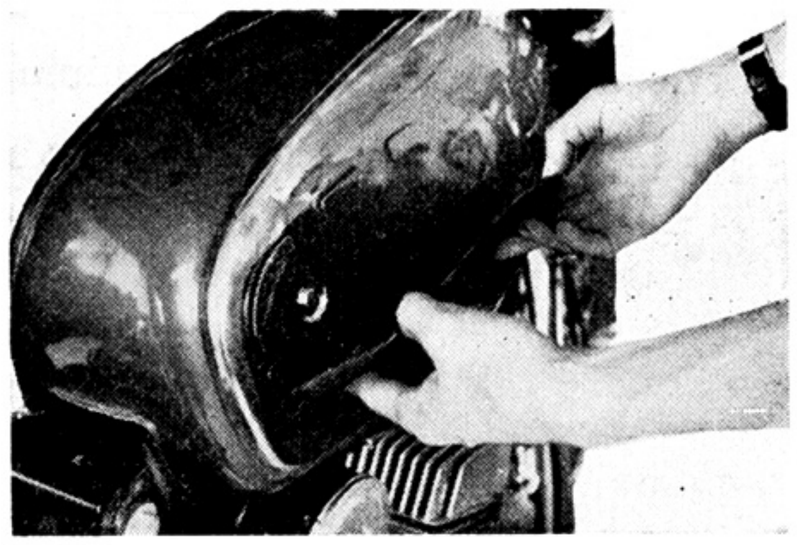


Fig. 4-4-1

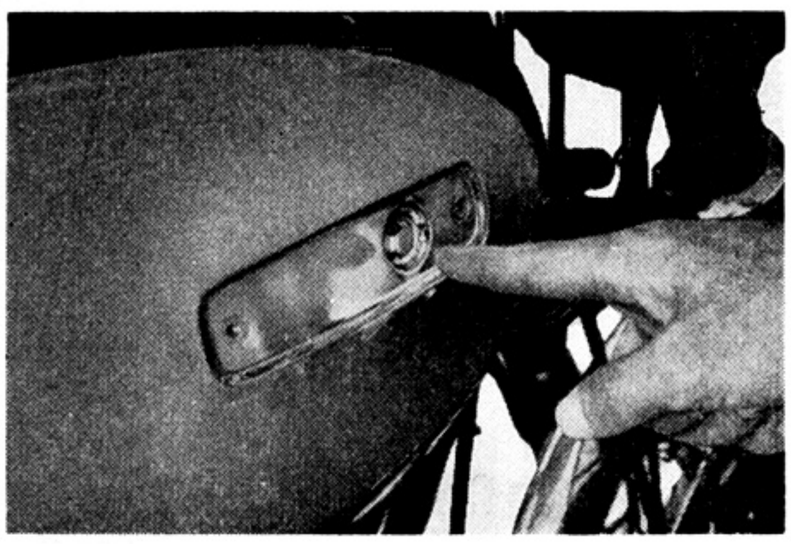


Fig. 4-4-2

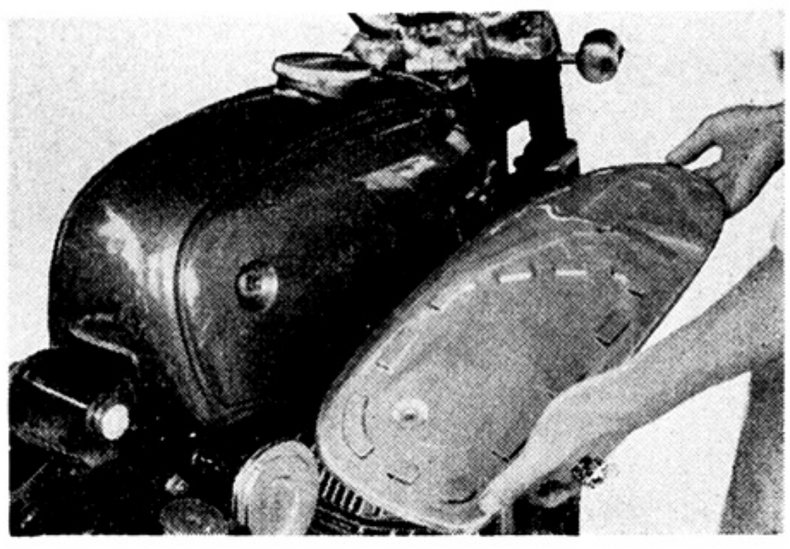


Fig. 4-4-3

b. Tank Body

1) Remove the tank mounting bolt. (Fig. 4-4-5)

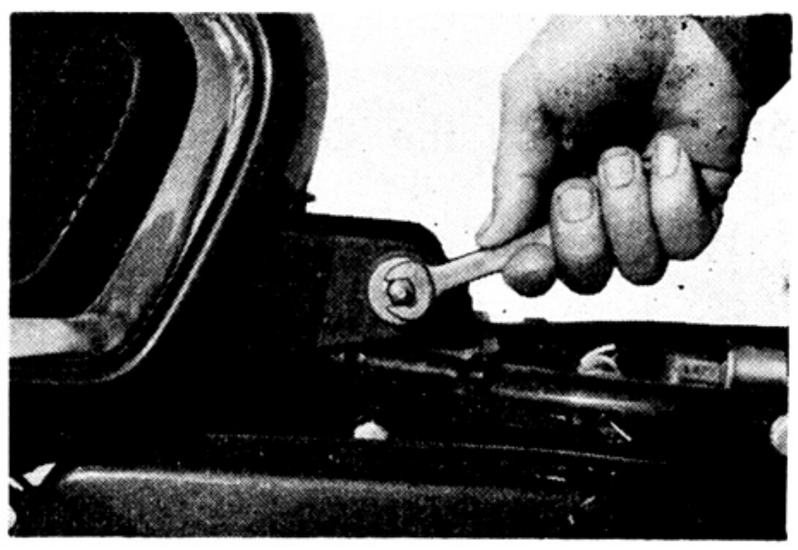


Fig. 4-4-4

2) Raise the rear part of the tank, and slide it rearward. Then remove the tank. (Fig. 4-4-5)

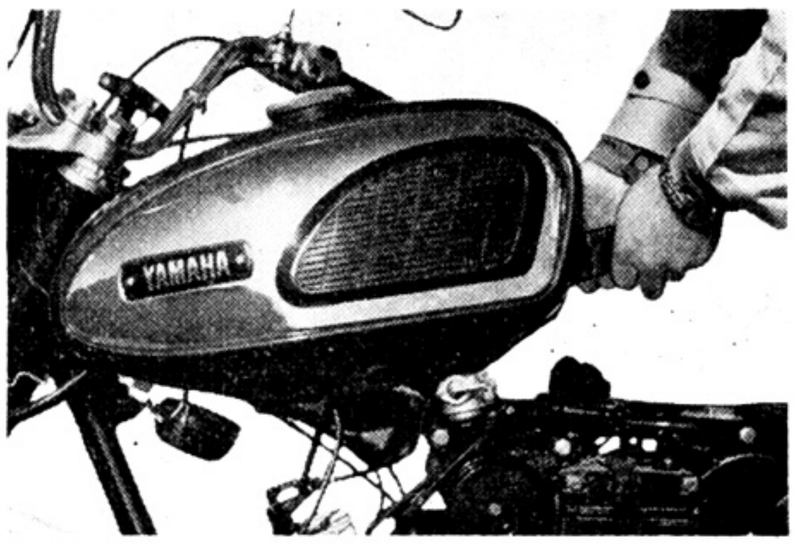


Fig. 4-4-5

4-5. Front Fork

1. Removal

a. Remove the front fender, and remove the inner tube mounting bolt.

b. Loosen the inner tube clamping bolt on the under-bracket. (Fig. 4–5–1)

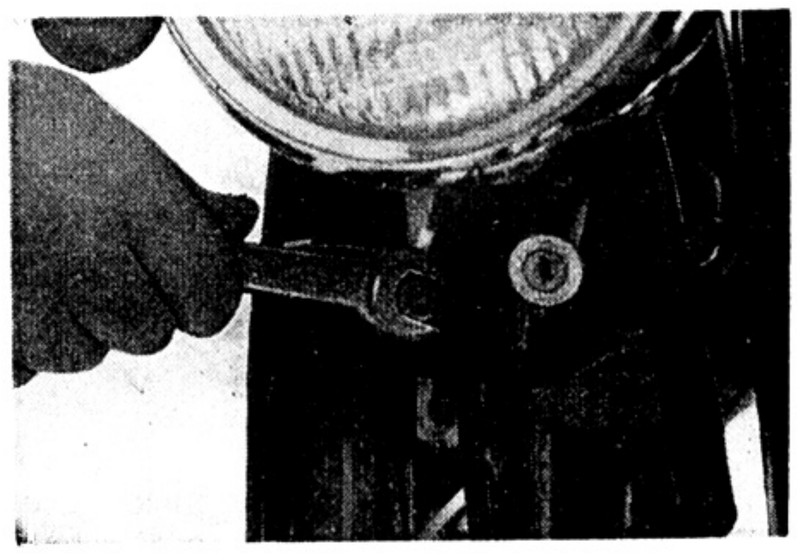


Fig. 4–5–1

c. Draw out the outer tube downward. (Fig. 4–5–2)

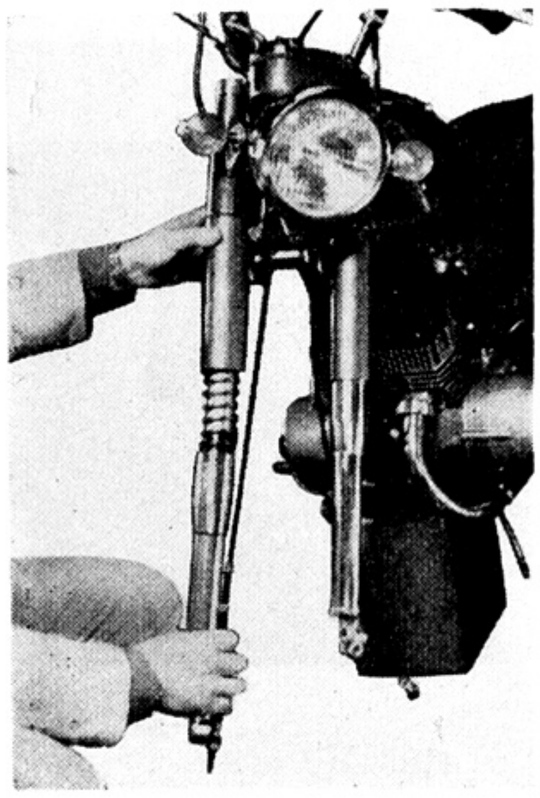


Fig. 4–5–2

2. Disassembling the Outer and Inner Tubes

a. Wind a rubber sheet or a tire tube around the outer tube nut, and remove the nut. Disasseble the tubes in the manner as shown in Figs. 4-5–3 and 4.

