

# SHOP MANUAL

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**HONDA**

**50**

MODEL

**P50**

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## FOREWORD

The P-50 is a gasoline engine powered bicycle, affording all the simplicities of the bicycle with the powered features of a mopet, yet so easy to handle that anyone who is able to ride a bicycle can ride the P-50 without any previous experience. It is designed to fulfill the need for a safe, economical and easy handling family transportation.

This manual has been prepared as a servicing guide for the P-50, and all personnel who will be servicing the P-50 should read this manual carefully to become familiar with all of its sections.

The manual is written in two parts, construction and maintenance inspection, for easy reference.

Any revisions to this manual will be notified by the Service Bulletin.

**July 20, 1967**

**Service Department  
Honda Motor Company Ltd.**

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# 1 FEATURES

## Engine

1. CHAIN DRIVEN O.H.C., 4-CYCLE ENGINE is used to provide quiet efficient power.
2. POWER TRANSMISSION IS PERFORMED by a specially engineered three stage speed reduction and a reliable centrifugal clutch that automatically disengages at idling speed and engages when throttle is opened ; eliminating any need for a manual clutch or gear shift.
3. ENGINE STARTING AND STOPPING is by opening or closing the decompression lever which relieve the compression from the cylinder.
4. THE ENGINE AND THE COMPLETE POWER TRANSMISSION UNIT are contained within the rear wheel hub together with the rear brakes.
5. SHIFTING THE CYCLING LEVER located on the engine disengages the engine to permit pedal operation of the P-50.
6. CHOKE BUTTON IS CONVENIENTLY LOCATED on the steering head, accessible while riding.

## Frame

1. A STEP THROUGH FRAME WITH A LOW CENTER-OF-GRAVITY makes it easy to mount or dismount and provides for greater stability. Frame main structure is a monocoque, welded pressed steel sheet for high strength and rigidity.
2. EXPANDING BRAKE SHOES in the front and clamping band brakes in the rear operated independently by the handle levers assure good braking.
3. AUTOMATIC ARM CHAIN TENSIONER constantly maintains the pedal drive chain in proper tension, eliminating any need for adjustment.
4. THE EASY STEERING BICYCLE TYPE HANDLEBAR is vertically adjustable.
5. A CONVENIENT BASKET IS MOUNTED ON THE FRONT FORK for carrying shopping or other light load.

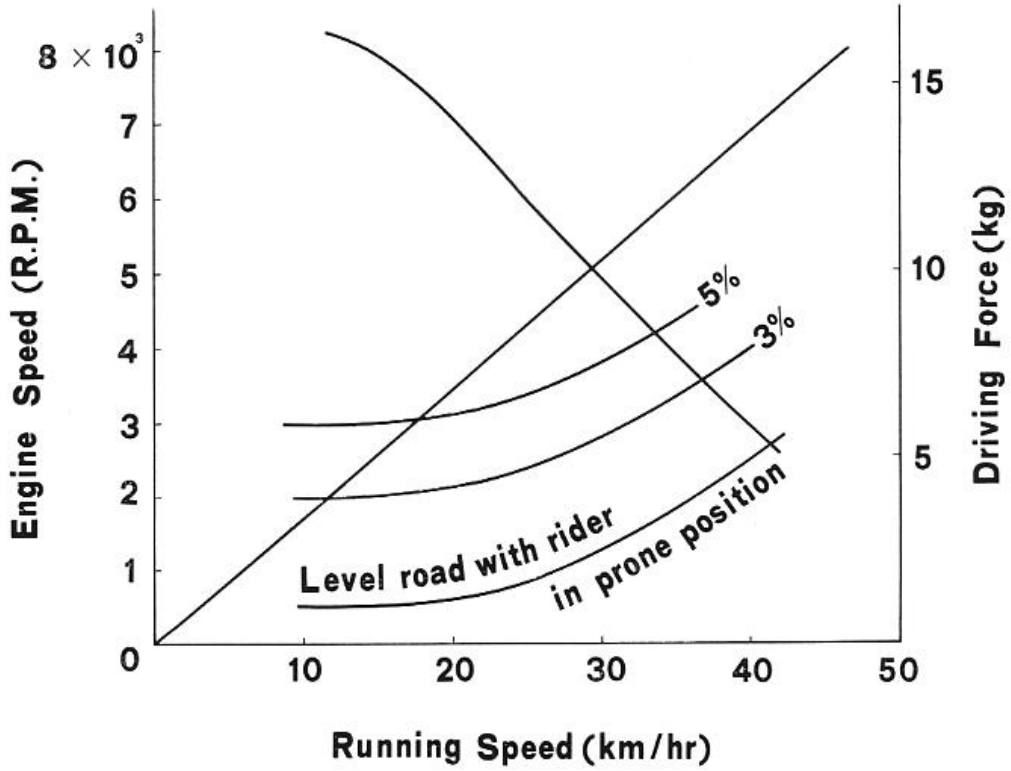
## 2. SPECIFICATION & PERFORMANCE

### SPECIFICATION FOR P-50

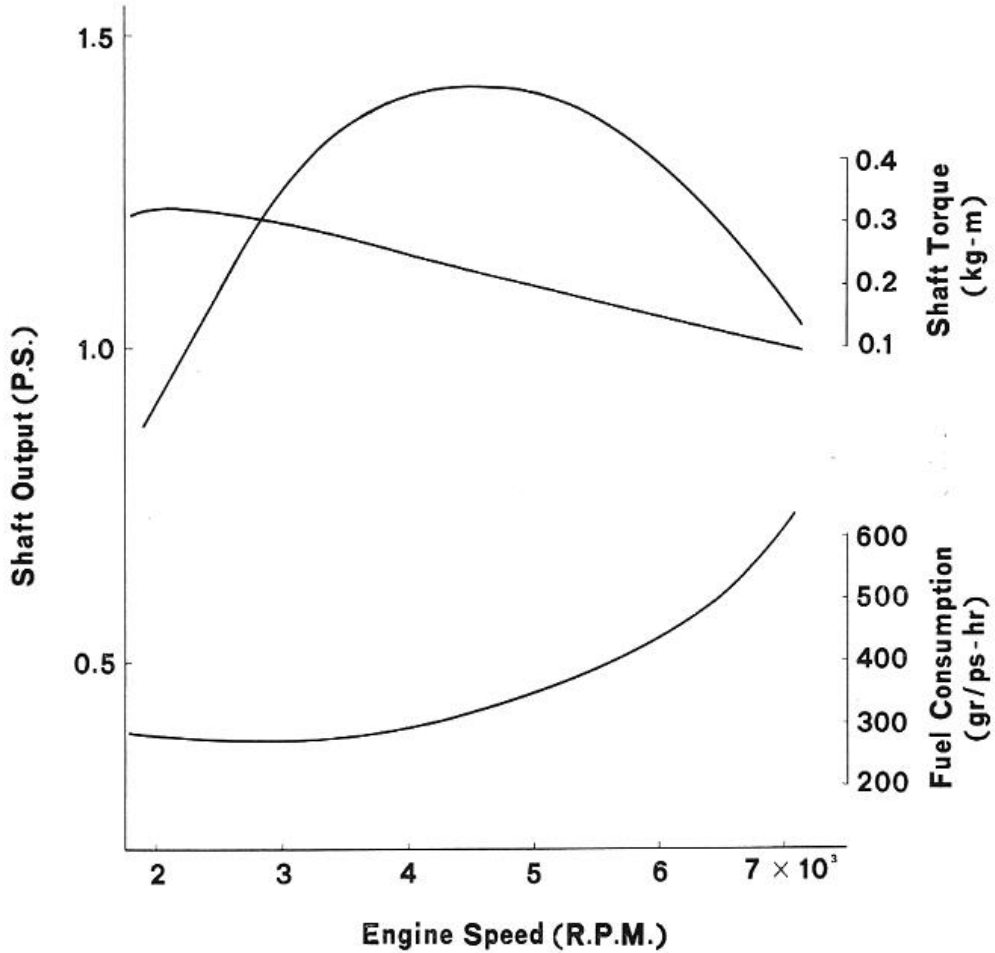
Description	Specifications
Name of motorcycle	Honda
Model type	P-50
Type of vehicle	Motorcycle
<b>Dimensions</b>	
Overall length	1,570 mm (65.7 in) 1,730 mm (68.2 in) (For Holland)
Overall width	620 mm (24.4 in)
Overall height	1,020 mm (40.2 in) 1,050 mm (41.4 in) (For Holland)
Wheelbase	1,070 mm (42.4 in) 1,090 mm (42.9 in) (For Holland)
Min. ground clearance	110 mm ( 4.3 in) 130 mm ( 5.1 in) (For Holland)
<b>Weight</b>	
Weight, empty	45 kg ( 99.1 lbs) 46 kg (101.3 lbs) (For Holland)
Empty weight distribution, front	14 kg ( 30.8 lbs) 13 kg ( 28.6 lbs) (For Holland)
Empty weight distribution, rear	31 kg ( 68.3 lbs) 33 kg ( 72.7 lbs) (For Holland)
Full load weight distribution, front	29 kg ( 63.8 lbs) 37 kg ( 81.5 lbs) (For Holland)
Full load weight distribution rear	71 kg (156.4 lbs) 84 kg (185 lbs) (For Holland)
<b>Performance</b>	
Max. speed	40 km/h (25 mile/h) 37 km/h (23 mile/h)
Climbing ability: grade	5°10'
<b>Engine</b>	
Type fuel used	Gasoline
Type engine	Air cooled 4 stroke cycle
No. of cylinder and arrangement	Single cylinder, tilted up 10° from horizontal
Valve arrangement	OHC and valve
Total piston displacement	49.3 cc (3.0 cu. in)
Bore×Stroke	42×35.6 mm (1.65×1.4 in)
Compression ratio	8.7 : 1
Compression pressure	12 kg/cm <sup>2</sup> (171 lbs/in <sup>2</sup> )
Max. output	1.38 PS/5,000 rpm
Max. torque	0.25 kg·m (1.81 ft. lbs)/2,800 rpm
Min. fuel consumption at max. load	270 gr/Ps-h/2,900rpm 350 gr/Ps-h/4,000rpm (For Holland type)
Dimension (mm)	396 ℓ × 278 w × 310 h (15.6 × 11.0 × 12.2 in)
Total weight	12 kg (25.4 lbs) 14 kg (30.9 lbs) (For Holland type)
Installation and method	Mounted on rear wheel with torque link
Starting method	Pedal starter
Carburetor No. and type	Single, downdraft
Air filter type	Dry (urethane foam)
Fuel tank capacity	2.5 lit. (0.7 US gal., 0.6 Imp. gal.)
Lubrication method	Splash
Lubrication system capacity	0.7 lit. (1.5 US pint, 1.2 Imp. pint)