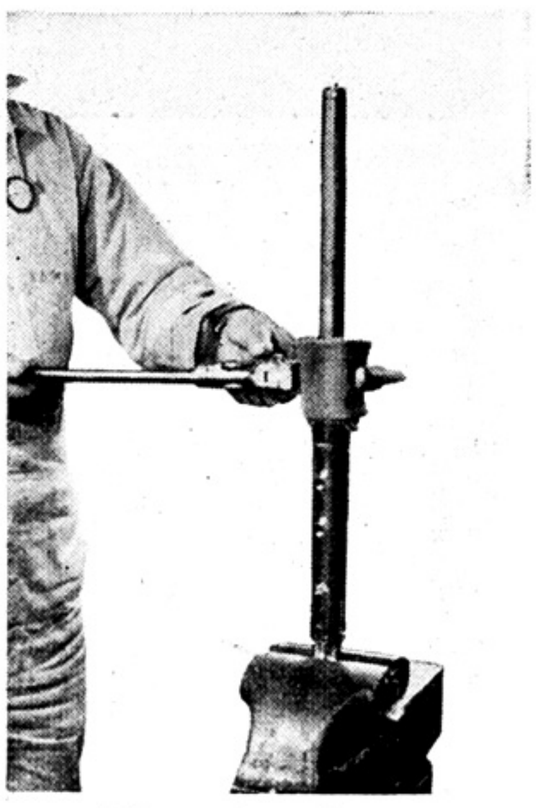


Fig. 4–5–3

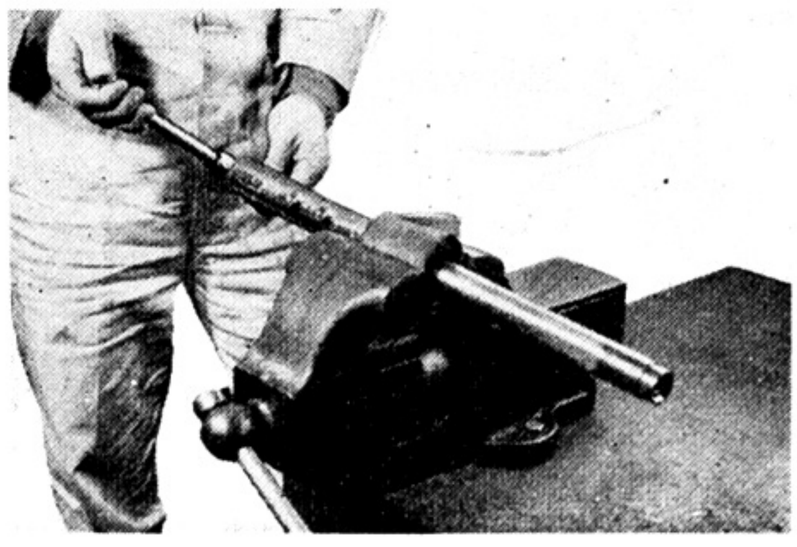


Fig. 4–5–4

3. Checking

a. Inner Tube

Check the inner tube for any bend or scratch. A minor bend may be corrected, but replacement is preferred.

b. Oil Seal

When disassembling the front fork, be sure to replace the oil seal, and "O" ring.

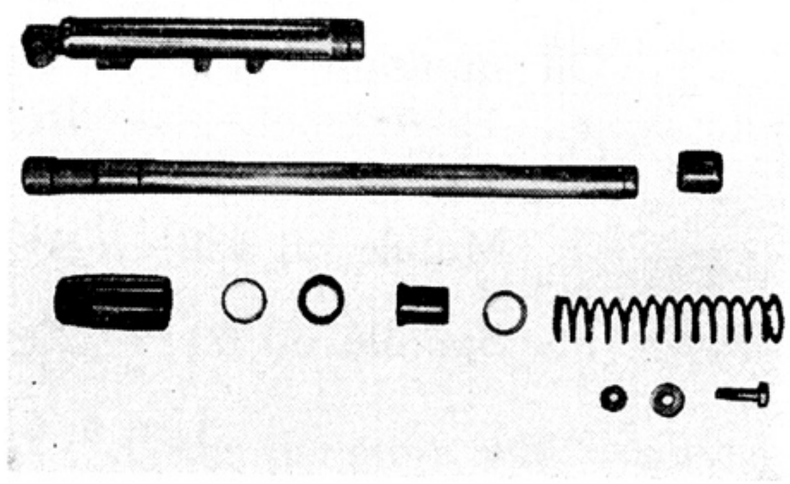


Fig. 4-5-5

4. Reassembling

a. Reassembling the Front Fork (without mounting on the chassis) To reassemble the front fork, reverse the sequence of disas-sembling as abovementioned.

After reassembling, check if the inner tube slides smoothly. (Fig. 4-5-6)

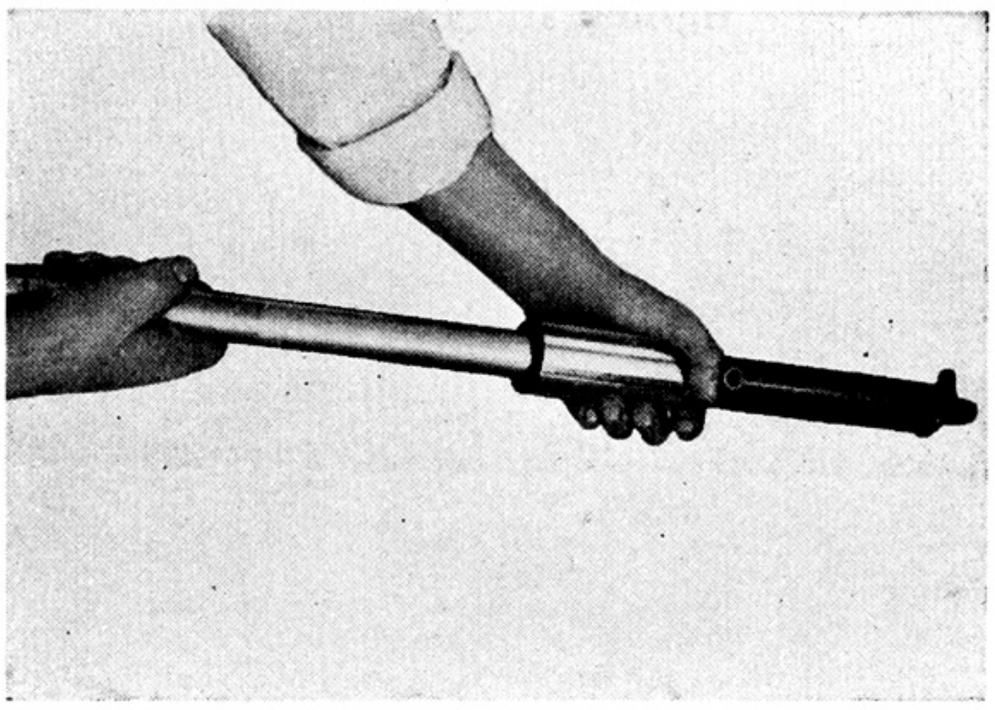


Fig. 4-5-6

b. Mounting the Front Fork on the Chassis

1) Pull the front fork upward by using the front fork puller, and tighten the under-braket clamping bolt. (Fig. 4-5-7)

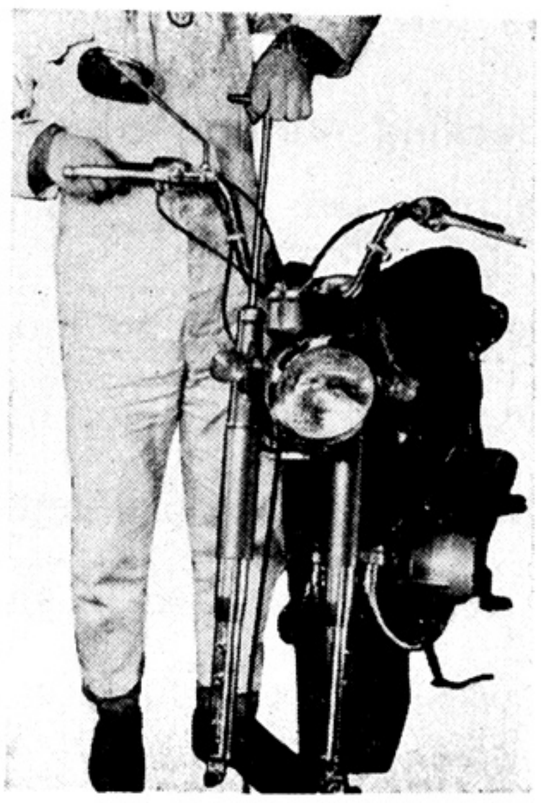


Fig. 4-5-7

2) Fill the inner tube with the specified front fork oil through the end opening of the tube. (Fig. 4-5-8)

Oil amount 162 cc (5.5 fl-oz.) each tube

Oil

Mobile oil #30……80%
Spindle oil 60……20%
Use a 4 : 1 mixture

YAMAHA gear oil (B) or SAE 20 W/40

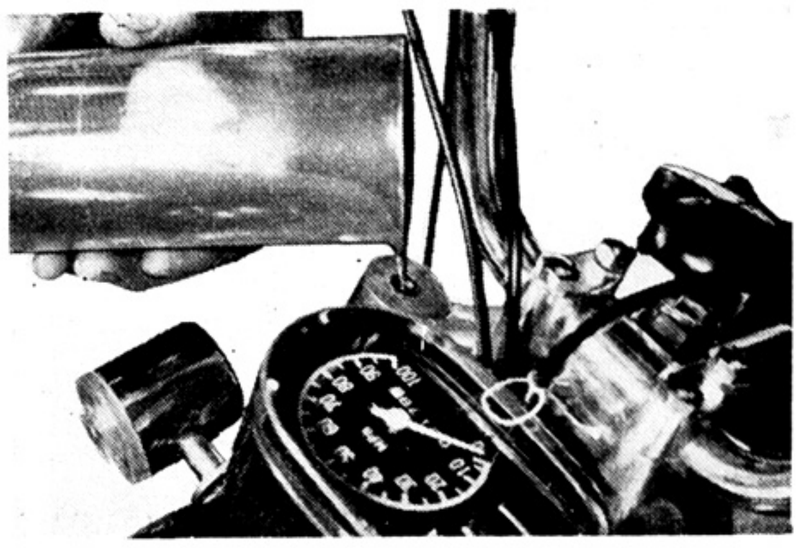


Fig. 4-5-8

3) Install the inner tube mounting bolt, and tighten it. (Fig. 4-5-9)

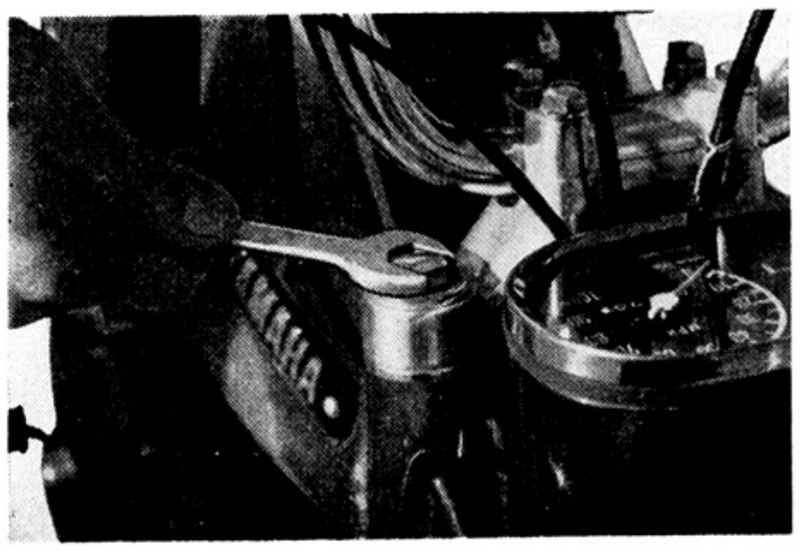


Fig. 4-5-9

4-6. Rear Cushion

The rear cushion is not designed to be disassembled, so this paragraph discusses how to check for oil leakages.

1. Checking Method of Oil Leakages

When checking the rear cushion, you may often find oil seepage on the lower part of the outer cover. In most cases, however, this results from melting the grease applied to the spring inside, not impairing the function of the rear cushion.