Description	Specifications
<b>Ignition system</b>	
Ignition method	Flywheel magneto
Ignition coil	High voltage A.C.
Type spark plug	C-6HB
<b>Power transmission system</b>	
Primary reduction method	Sprocket and chain
Reduction ratio	2.74:1
Clutch type	Centrifugal automatic
Secondary reduction method	Sprocket and chain (Gear for Holland type)
Reduction ratio	6.25:1 (6.95:1 for Holland type)
<b>Steering system</b>	
Steering handle turning radius	75°
Steering handle width	570 mm (22.4 in)
Caster	66°
Trail	40 mm (1.58 in), [50 mm (1.97 in) for Holland type]
Tire, front	2.00-17 (2PR) (23-2.00 for Holland)
Tire, rear	2.25-17 (2PR) (23-2.25 for Holland)
<b>Brake system</b>	
Type brake, front	Expanding brake shoe
Type brake, rear	External clamping shoe
Method of application, front	Right handle lever
Method of application, rear	Left handle lever
<b>Suspension system</b>	
Suspension method, front	Spring
<b>Lighting system</b>	
Headlight rating	6V-15W (For U.S.A. type)
	6V-10W (For General export, England type)
	6V-6W (For France, Belgium, Holland type)
	6V-15W (For Germany type)
Taillight rating	6V-5.3W (For U.S.A. type)
	6V-3W (For General export, England type)
	6V-1.8W (For France, Belgium, Holland type)
	6V-1.8W (For Germany)
Stoptlight rating	6V-17W (For U.S.A. type)
	6V-8W (For General export, England type)
	6V-5W (For France, Belgium type)

**DRIVING PERFORMANCE CURVES**

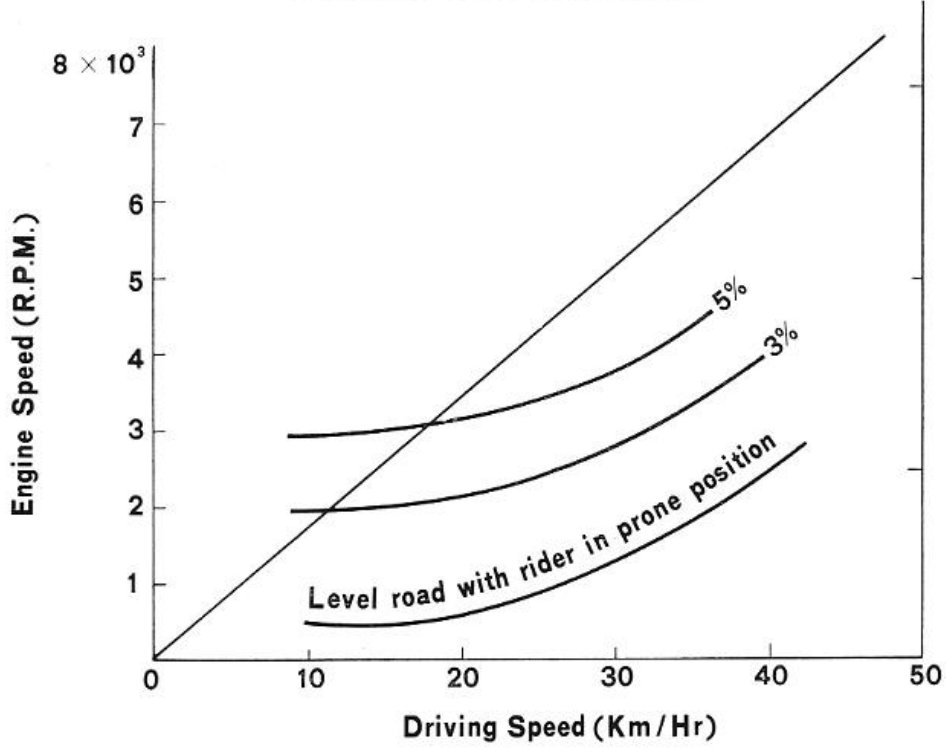


**ENGINE PERFORMANCE CURVES**

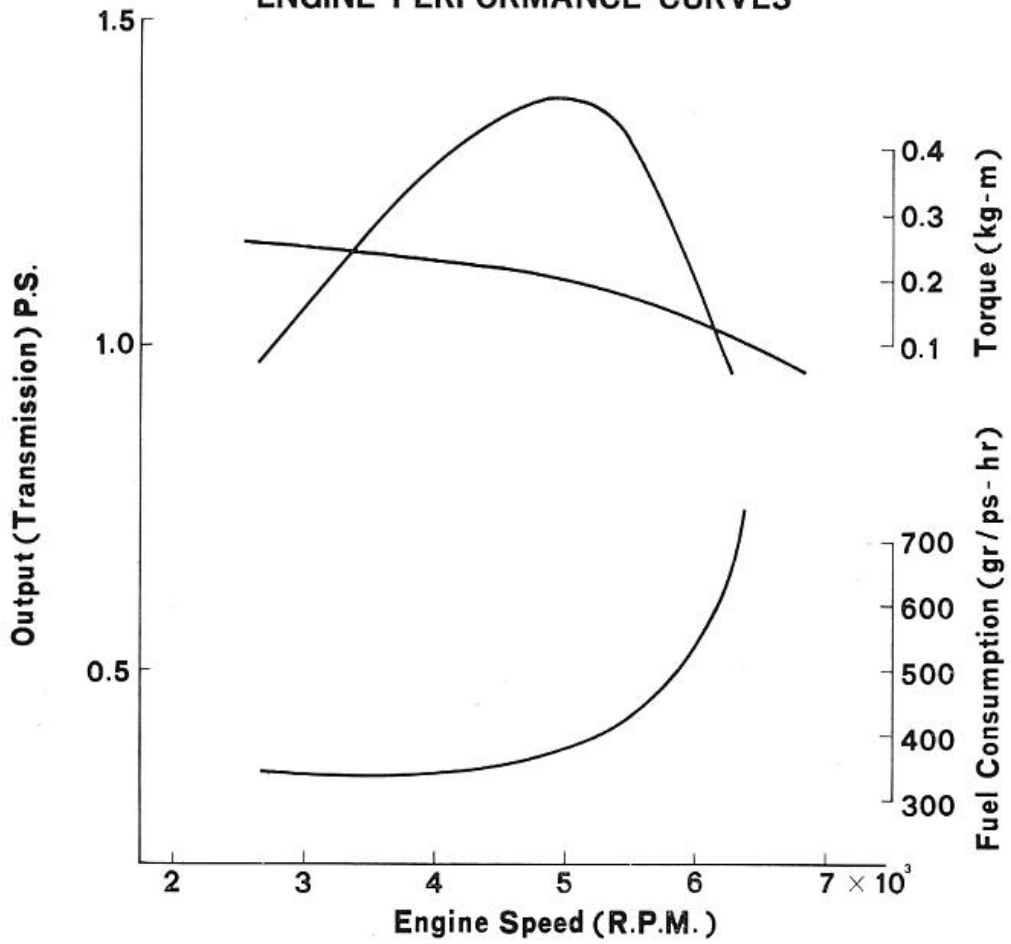


(General, England, Belgium, France and U.S.A. export type)

**DRIVING PERFORMANCE**



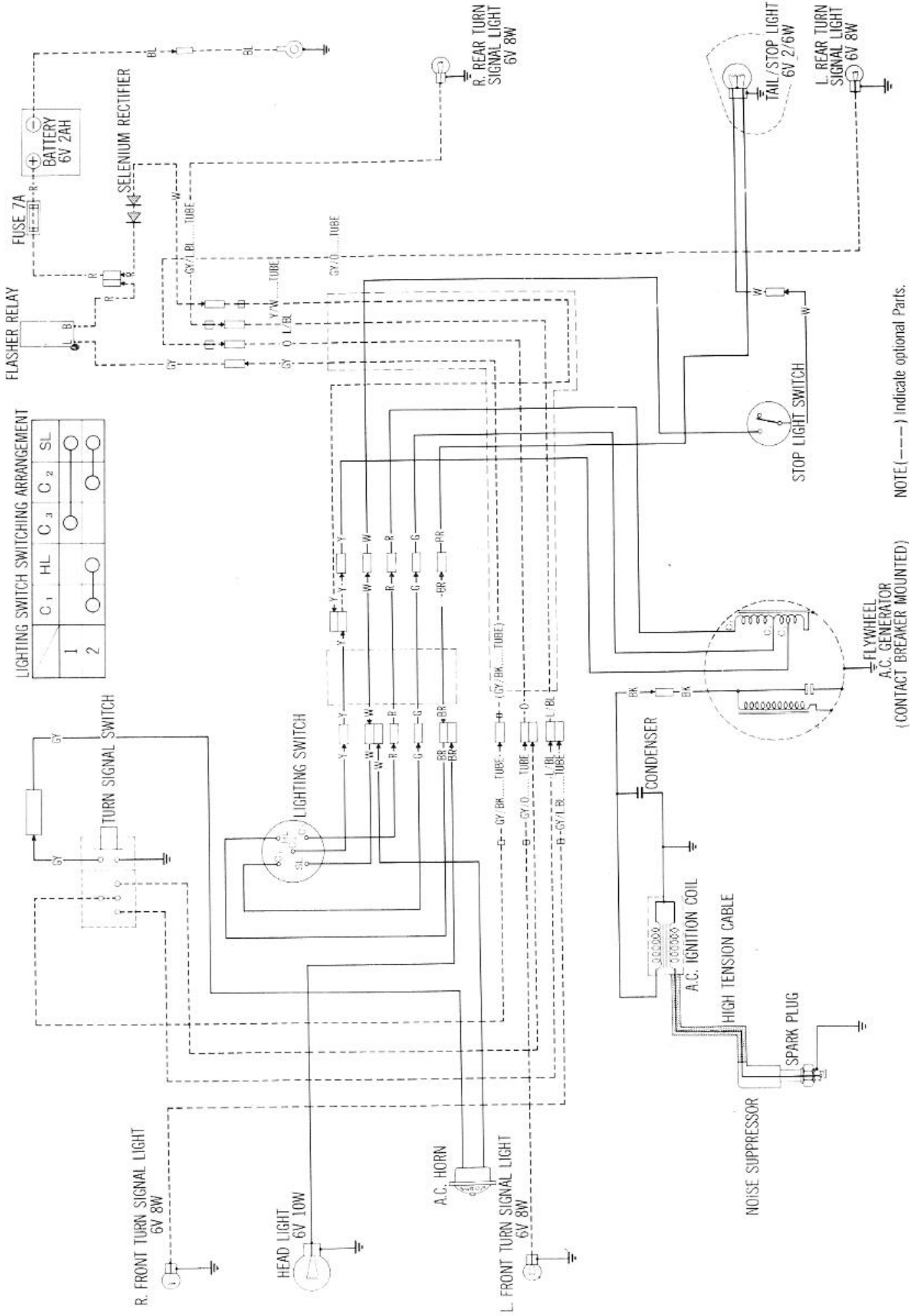
**ENGINE PERFORMANCE CURVES**



(For Netherlands export type)



WIRING DIAGRAM (For General export type)

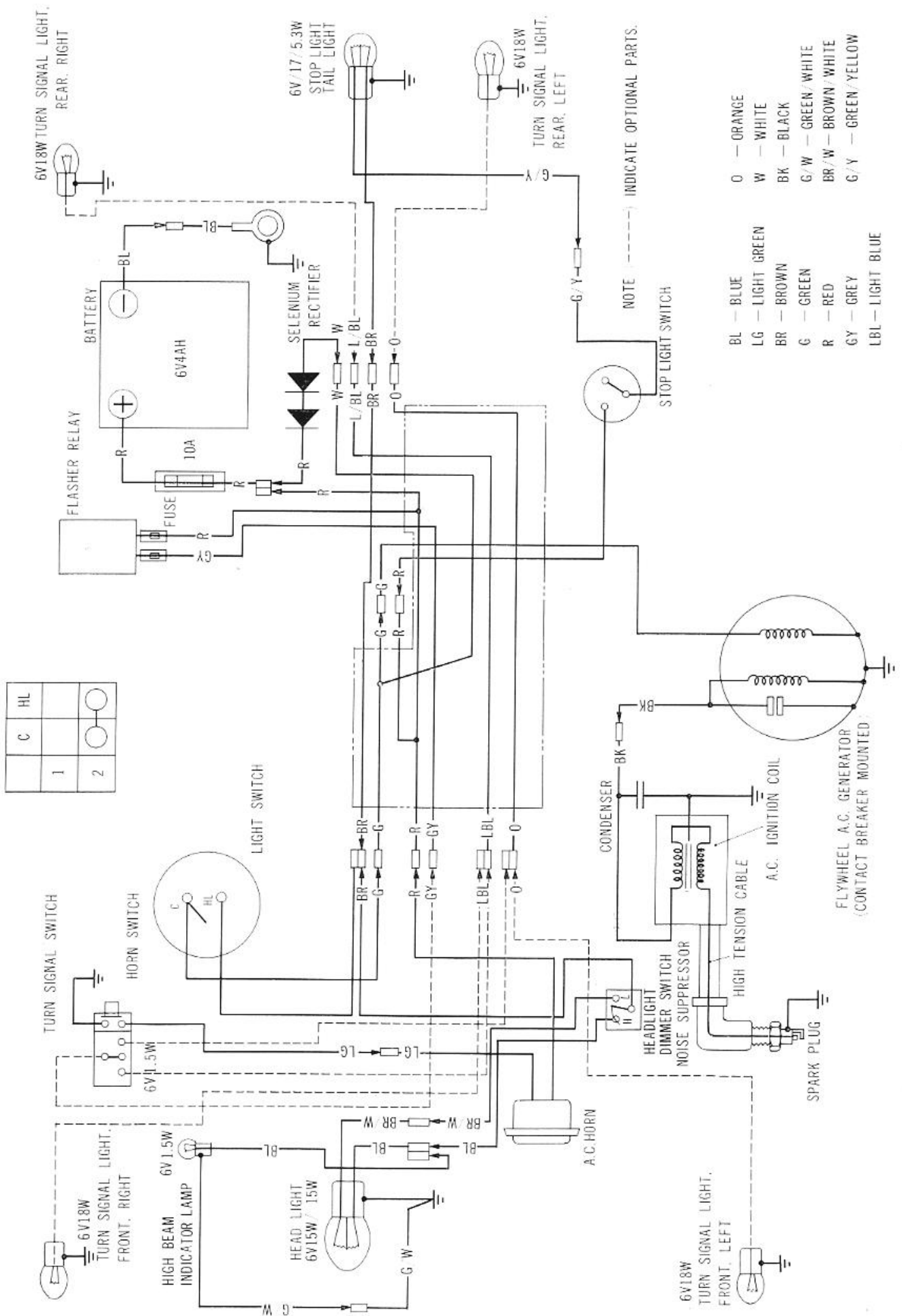


NOTE (---) Indicate optional Parts.

(CONTACT BREAKER MOUNTED)

(For U. S. A. export type)