Take the following steps to inspect oil leakages.

a. Remove the rear cushion, and repeat depressing the cushion a few times. If the spring quickly restores half-way and slowly the last 10 mm, the cushion is in good working condition. If the spring quickly restores all the way, the cushion must be leaky. Replace it with new one. (Fig. 4-6-1)

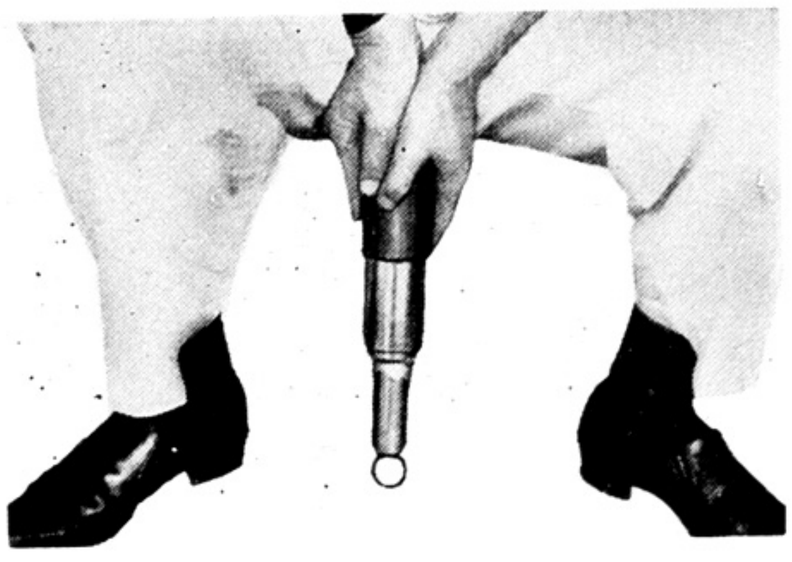


Fig. 4-6-1

Chapter 5.

Electrical Equipment

5-1. YAMAHA 180 YCS1 (C) Electrical Equipment

The YAMAHA180 YCS1(C) is equipped with a large-sized starter dynamo, which serves as a high-output D–C generator as well as a starter. This enables all electrical terminals to keep voltages almost constant at all times regardless of engine speeds. All electrical parts are of 12-V capacity.

5-2, Main Components

1. Ignition System

This system starts the engine by using the spark plug to ignite on air-fuel mixture in the cylinders. The main parts consist of:

Contact breaker (connected to the dynamo)

Condenser (connected to the dynamo)

Ignition coil, spark plug, high tension lead and battery which is the power source for the primary electric current)

2. Charging and Starting Systems

Charging system: The purpose of the charging system is to charge the battery which is the power source for engine starting and all electrical equipment (lights, horn, etc) while the machine is running.

Starting system: This system is used for cranking the engine.

The main parts of these two systems are:

Dynamo (yoke, armature, brushes), regulator (with cutour relay), starter button (with starting switch), fuse and battery (power source)

3. Lighting and Signal Systems

The lighting and signal systems consist of signal lights, switch and meter lights (Signal system) and illumination lights for night travel.

Signal system:. Horn, flasher light (flasher relay), stop light, speedometer light, neutral light, and switches.

Lighting system: Head light, tail light, and meter lights.

5-3. Connection Diagram

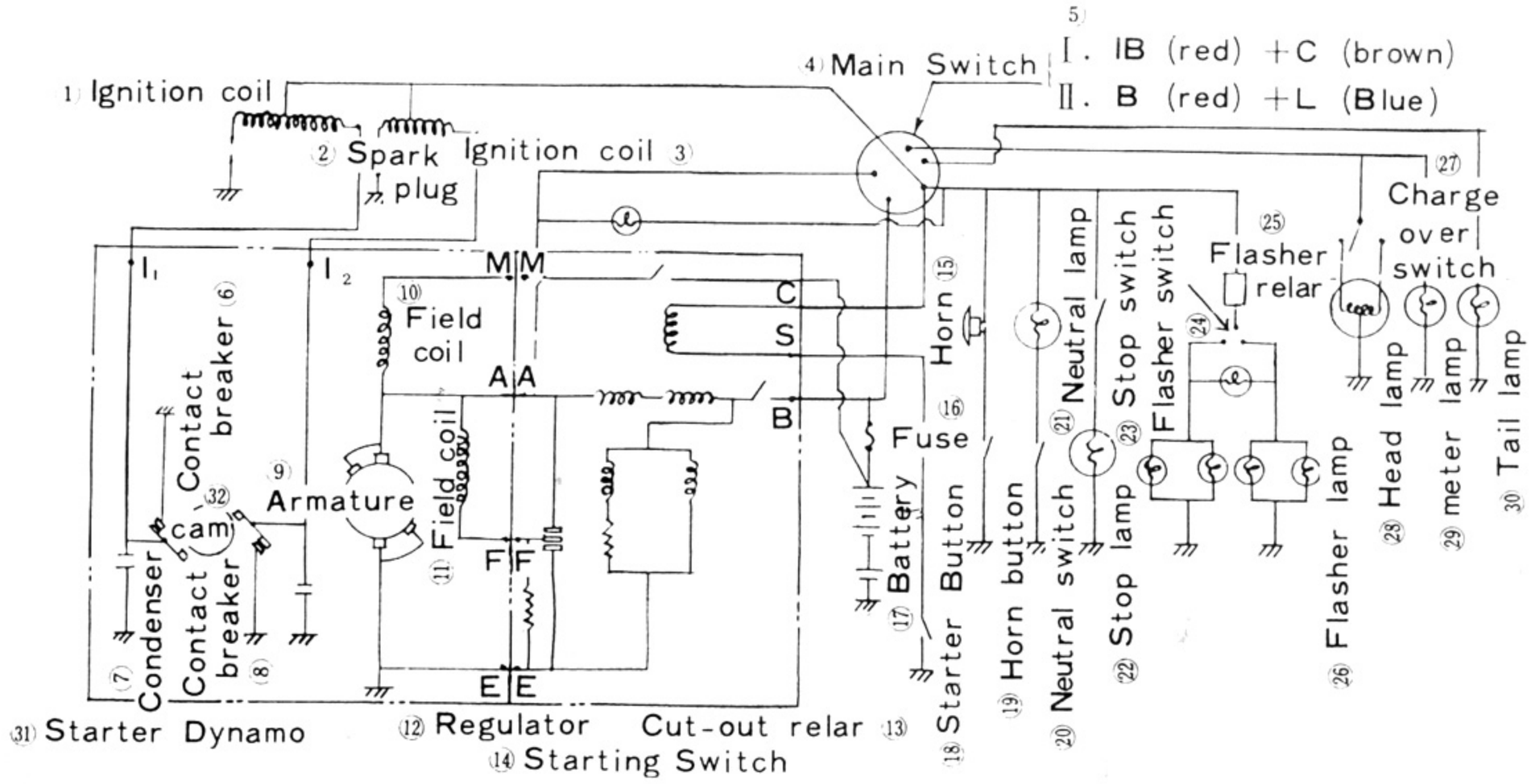


Fig. 5-3-1

5-4. Starter Dynamo

The dynamo ass'y is made up of the yoke ass'y (field coil, contact breaker, condenser, etc), the armature ass'y (armature coil, commutator) and the cam ass'y, and supplies power to the ignition and charging systems.

Ignition System :

The ignition system consists of the contact breaker, condenser, and cam. The system interrupts the current flowing from the battery to the primary coil, thereby inducing a high voltage of current in the secondary coil.

a. Contact Breaker Ass'y

Incorrect ignition timing results in irregular engine speeds, thereby causing engine knocking or vibrations. It also causes loss of engine power or engine overheating, thus shortening engine life. Check the contact breaker periodically.

b. Condenser

The condenser stores electricity from the breaker points when they open, and discharges the static when the points close. It prevents sparking between the points, minimizing burning by absorbing on abrupt increase in electricity when the breaker points open, and it amplifies the effect of the primary ignition coil.

Charging System :

The charging system of the starter dynamo consists of the yoke ass'y (shunt field coil and brushes) and the armature ass'y (commutator). The armature coil cuts through the magnetic lines of force of the field coil as the engine runs so that a flow of alternating current is induced. The alternating current is converted into a direct current through the com-

mutator brushes. The voltage of the direct current is kept constant by the voltage regulator, and supplied to each load of the ignition, lighting and signal systems as well as to the battery.

Starting System :

In the starting system of the starter dynamo, the series coil and the armature, as a D-C motor, generate a great amount of torque, by which the engine is cranked.

1. Inspection and Repairs

A. Checking the Dynamo

First disconnect the wires from the terminals A (white) and F (green), the ground the terminal F to (E)···(black), with a copper wire. Connect the positive lead of the tester to the terminal A (white), and ground the negative tester lead to the frame. Start the engine and keep it running at 1,700 rpm. If the electricity generated reads more than 10 V on the tester, the generator is in good working condition.

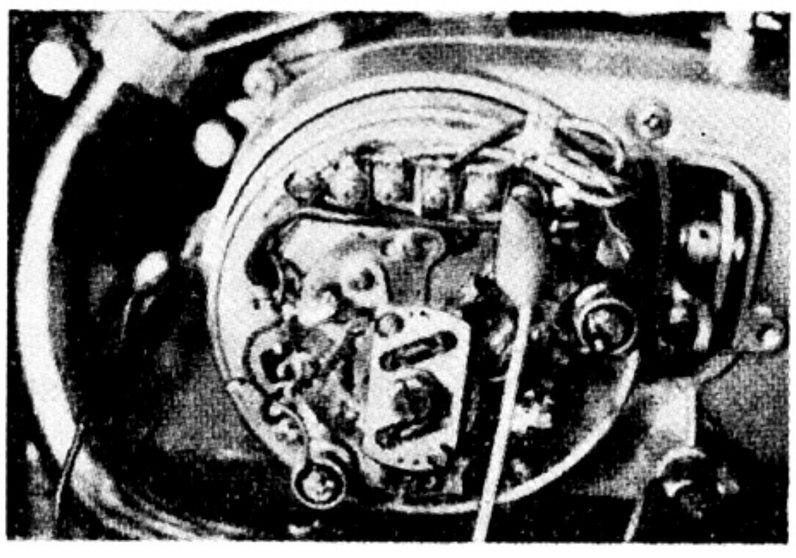


Fig. 5-4-1

Caution : Do not run the engine at more than 1,700 rpm in this test. If you run the engine at more than 1,700 rpm, a high voltage current generated will ruin the coil, lead wire, etc. (Fig. 5-4-1)

B. Checking the Yoke Ass'y

Clean the yoke with a rag to remove dust, oil and dirt from brush wear, etc.

1) Field Coil Brush Insulation Test

The positive brush of the field coil is insulated from the yoke and by using the tester, you can check its insulation as shown in Fig. 5-4-2. If the insulation is bad, the circuit between the field coil, or the brush holder, and the yoke is in shorts. (Note : The negative brush is not insulated.)

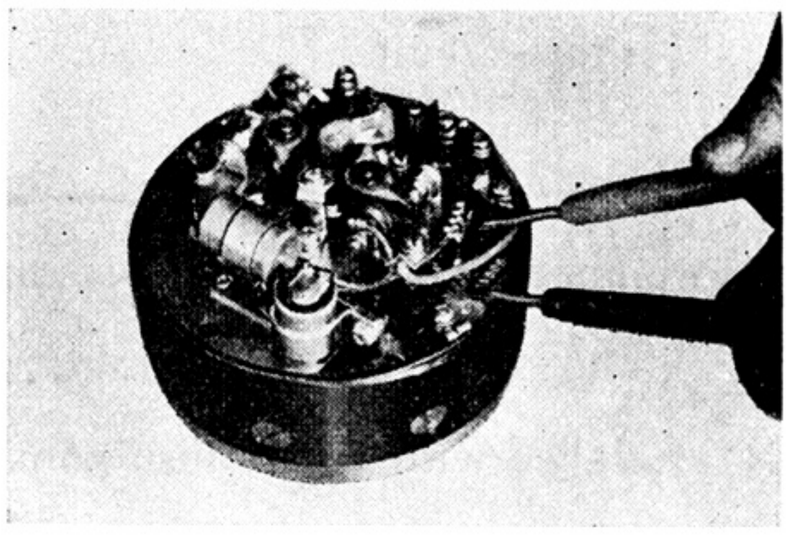


Fig. 5-4-2

2) Conductivity Test of Field Coil

Check the canductivity between the terminals M, A, and F. If conductivity is bad, the field coil is broken. Check the coil for connection. If the coil is broken in its

inside, replace it because repairs are difficult. (Fig. 5-4-3)

3) Checking the Brushes

The brushes are one of the most important parts in the dynamo. Take out the brushes and check their surfaces for the condition of contact with the commutator.

Each brush must contact the commutator in more than ¾ of its surface area. If both brush and commutator surfaces are rough, check both crankshaft and armature for alignment. Smooth down any burrs on the edge of the armature's tapered bore, and clean it thoroughly.