LIGHTING SWITCH SWITCHING ARRANGEMENT



	C	HL
1		
2		

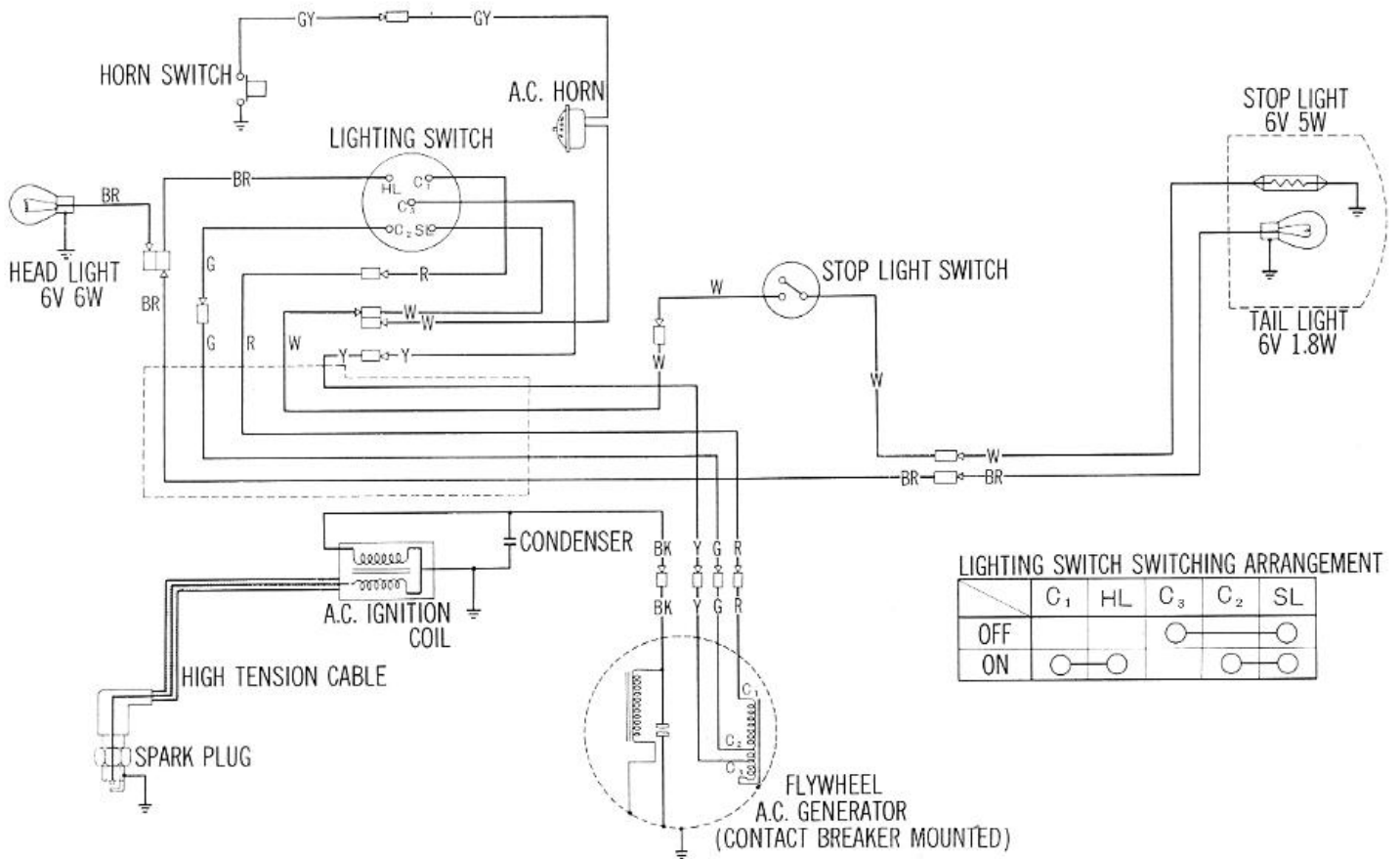
- BL — BLUE
- LG — LIGHT GREEN
- BR — BROWN
- G — GREEN
- R — RED
- GY — GREY
- LBL — LIGHT BLUE
- O — ORANGE
- W — WHITE
- BK — BLACK
- G/W — GREEN/WHITE
- BR/W — BROWN/WHITE
- G/Y — GREEN/YELLOW

NOTE --- INDICATE OPTIONAL PARTS.

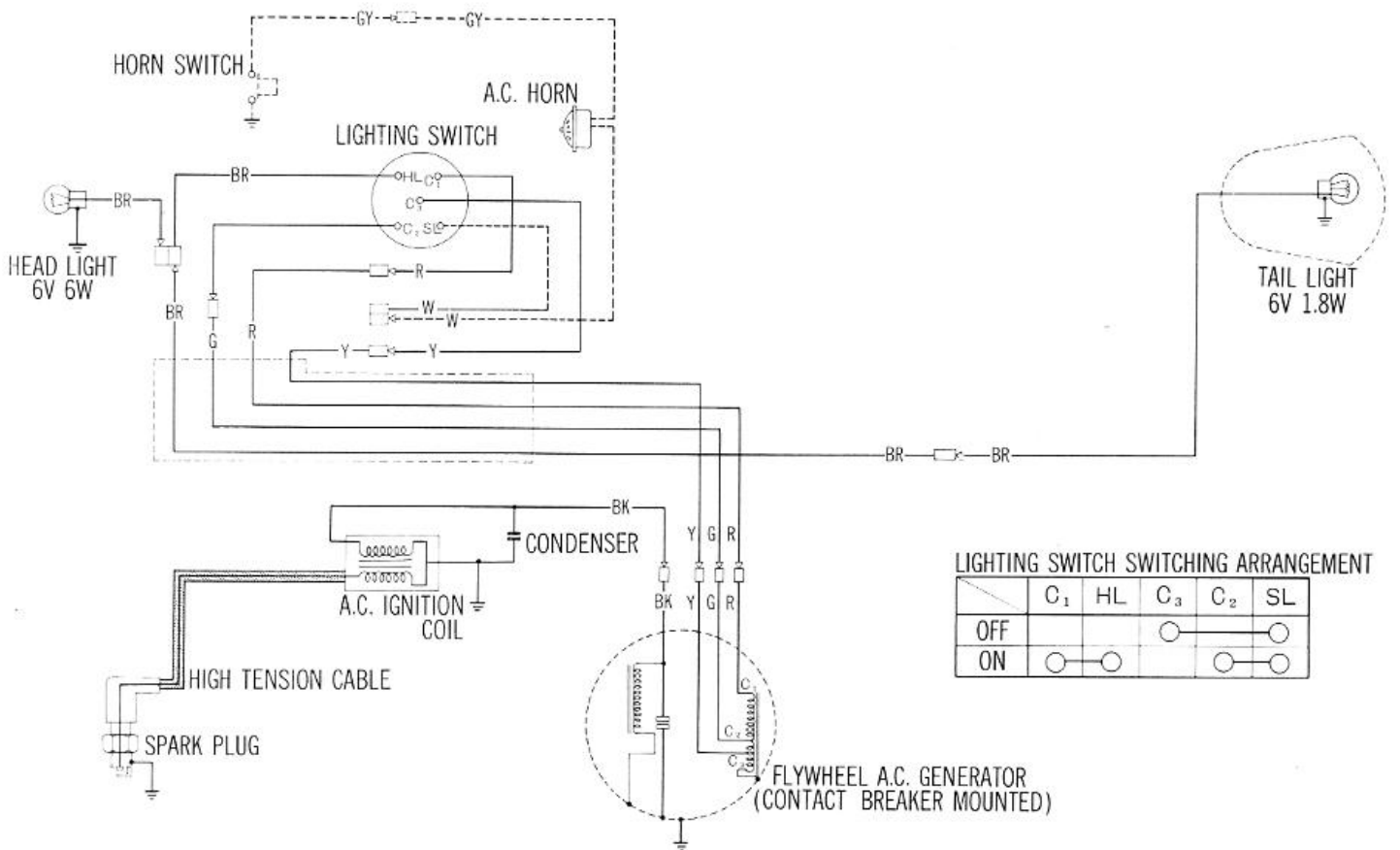
STOP LIGHT SWITCH

FLYWHEEL A.C. GENERATOR  
(CONTACT BREAKER MOUNTED)

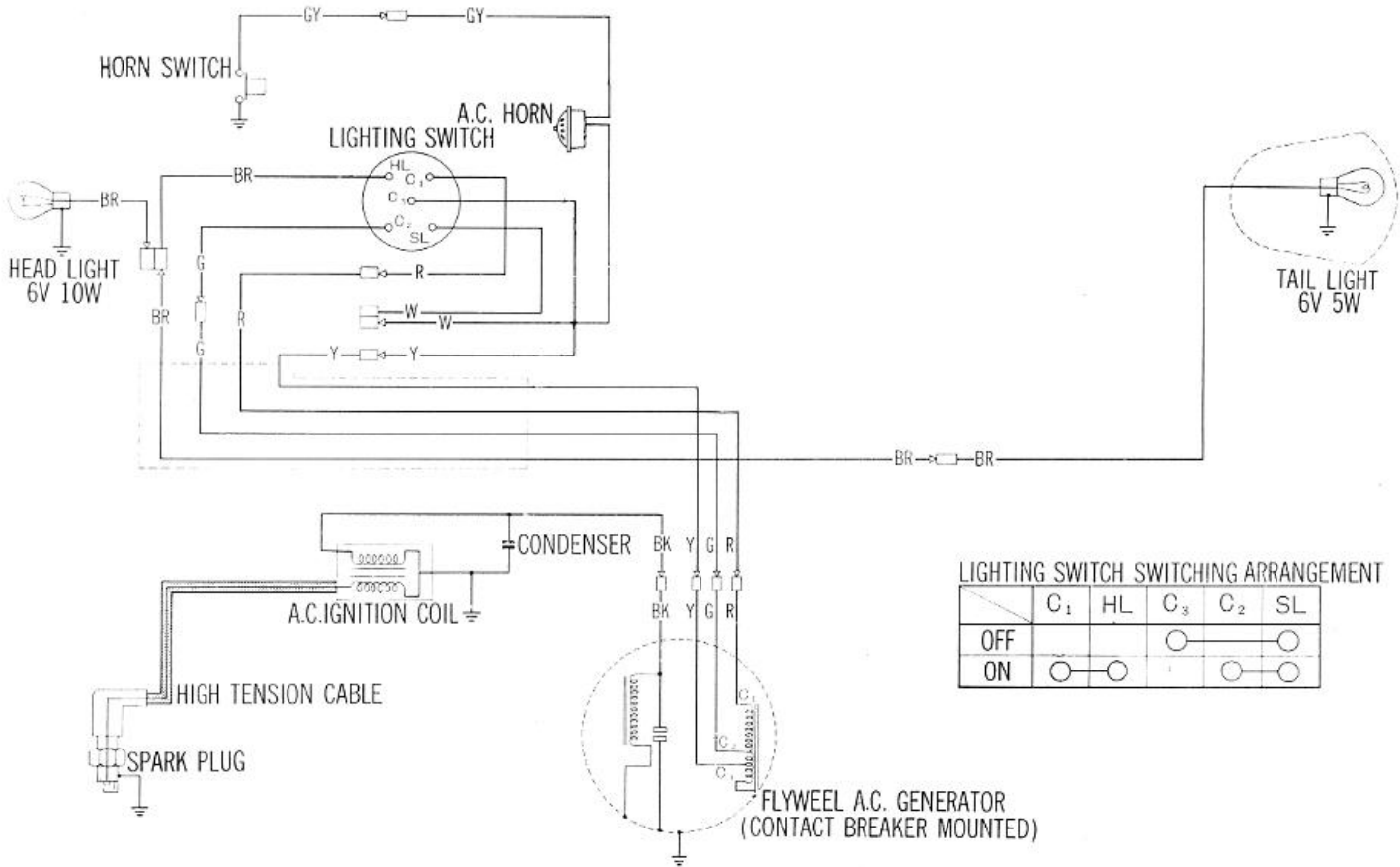
(For France and Belgium export type)



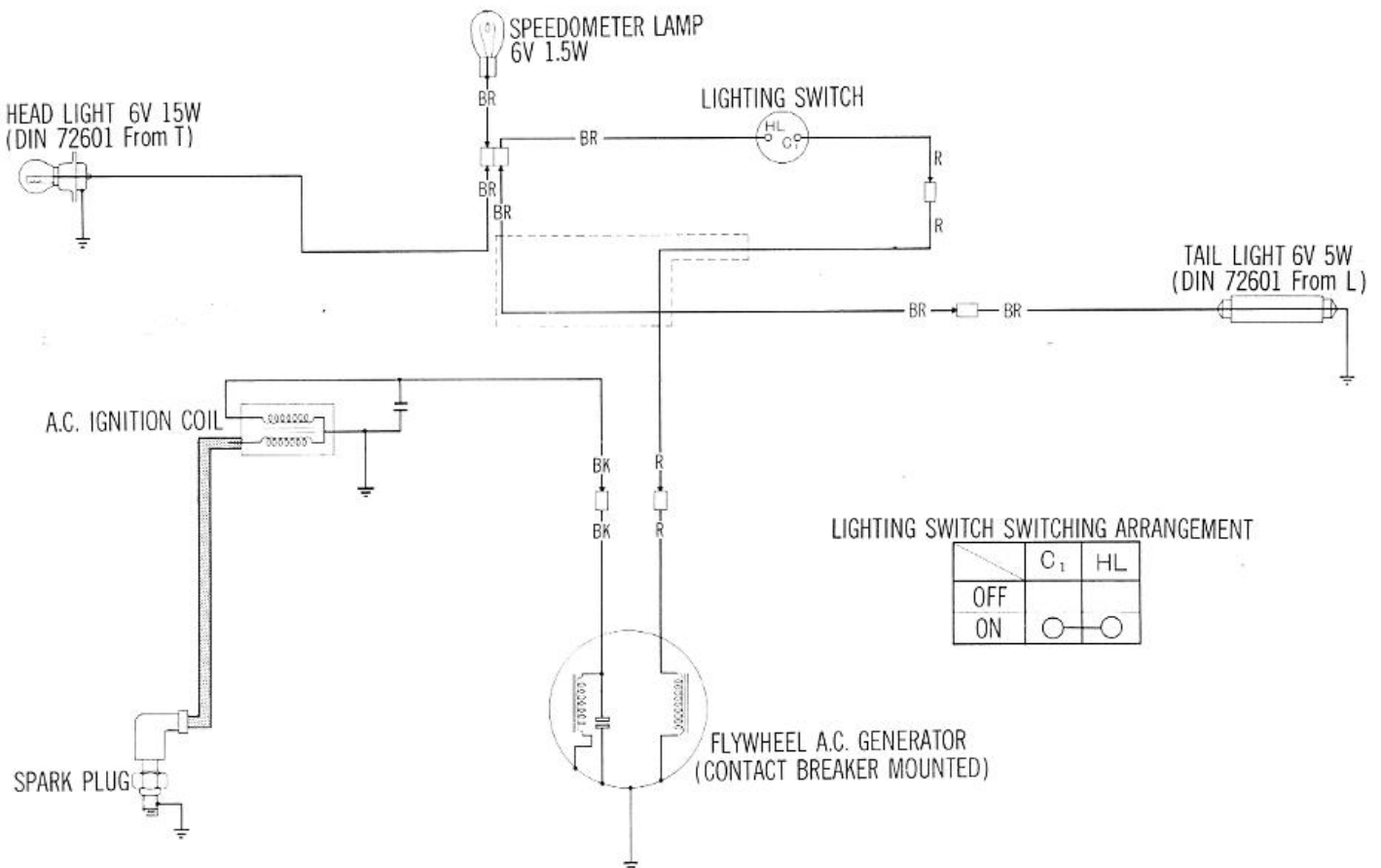
(For Holland export type)



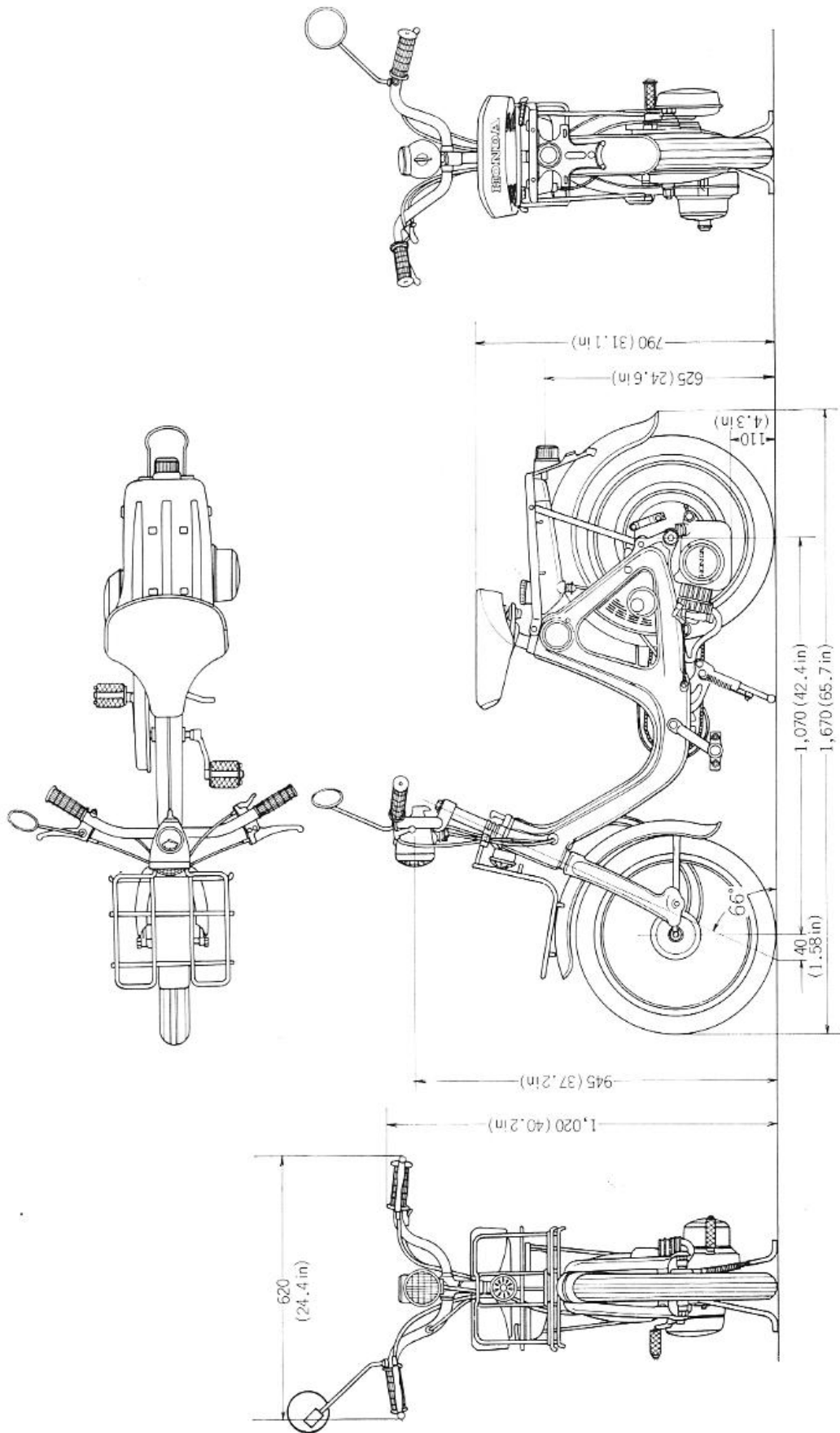
(For England export type)



(For Germany export type)



DIMENSIONAL DRAWING



# GENERAL DESCRIPTION

## 3. ENGINE

In the gasoline engine, the fuel and air is mix in the proper ratio and this mixture is taken into the cylinder in a vapor condition where it is compressed and ignited, the resulting combustion forces the piston downward, and the combustion pressure is transformed to the rotary motion of the crankshaft by means of the connecting rod.

The operation of the engine is quite similar to the pedaling of a bicycle, with power produced by pedaling considered as the combustion pressure of an air-fuel mixture, the foot acting the role of the piston, the pedal the connecting rod, and the sprocket simulating the crankshaft.