If either brush is worn past the minimum length mark, replace them both with new ones. (Fig. 5-4-4)

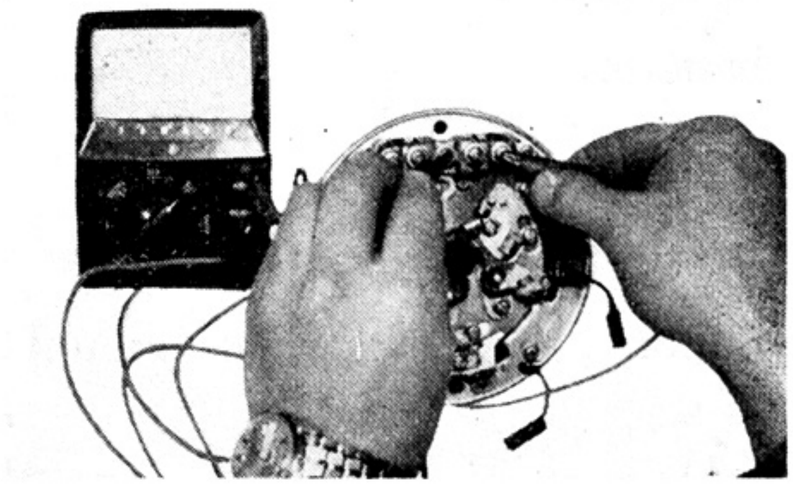


Fig. 5-4-3

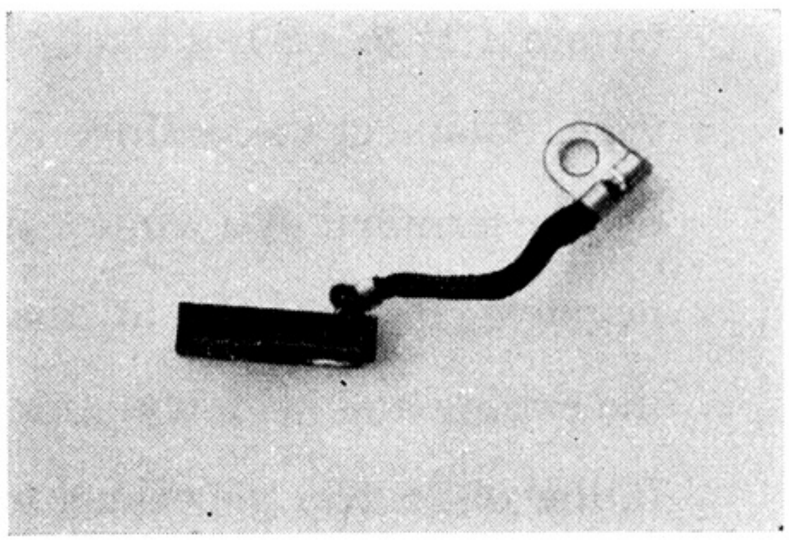


Fig. 5-4-4

4) Materials of the Brush

Use the brush having the model No. "6 R-1" on its side.

5) Handling the Brushes

When replacing the brushes, be sure the braided lead of the positive brush does not touch the edge of the breaker plate or brush holder, and that the lead of the negative brush does not touch the positive brush spring. The friction of the braided lead against other parts as a result of vibrations may wear their insulation and cause a short-circuit.

C. Checking the Armature Ass'y

1) Thoroughly clean the commutator of oil and dirt. If the commutator is rough or dulled with brush dust, polish it with fine grain sandpaper (#400 - 600) as shown in Fig. 5-4-5, by rotating the armature in order to polish its surface evenly. Partial polishing will only deform the commutator and shorten brush life.

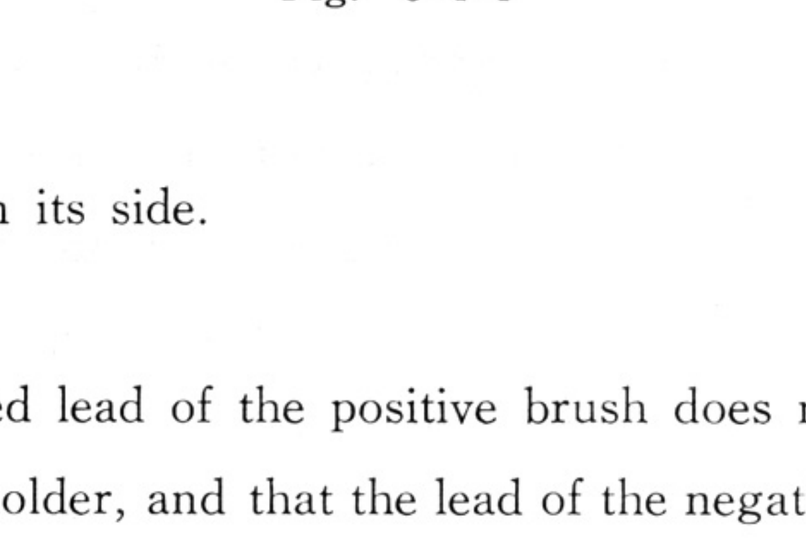


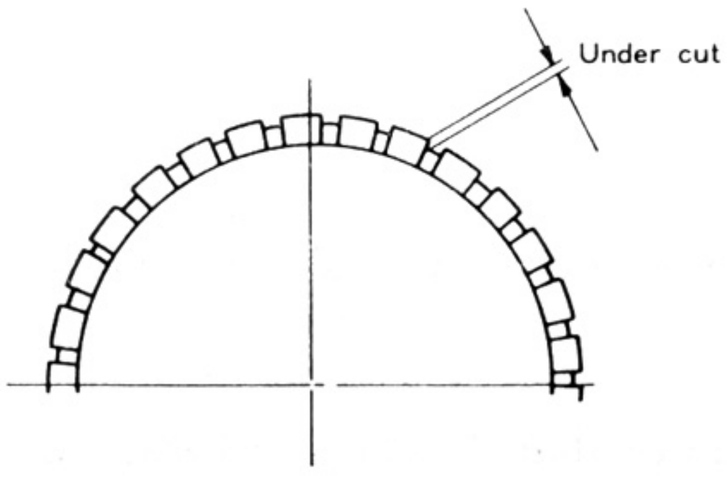
Fig. 5-4-5

If the commutator is burned, out of round, or too rough to be sandpapered, turn it in a lathe no more than 2 mm under the standard 40 mm diameter.

2) Checking the Commutator Mica Under-Cut

If the commutator is worn and if it has high mica, the mica should be undercut with a saw blade.

Sand off all burrs with sandpaper. Be sure the mica is cut away clean between segments, leaving no thin edge next to segments. (Fig. 5-4-6)



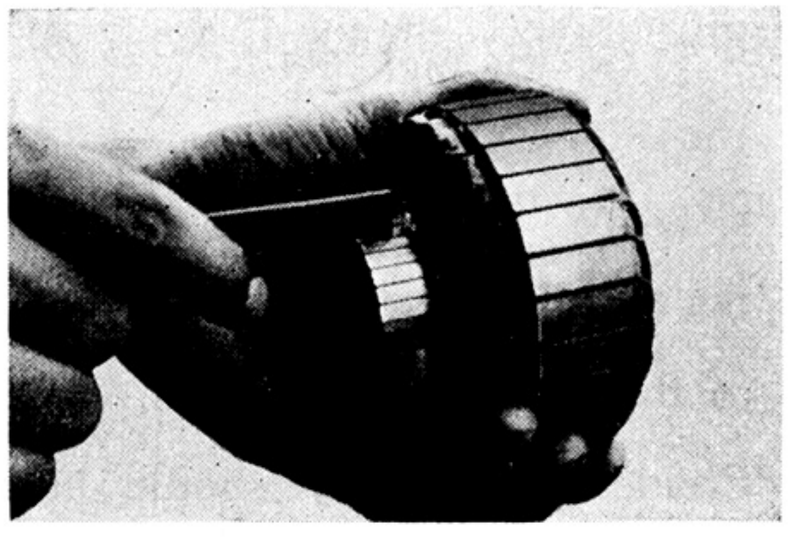


Fig. 5-4-6

Mica under-cut inspection limits : 0.5 – 0.8 mm

Mica under-cut correction limits : 0.2 mm

3) Checking the Armature for Insulation

If there is electrical leakage between the commutator and shaft, replace the whole armature. (Fig. 4-4-7)

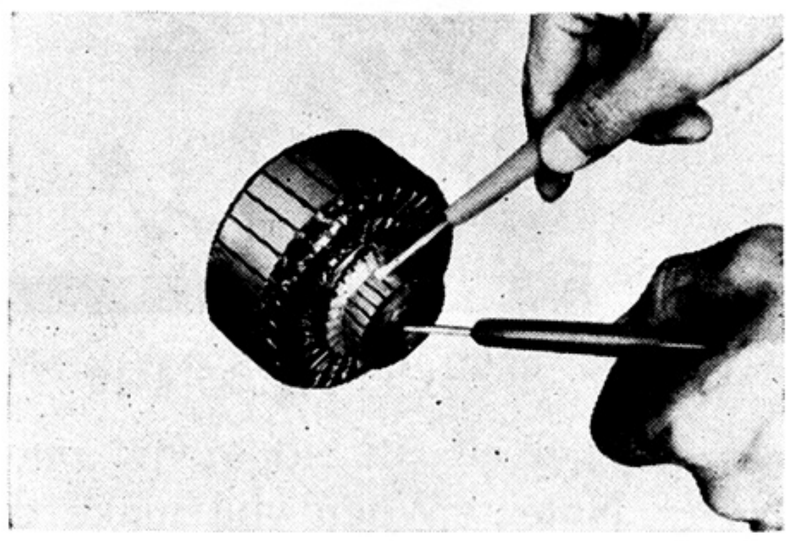


Fig. 5-4-7

4) The field coil is perfectly insulated and conductivity is also good. But if the dynamo will not generate electricity, the core of the armature coil must be in short-circuit. Check the armature with a growler at a special service shop.

D. Checking the Condenser

1) Insulation Tests

Hook up an electro tester (service tester) for the insulation resistance test, and attach the tester terminals to those of the condenser. If the tester needle swings once and then returns to its original position, the condenser is in good condition. Condenser leakage will hold the needle at a maximum reading. If the reading in more than

3 MΩ, ground the condenser terminals to discharge electricity. (Figs. 5-4-8 and 9)

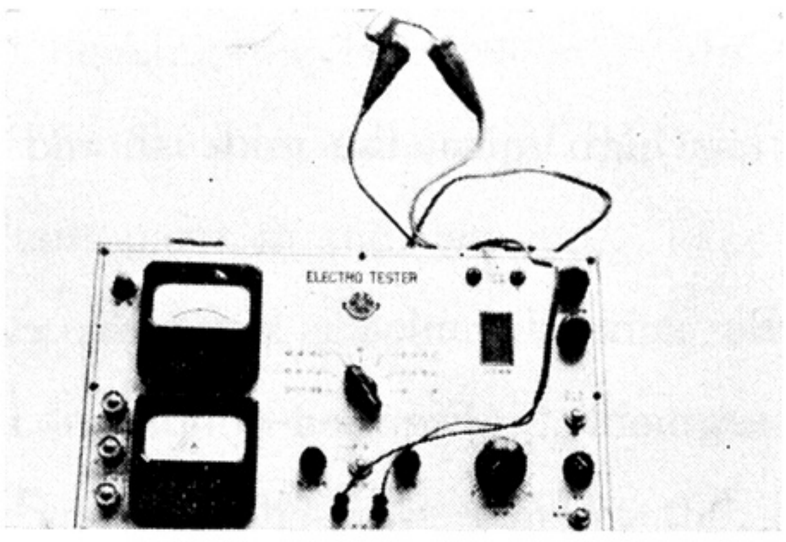


Fig. 5-4-8

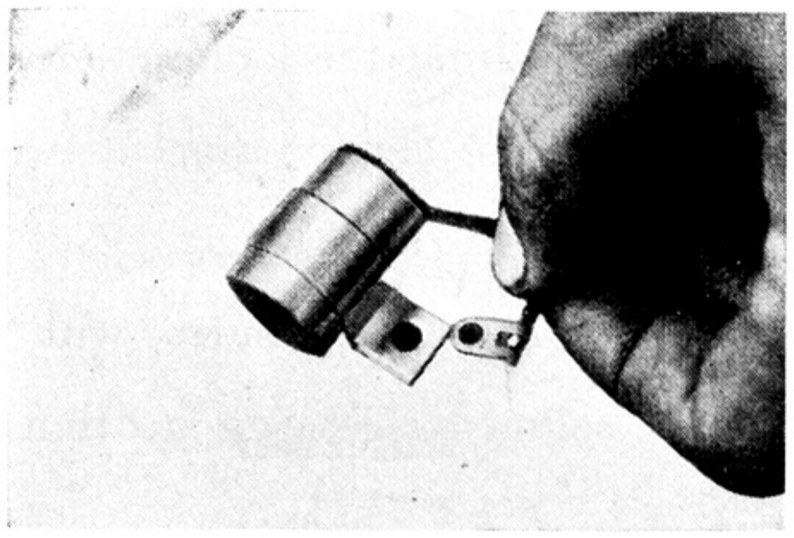


Fig. 5-4-9

2) Capacity Tests

Set the service tester for the condenser capacity position, and connect its terminals to those of the condenser.