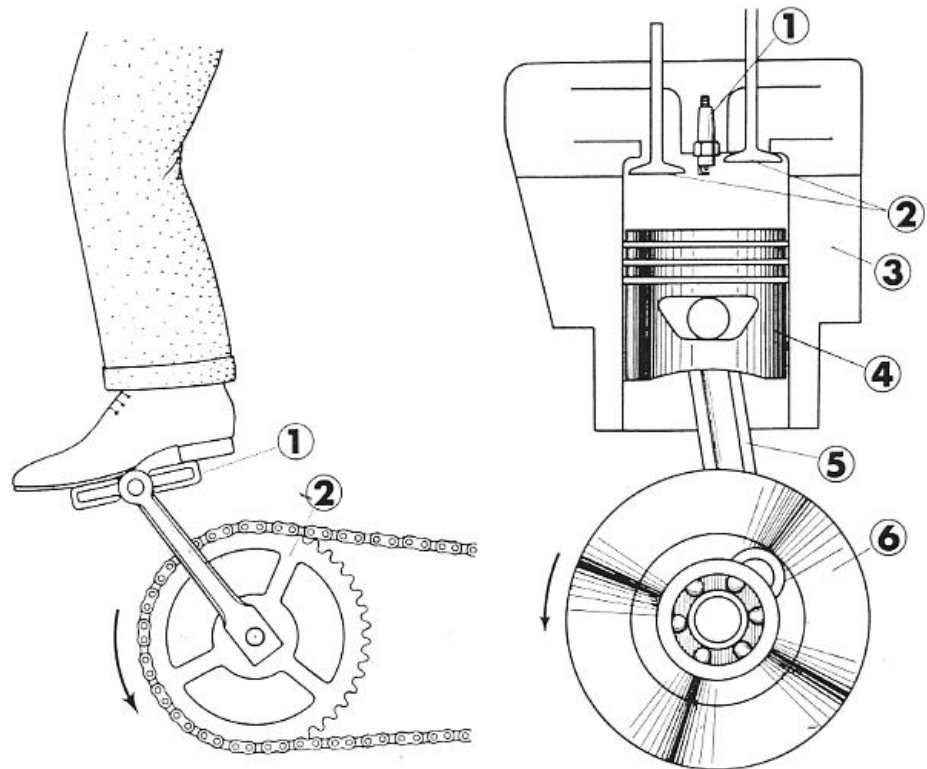


Fig. 3-1 ① Pedal ② Sprocket Fig. 3-2 ① Spark plug ② Valve ③ Cylinder ④ Piston ⑤ Connecting-rod ⑥ Crankshaft

The gasoline engine produces power at the crankshaft by the following four sequence of events, or strokes.

① Intake → ② Compression → ③ Power → ④ Exhaust

The term "cycle" is applied to one complete sequence of these four strokes. When the entire cycle of events in the cylinder requires four strokes (two crankshaft revolution), the engine is referred to as a four-cycle engine. An engine which accomplishes the entire cycle of events in two strokes (one crankshaft revolution), is referred to as a two-cycle engine. P-50 is equipped with a four-cycle engine. (Fig. 3-3~6)

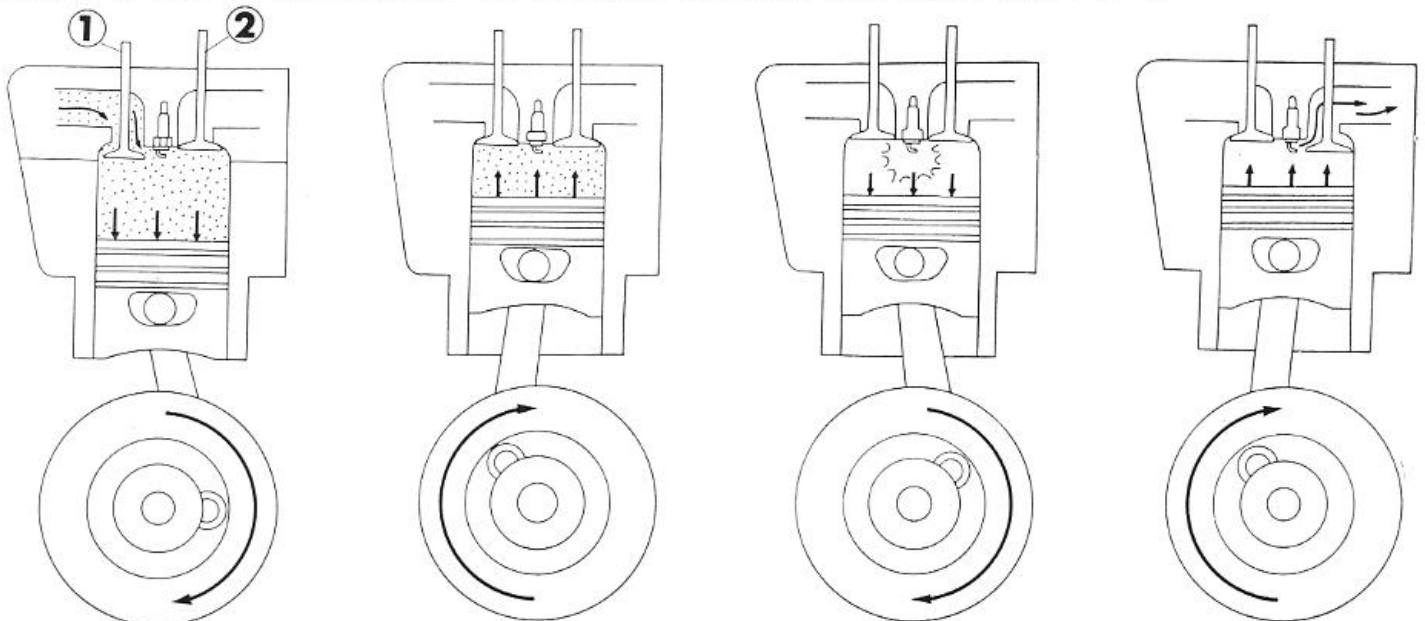


Fig.3-3 Intake stroke Fig. 3-4 Compression stroke Fig. 3-5 Combustion stroke Fig. 3-6 Exhaust stroke  
① Inlet valve ② Exhaust valve

## Operation of the Four-cycle Engine

The four-cycle engine requires two reciprocating sequence of the piston (two crankshaft revolutions) to complete the intake, compression, power and exhaust strokes.

### INTAKE (Intake of the fuel-air mixture)

#### Air Cleaner

If the air that is used to mix with the fuel is dirty, a great amount of dust and grit enters the carburetor to cause troubles and they eventually pass into the cylinder to cause rapid wear to the cylinder.

The air cleaner serves to clean the air entering the carburetor.

The air cleaner removes the dust from the air and permits only the clean air to enter the carburetor through the air cleaner connecting tube. (Fig. 3-7)

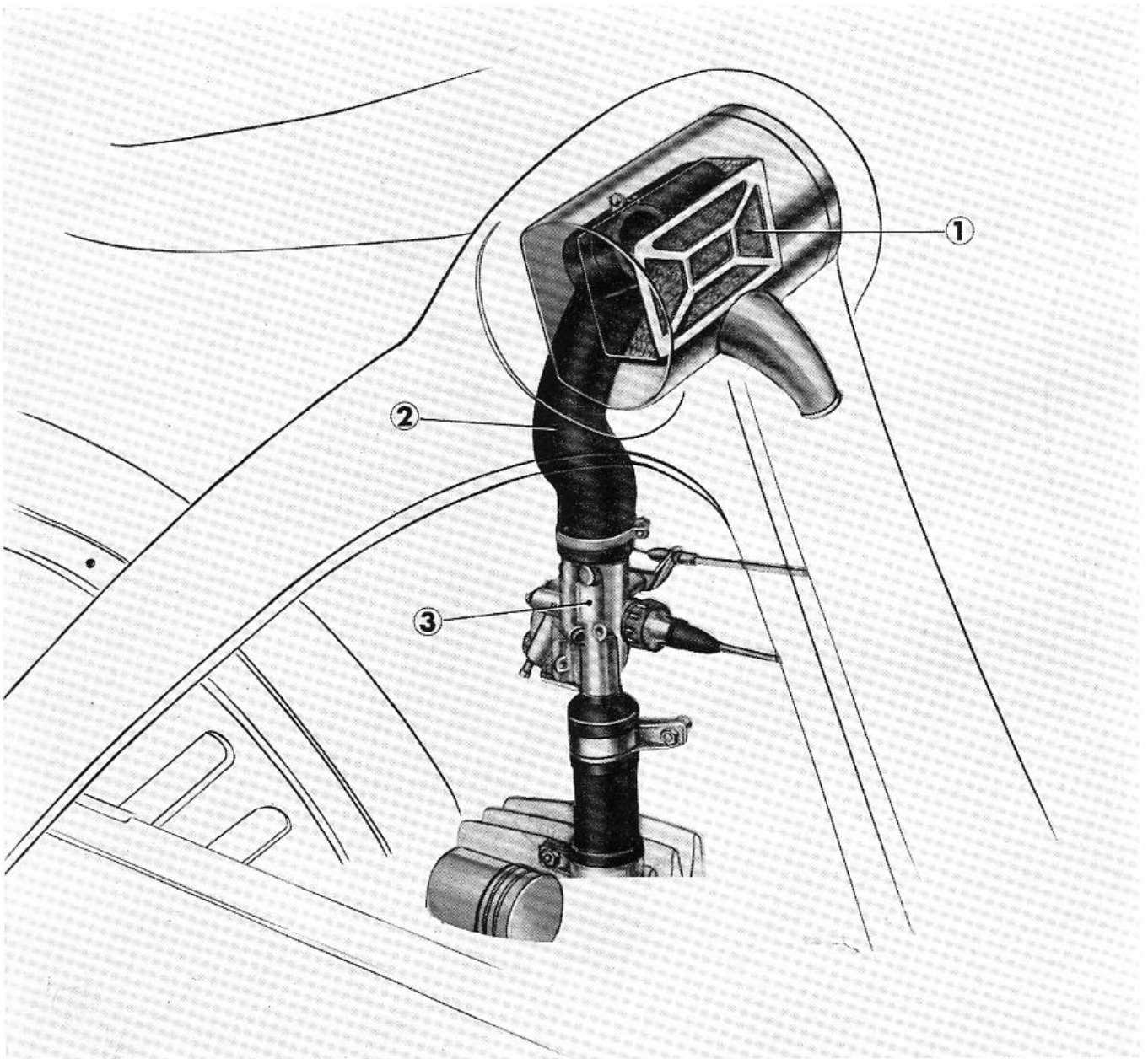


Fig. 3-7 Air cleaner construction ① Air cleaner element ② Connecting tube ③ Carburetor