Condenser capacity should be no more than 0.22 uF ± 10%, so before testing the condenser, adjust the capacity of the service tester. (Figs. 5-4-10 and 11)

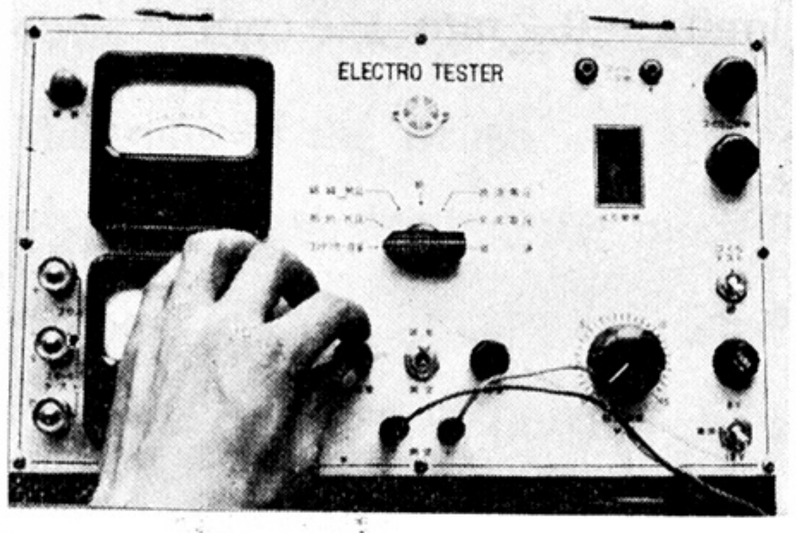


Fig. 5-4-10

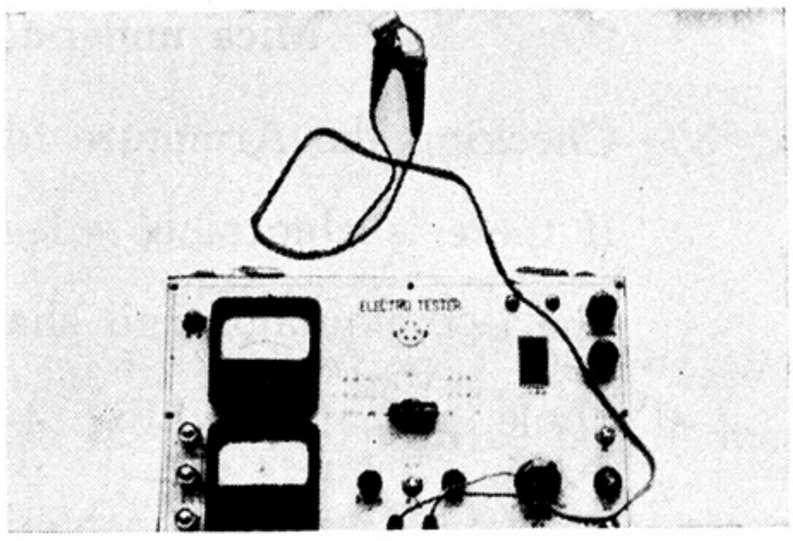


Fig. 5-4-11

Note: When you make this test with the condenser mounted on the dynamo, disconnect the wires from the terminals, and insert a piece of card board between the breaker points.

In this test, the insulation resistance of the contact breaker can be tested at the same time. If the insulation resistance is too low, disconnect the lead wires from the condenser, and test it again.

E. Contact Breaker

1) Periodically inspect the breaker points and check the point gap. If the gap is incorrect, adjust it.

2) Periodically inspect the breaker points for any scratch.

An excessive scratch should be smoothed out with sand paper (#400 - 600), and wiped

off with soft cloth. (Fig. 5-4-12)

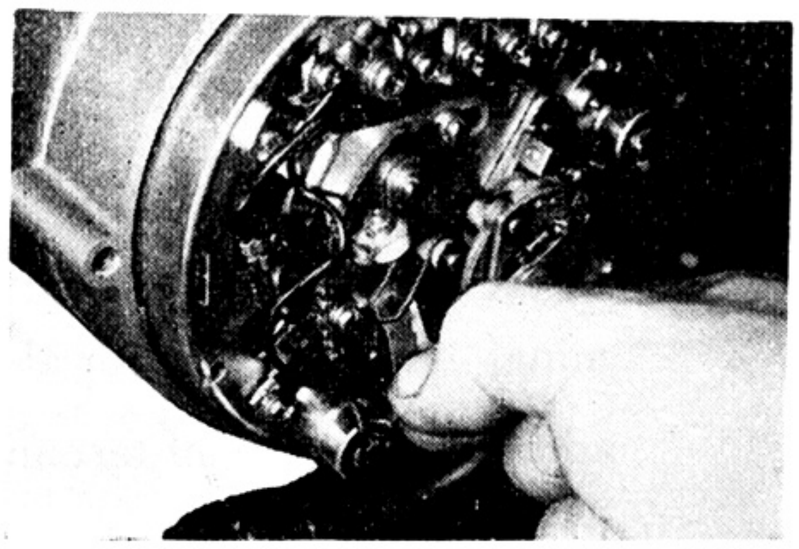


Fig. 5-4-12

3) After every 5,000 km, inspect the breaker cam lubricator and grease it a little.

4) Oil or dust on the points impairs spark performance.

The oil on the points will considerably shorten point service life. Wipe it off from time to time.

F. Adjusting Ignition Timing

1) Adjusting with Dial Gauge :

Tools and insturments for adjusting :

Dial gauge (accuracy - 1/100)
Dial gauge adapter
Conductivity testing lamp, YAMAHA electrotester or YAMAHA point checker
Point wrench
Slot-head screw driver
12-mm wrench

2) Adjust ignition timing separately for the right and left cylinders.

3) Screw the dial gauge adapter into the plug hole of either cylinder head and install the gauge. Turn the armature bolt until the piston reaches top dead center, then turn the zero on the indicator to exactly that point where the needle stopped before reversing. (Fig. 5-4-13)

4) While watching the dial gauge, turn the governor until the piston lowers 1.8 mm below top dead center. (Fig. 5-4-14)

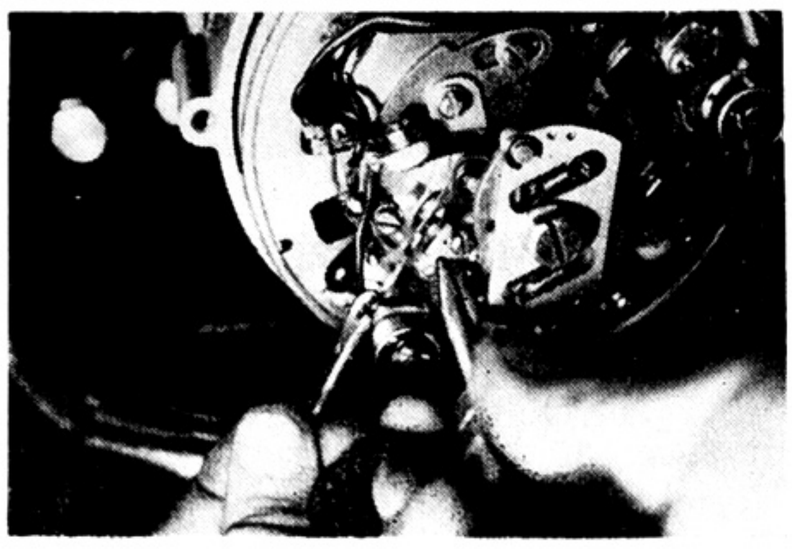


Fig. 5-4-13

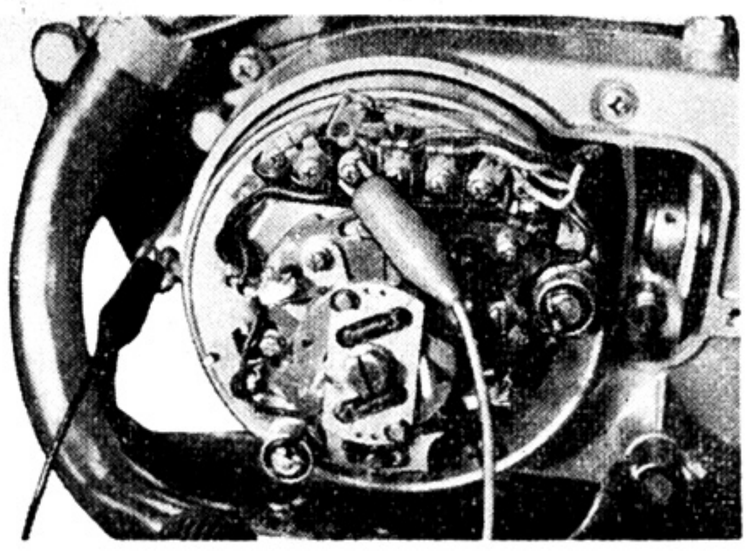


Fig. 5-4-14

5) Set the point gap at 0.3 – 0.35 mm. (Fig. 5–4–15) When adjusting the right cylinder (right in relation to the riding direction), adjust the breaker points of terminal 1_1 (gray). For the left cylinder, adjust the points of terminal 1_2 (orange).

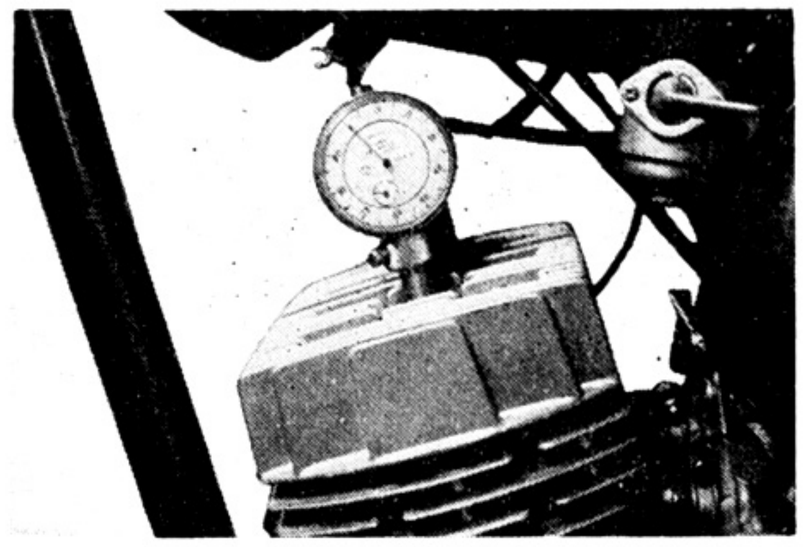


Fig. 5–4–15

6) Remove the lead wires from terminal 1_1 or 1_2. Connect the terminal to the positive (+) tester lead, and ground the tester's negative lead to the frame. (Fig. 5–4–16)

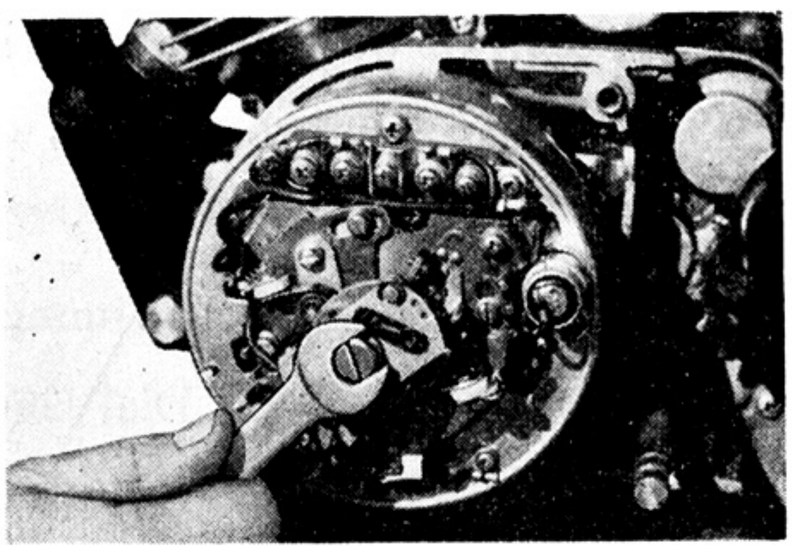


Fig. 5–4–16

7) Insert a matchwood into the governor, and open the governor. Then loosen the breaker plate holding screw, and turn the breaker plate. When the points open (the testing lamp lights up), set the screw. (Do not fully loosen the breaker plate holding screw, because the breaker plate tends to shift its position.) Turning the breaker plate in the normal turning turing direction causes ignition timing to delay, and turning it in the opposite direction advances ignition timing. (Figs. 5–4–17 and 18)

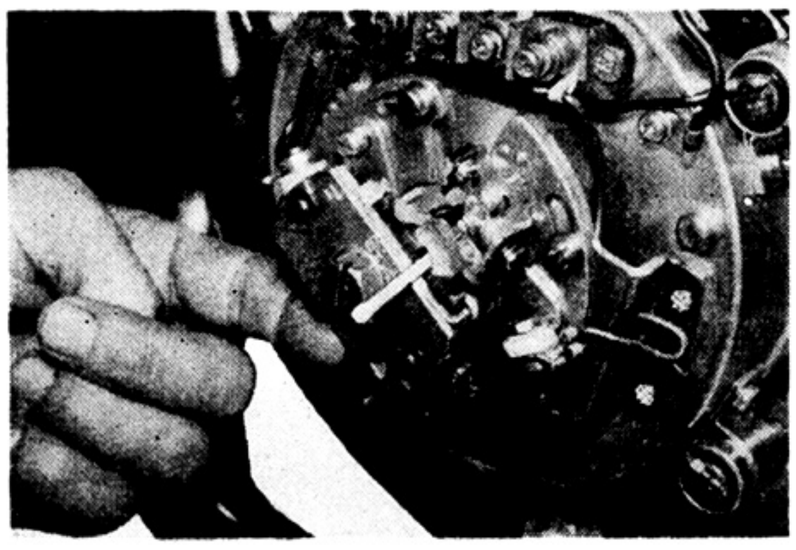


Fig. 5–4–17

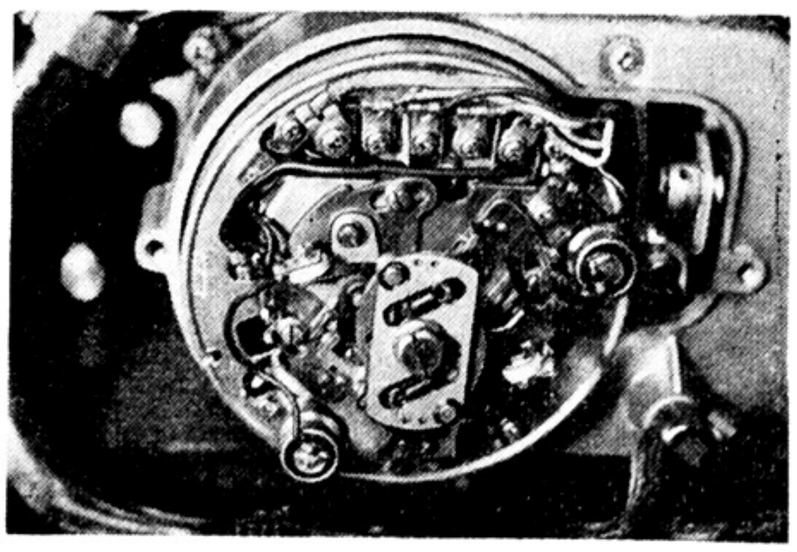


Fig. 5–4–18

8) Check the other cylinder in the same way.

Keep the error between the right and left sides within 0.05 mm.

9. Dynamo Adjustment Standards

Part	Item	Maintenance	Inspection
Field	Resistance (20°C) Shunt Series	4.9Ω	When voltage is irregular
Brushes	Material	CG-6R-1	First 6,000 km (4,000 mi) Every 4,000 km thereafter (2,500 mi)
	Number	4	
	Width × thickness × length	8×4.5×20mm	
	Minimum length	8mm	
	Spring capacity	400g – 560g (initial use)	
Commutator	Diameter	40ϕmm	
	Minimum diameter	38ϕmm	
	Mica undercut	0.5 – 1.0 mm	
	Minimum mica undercut	0.2 mm	
	Difference between max. and min. diameter	0.03 mm	
Breaker	Point gap	0.3 – 0.35 mm	Every 3,000 km (2,000 mi)
	Point pressure	700 g	(High rpm irregular)
	Ignitinn timing	BTDC 21° (18 mm)	(Ignition irregular)
	Automatic spark advancer	Starting 1,200 rpm	
		Final 1,600 rpm	
		Advance 12°	
Others	Dinamo dia. (outer)	134ϕmm	
	Dinamo dia. (inner)	130ϕmm	
	No. of poles	8	
	Core gap	0.3 mm	
	Armature taper	20ϕ×1/10	
	Cut-in rpm	1,700 rpm	
Capacity	Rated output rpm	14-V, 7-A/1,900 rpm	

5-5. Regulator (Voltage Regulator)

The dynamo alone can not provide stable electric current because fluctuating engine rpm affects the voltage. The regulator (also called a voltage relay) stabilizes the voltage generated. by breaking the filed coil circuit when the voltage exceeds a pre-set level.

A cutout relay (also called a charging relay) is built into the regulator. It allows stable electric current from the dynamo to charge the battery. However, when the engine stops, or when its speed is so low that the dynamo output is lower than that of the battery, it breaks the circuit to the battery so the battery will not drained. The starting switch is provided in order to interrupt a flow of current to the starter dynamo when the engine is started.

1. Inspection and Adjustment

If the regulator can no longer control the voltage, the battery will be drained or overcharged, and all electrical parts may be burued out, so use a good tester when inspecting or adjusting the regulator. (It is advised that you learn how to adjust the regulator at training cources because it is very difficult.)

A. No-Load Voltage

1) Inspection

○Disconnect the wire at terminal B (red) of the regulator and connect the positive tester lead to terminal B (red). Then ground the negative tester lead.

○Start the engine and keep it running at 2,500 rpm. Your regulator is correct if the tester reads 15.60 – 16.3 V. (Fig. 5-5-1)

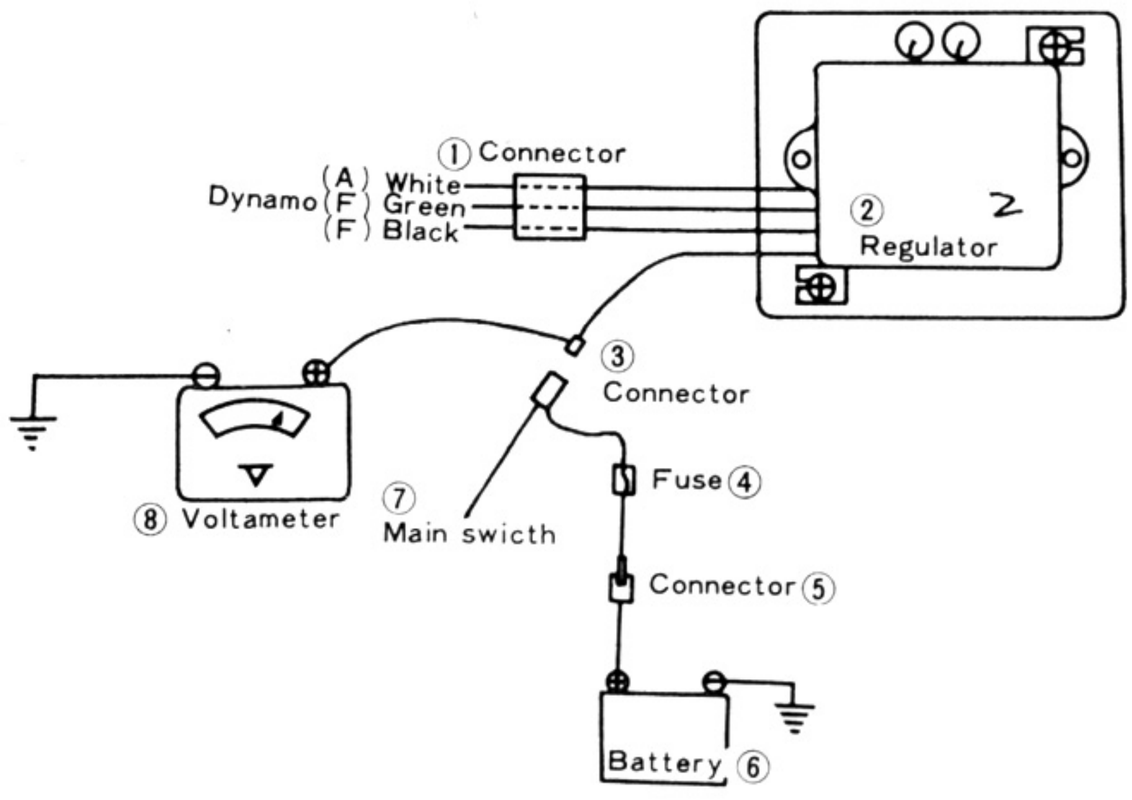


Fig. 5-5-1

2) Adjustment

If the voltage is measured more or less than the above range, adjust it by raising or lowering the spring pin on the voltage relay side.