## Fuel Tank

### Fuel Cock

The 2.5 ℓ (5.3 U.S. pt./4.4 Imp. pt.) capacity fuel tank also serves as a luggage carrier. A cock is installed on the fuel tank to control the flow of fuel from the fuel tank to the carburetor. Fuel is supplied to the carburetor by gravity feed.

The fuel filler opening is made into a tubular shape to prevent the fuel from surging out of the cap by vibration. (Fig. 3-8)

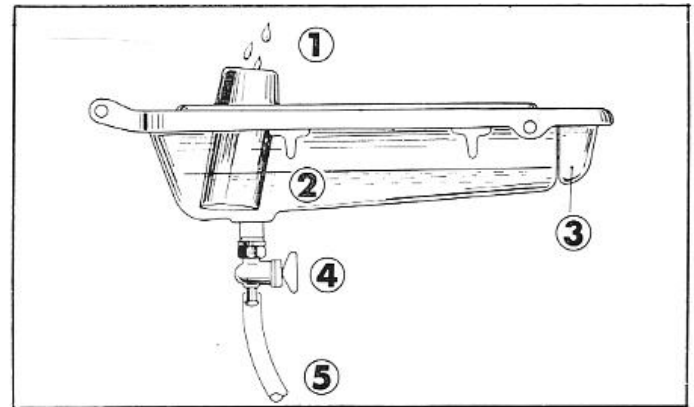


Fig. 3-8 Fuel tank

- ① Fuel filler opening ② Fuel  
③ Tool Kit ④ Fuel cock  
⑤ To carburetor

## Carburetor

The carburetor performs the function of mixing the fuel with air in the properly proportioned mixture to form a combustible fuel air vapor.

Shown in figure 3-9 is an atomizer sprayer for home use. Air blown through the pipe A increases in velocity as the air leaves the narrow outlet, causing a decrease in pressure. The decreased pressure draws the water out of the stand pipe B which becomes atomized as it is formed into a spray.

The carburetor performs the same function, it draws in the air and atomizes the gasoline.

The fuel which is delivered from the tank first enters the float chamber of the carburetor. Fuel in the float chamber is always maintained at a constant level by the action of the float which regulates the valve. If there were no means to maintain the fuel level constant, the fuel will overflow out of the float chamber or else there will be insufficient flow of fuel into the carburetor.

During the intake stroke of the engine, the inlet valve opens, piston moves downward creating, negative pressure in the cylinder. The air rushes in from the carburetor.

As air flows through the venturi, the velocity of the air increases as it moves through the narrow throat and causes a decrease in pressure, causing the gasoline to be drawn out of the nozzle as a spray and mixes with the passing air stream. The volume of air-fuel mixture that enters the cylinder is regulated by the amount of opening or closing of the throttle valve. (Fig. 3-10)

The choke valve is used to permit the carburetor to supply the engine with the rich mixture required for starting during cold weather. The choke button is located at the handle mounting. (Fig. 3-12)

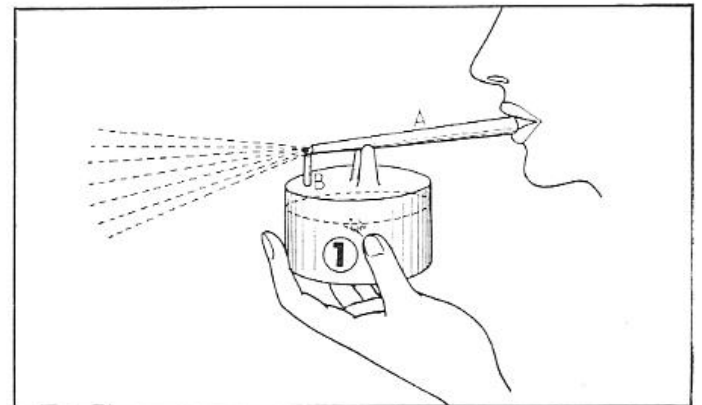


Fig. 3-9 Sprayer ① Water

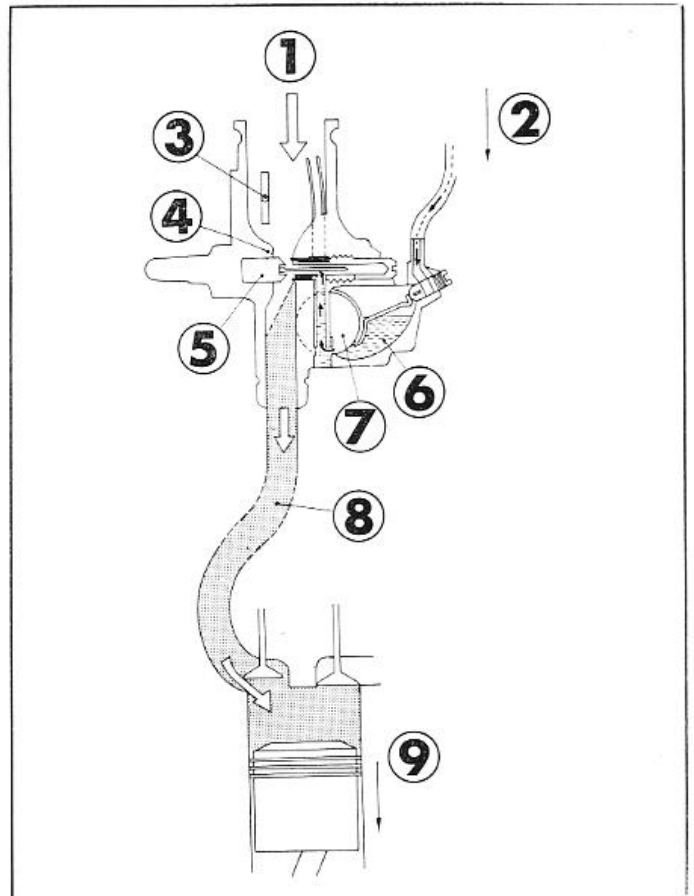


Fig. 3-10 Carburetor ① Air ② From fuel tank ③ Choke valve ④ Venturi ⑤ Throttle valve ⑥ Float chamber ⑦ Float ⑧ Fuel-air mixture ⑨ Intake stroke