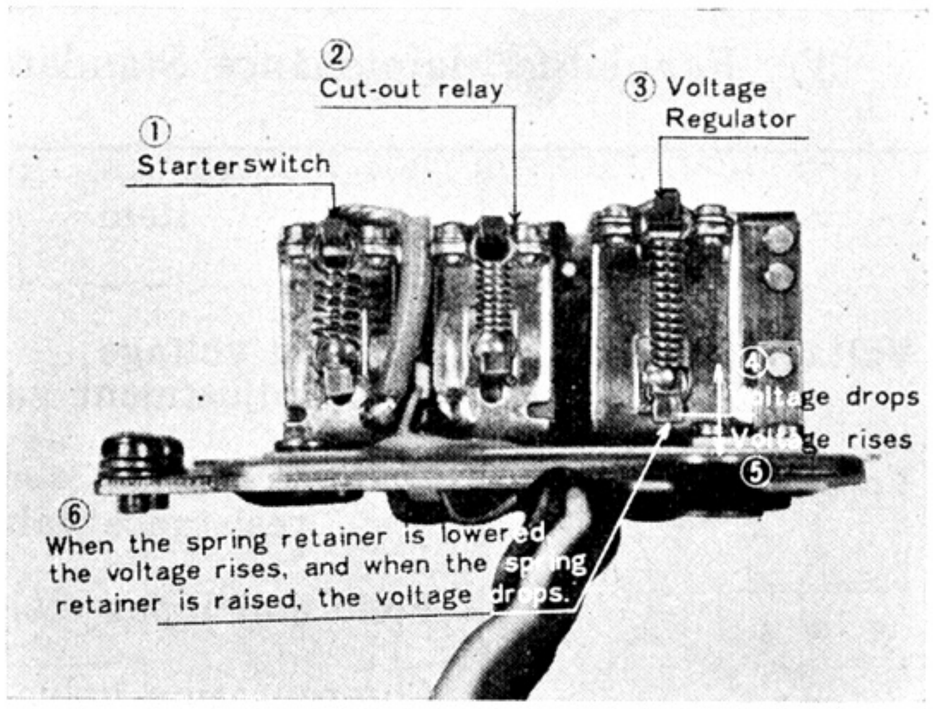


Fig. 5-5-2

B. Cut-in Voltage of the Cut-out Relay

1) Inspection

○Disconnect the lead from the dynamo A terminal, and connect the tester positive lead to the A terminal, then ground the negative lead to the frame. (Fig. 5-5-3)

○Start the engine, and increase engine speeds slowly. The cut-out relay is correctly set if its breaker points close at 12.5 – 13.5 V. (approx. 1,800 rpm)

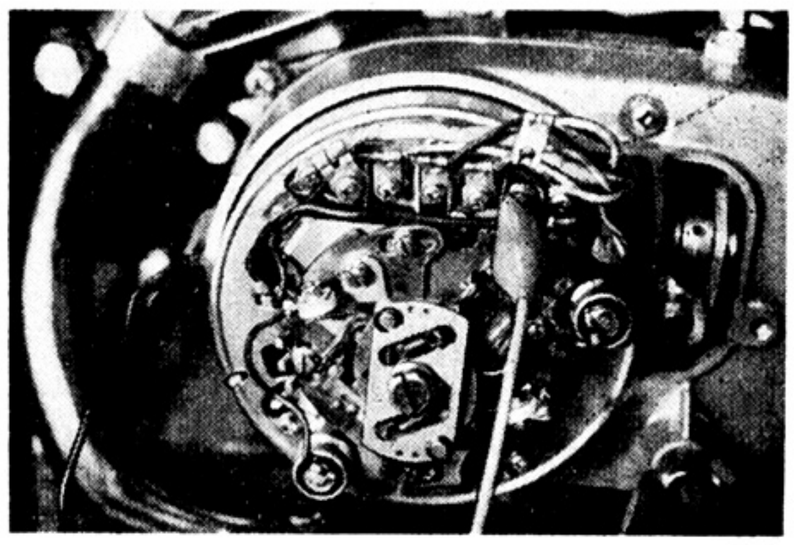


Fig. 5-5-3

2) Adjustment

If the breaker points will not close at the specified voltage, adjust the cutout relay by changing its spring tension. (Fig. 5-5-4)

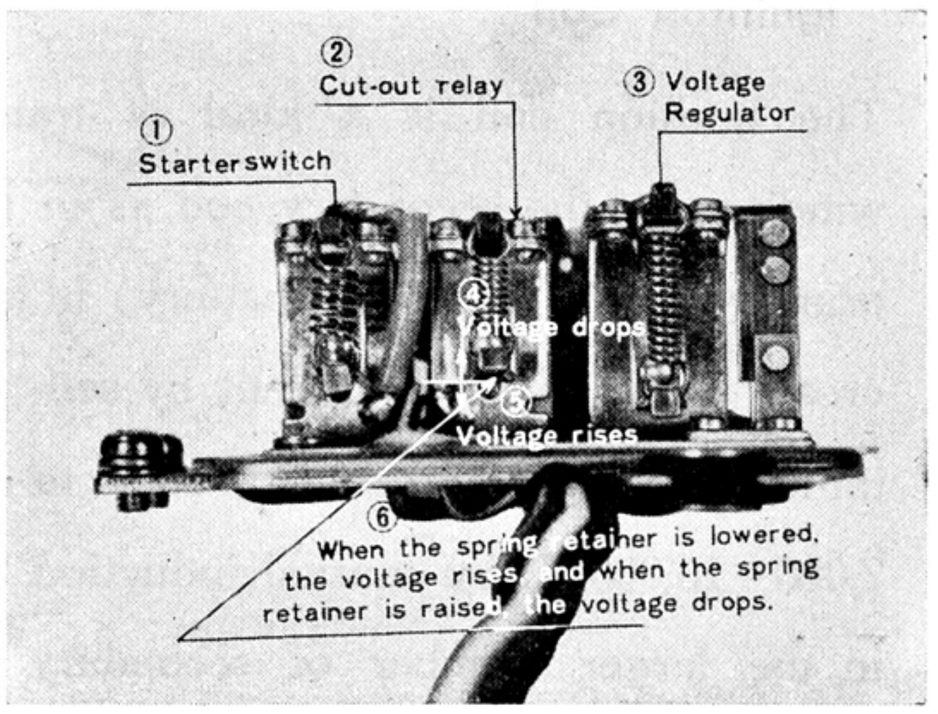


Fig. 5-5-4

In actual practice, there will rarely be need to adjust the cutout relay.

If the point surfaces of the voltage and cutout relays are worn or pitted, polish them with fine sandpaper (#400 – 600) before making any adjustment.

3) Regulator Maintenance Standards

	Item	Maintenance standards	Inspection
Voltage regulator	No load voltage adjustment value	15.6–16.3V/2,500 rpm	When voltage is irregular
Voltage relay	Voltage coil resistance value	8.1Ω/20°C	
	Field coil input resistance	10Ω/20°C	
	Compensation value	16Ω/20°C	
	Core gap	1.0 – 1.2 mm	
	Point gap	0.3 – 0.4 mm	
Cutout relay	Cut-in voltage	13±0.5 V	
	Reversing current	5 A or less	
	Voltage coil resistance value	79.2Ω/20°C	
	Core gap	0.3 – 0.5 mm	
	Point gap	0.7 – 0.9 mm	

5-6. Igniti̇ton Coil

The ignition coil is a kind of transformer, with approximately 50 times the number of windings in the secondary coil as in the primary. If the electric current supplied to the primary coil (from the battery) is interrupted by a contact breaker, the primary coil will create a 150 – 1300 V current by self-induction. This current is boosted to 7,000 – 10,000 V by mutual induction in the larger number of secondary coil windings, thereby making a spark jump the plug electrodes.

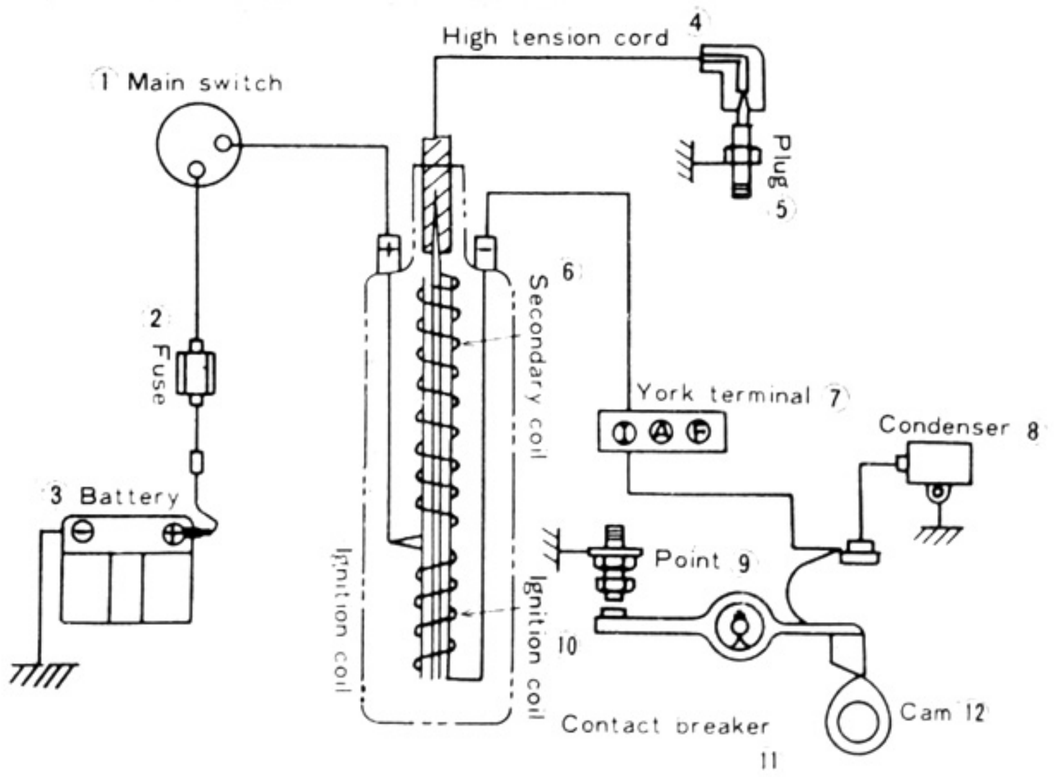


Fig. 5-6-1

1. Inspection

If no spark, or a rather week spark jumps the plug gap, inspect the ignition coil as will as the contact breaker.

a. When you test the coil alone, use a 12-V battery as power source. A spark of 7 mm or more means the coil is in good condition.

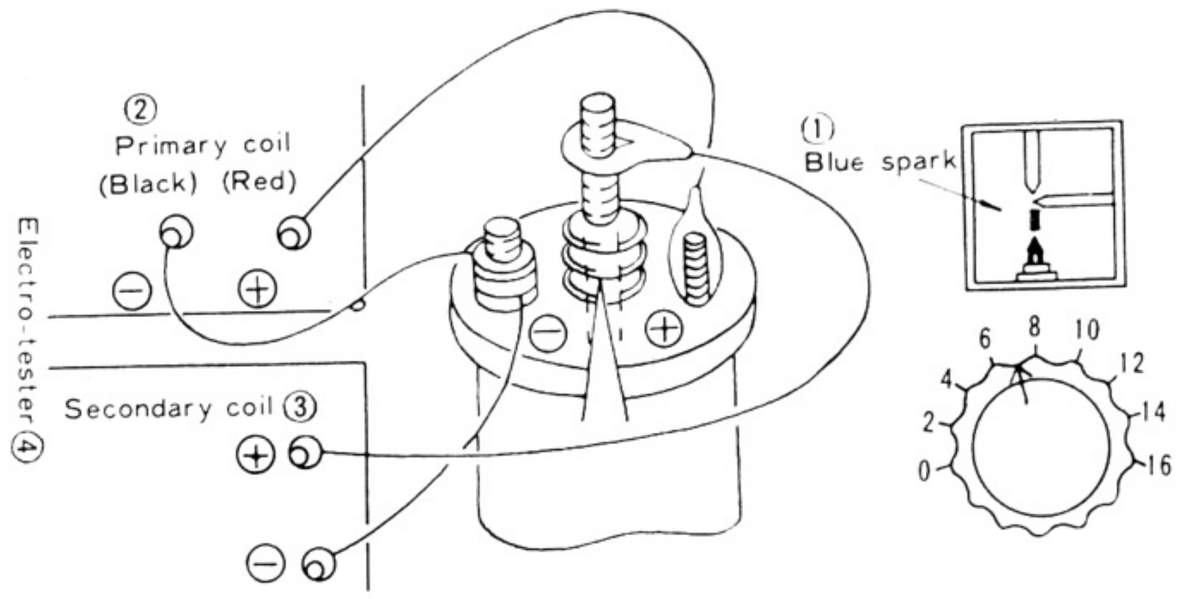
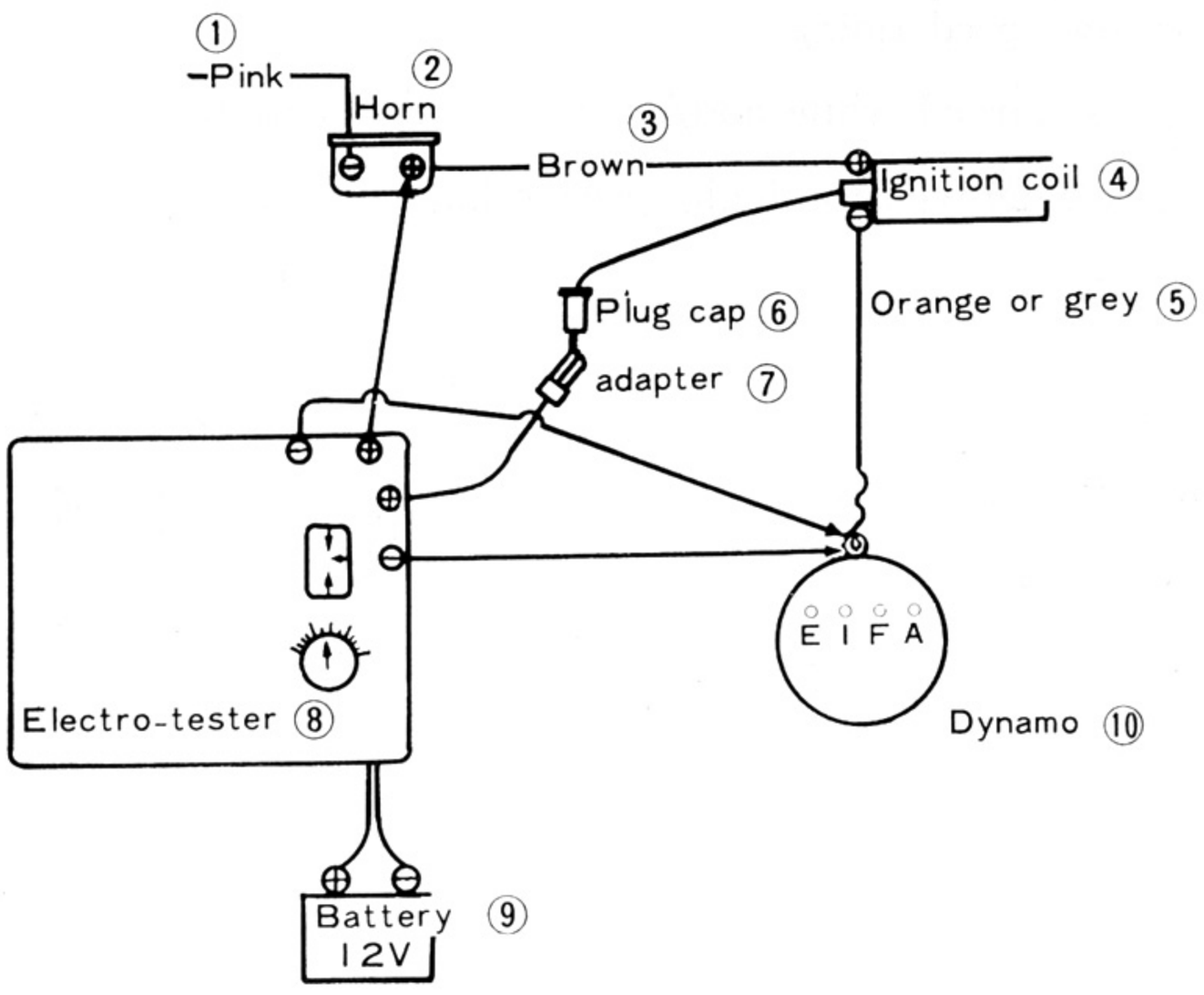


Fig. 5-6-2

b. Test, with Coil Installed (practical test)



○Disconnect the lead attached to the ignition dynamo terminal 1 and connect it to the negative primary and secondary leads of the tester.

○Detach the high tension lead from the plug, attach an adapter (copper or iron wire) to the plug lead cap, and connect this adapter lead to the positive secondary lead of the tester.

○Connect the positive primary lead of the tester to the brown lead terminal of the horn.

○Use a 12-V battery as power source for the tester.

○If the tester shows a spark of 7 mm or more, the coil is in good condition.

5-7. Spark Plug

The life of a plug and its dicoloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with suitable ones according to the color and condition of the bad plugs. One machine may be ridden only in urban areas at low speeds, whereas another may be ridden for hours at high speeds, so confirm what the present plugs indicate by asking the rider how long and how fast he rides, and recommend a cold, standard, or hot plug accordingly. It is actually economical to install new plugs every 3,000 km, since it will tend to keep the engine in good condition, prevent ing excessive fuel consumption, etc.

1. How to judge plug condition

a. Best……when the porcelain around the center electrode is a light tan color.

b. If the electrodes and porcelain are black and somewhat oily, replace the plug with a hotter-type for low speed riding.

c. If the porcelain is burned white and/or the electrodes are partially burned away, replace the plug with a colder-type for high speed riding.

2. Inspection

Instruct the rider to :

Inspect and clean the spark plug at least once a month or every 1,000 km. Clean the electrodes of carbon and adjust the electrode gap to 0.5 – 0.6 mm.

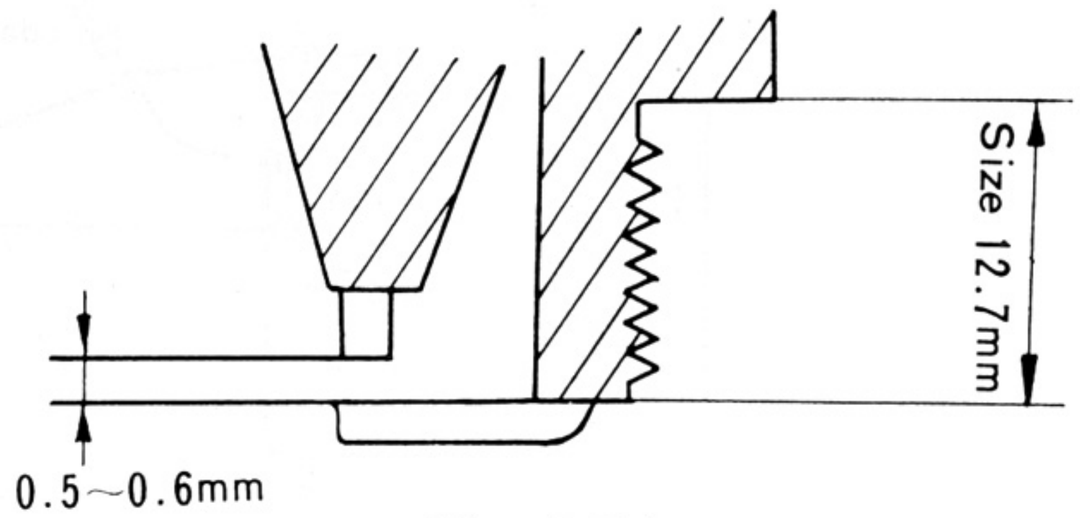


Fig. 5-7-1

Be sure to use standard B-8 HC plugs as replacements to avoid any error in reach.

5-8. Battery

The battery is the power source for the whole electrical system. When the engine starts, or engine speeds are low and the dynamo generates a very little amount of electricity, the battery supplies power to the ignition system, lights, etc. During riding, the dynamo supplies electric power and also recharges the battery.

1. Before the First Ride

a. A new battery should be charged by a battery service shop, but if you charge it at your shop take the following steps.

b. How to Charge the Battery

○First, fill each battery cell to a maximum level with dilute sulphuric acid (specific gravity 1.28).

○Then charge the battery at 0.9 A for 13 hours.

○After charging, tilt up a corner of the battery to let out air bubbles. If necessary, add more acid to restore it to the maximum level, so the specific gravity is between 1.26 and 1.28. Then tighten all the cell caps.

○Wash the battery off with water to remove any sulphuric acid. Dry it will and then mount it in the frame.

2. Periodic Inspection and Supplementary Charging

○Inspect the fluid level every month. If it drops below the middle line, instruct the rider to add distilled water to raise the fluid to the maximum level.

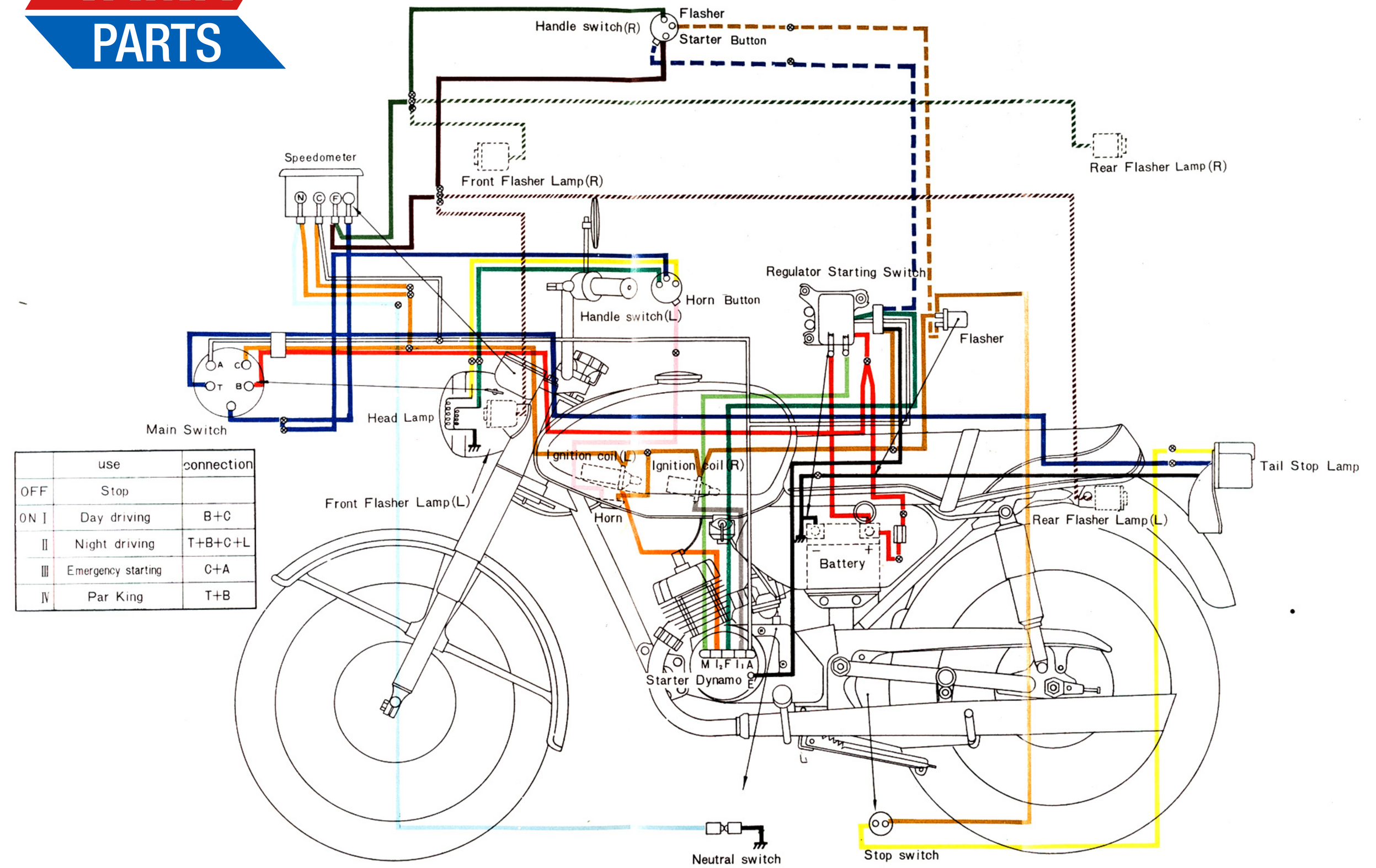
If the battery seems to be discharged, recharge it. The secondary charge should also be at 0.9 A for 13 hours.

3. Maintenance

○If your motorcycle will not be used for a long time, remove the battery and have a battery shop store it. In shops equipped with a charger, do the following:

1) Recharge the battery.
2) Store it in a cool, dry place, and avoid temperatures below 0°.
3) The battery should be recharged before mounting.

YAMAHA 180 YCS1-C CIRCUIT DIAGRAM



	use	connection
OFF	Stop	
ON I	Day driving	B+C
II	Night driving	T+B+C+L
III	Emergency starting	C+A
IV	Par King	T+B

YAMA PARTS

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