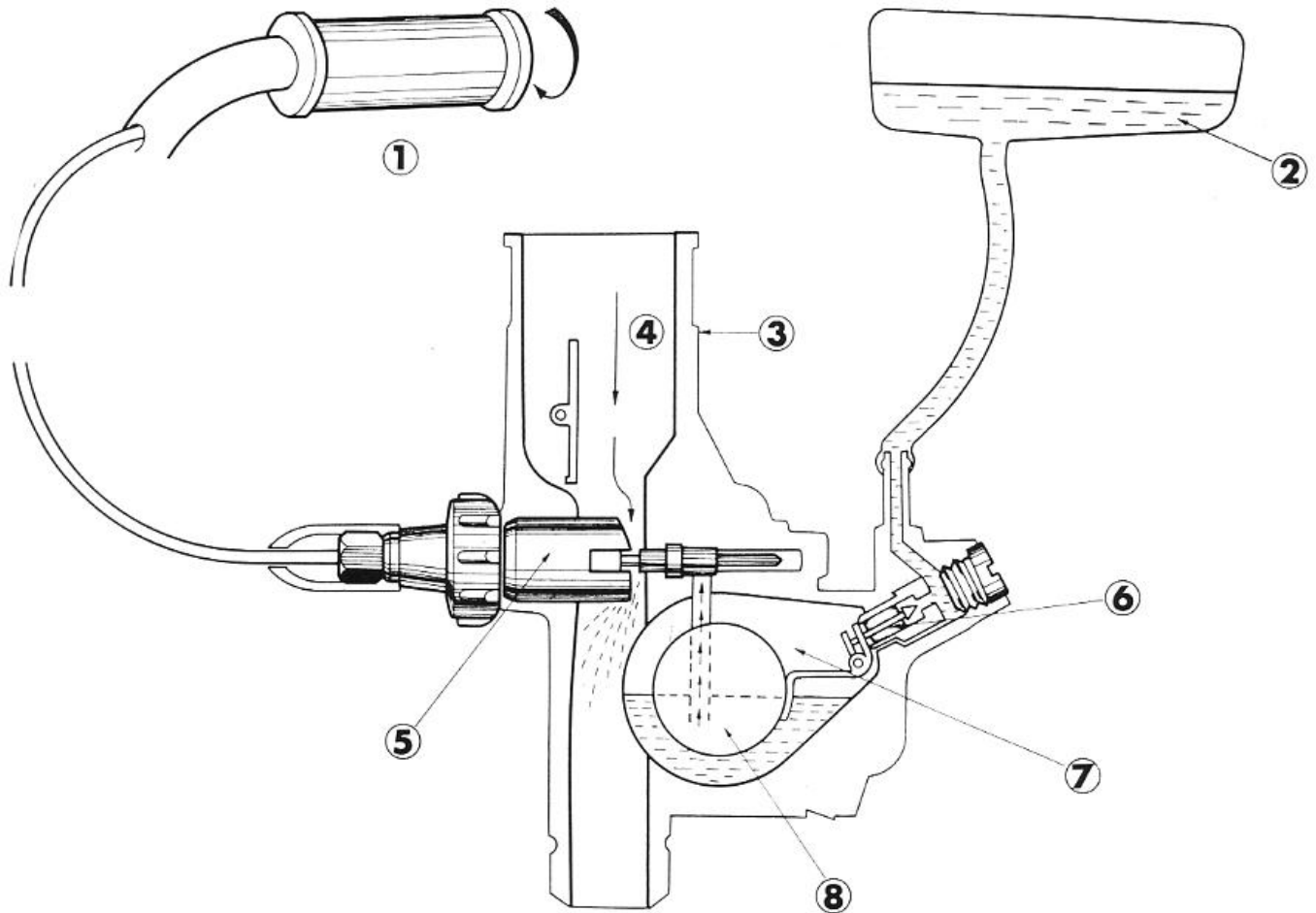


Fig. 3-11 Operation of throttle valve ① Throttle grip ② Fuel ③ Carburetor ④ Air  
⑤ Throttle valve ⑥ Float valve ⑦ Float chamber ⑧ Float

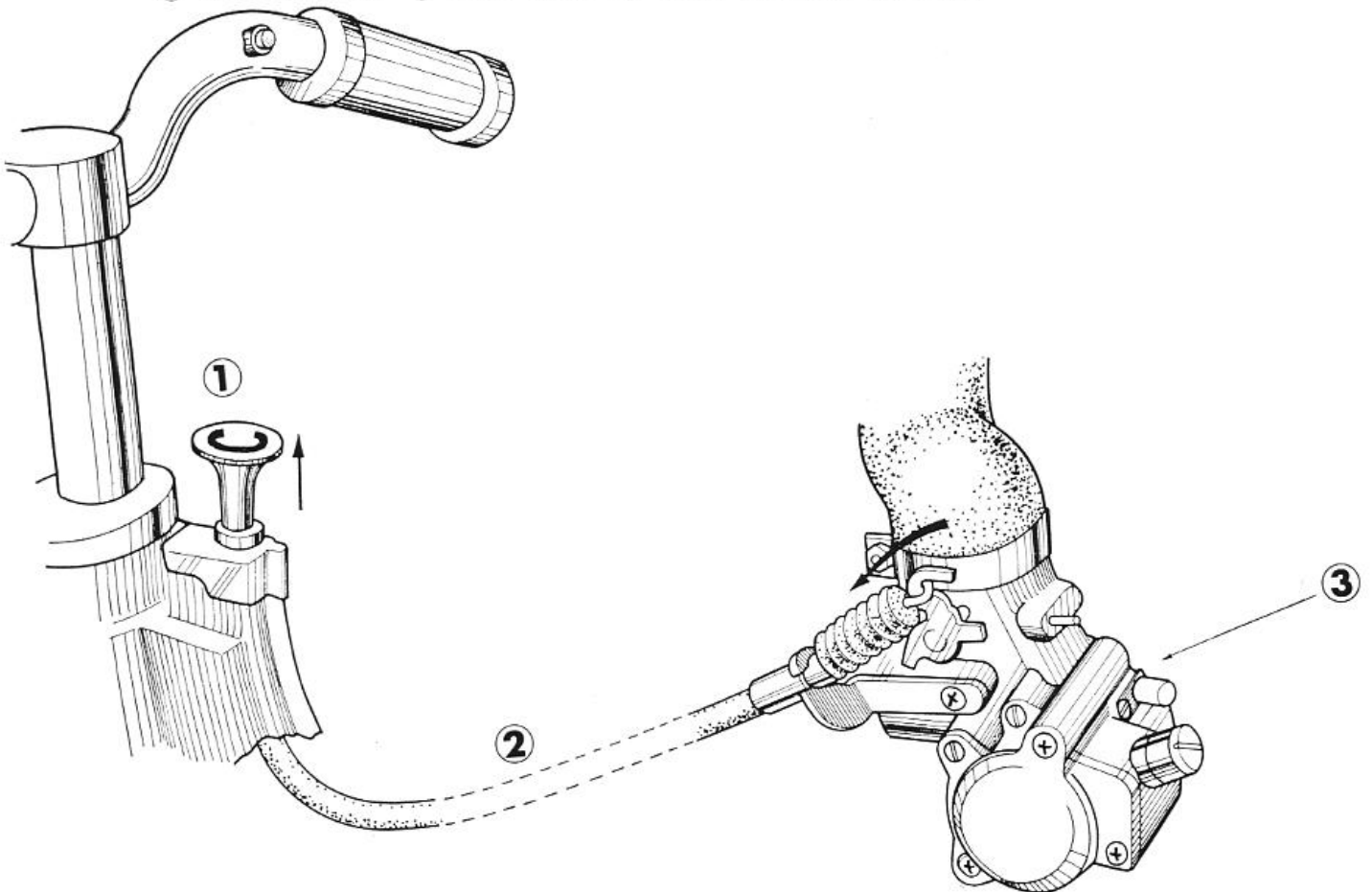


Fig. 3-12 Operation of choke valve ① Choke button ② Choke cable ③ Carburetor

### Throttle Valve

The throttle valve regulates the amount of air-fuel mixture to enter the cylinder. The opening or closing of the throttle valve is controlled by the throttle grip through the use of the throttle cable. Turning the throttle grip inward raises the throttle valve to increase the diameter of air passage in the carburetor as well as the opening of the needle jet so that the amount of fuel to be discharged is regulated, maintaining the air-fuel mixture ratio constant at all times. (Fig. 3-11, 13 and 14)

### Mixture Ratio

The amount of fuel mixed with the air is called "mixture ratio", a weight ratio. The typical ratio is a mixture of 1 pound of fuel to 15 pounds of air. This is normal for riding at a constant speed on a level road. Actually, the mixture ratio will vary with the engine operating conditions such as:

- The leanest combustible mixture ratio → 22 : 1
- The leanest operating mixture ratio → 18 : 1
- **The mixture ratio for complete combustion → 15 : 1**
- **The mixture ratio to obtain maximum power → 13 : 1**
- The richest operating mixture ratio → 8 : 1
- The richest combustible mixture ratio → 7.5 : 1

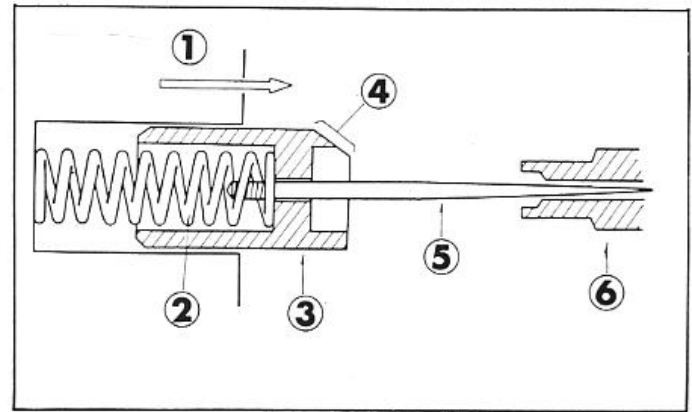


Fig. 3-13 Throttle valve

- ① Close ② Throttle valve spring
- ③ Throttle valve ④ Cutaway
- ⑤ Jet needle ⑥ Needle jet

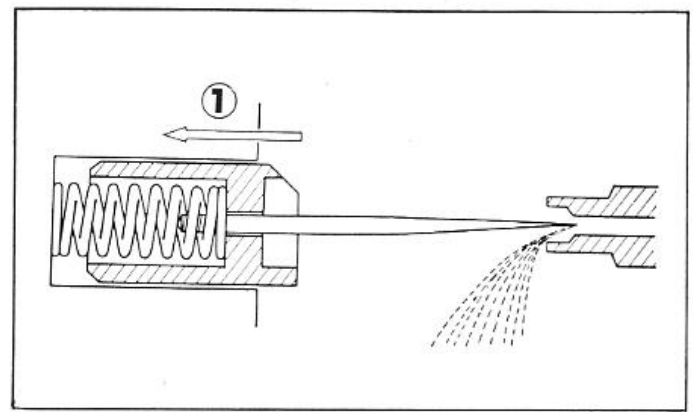


Fig. 3-14 Throttle valve ① Open

P-50 Carburetor Construction

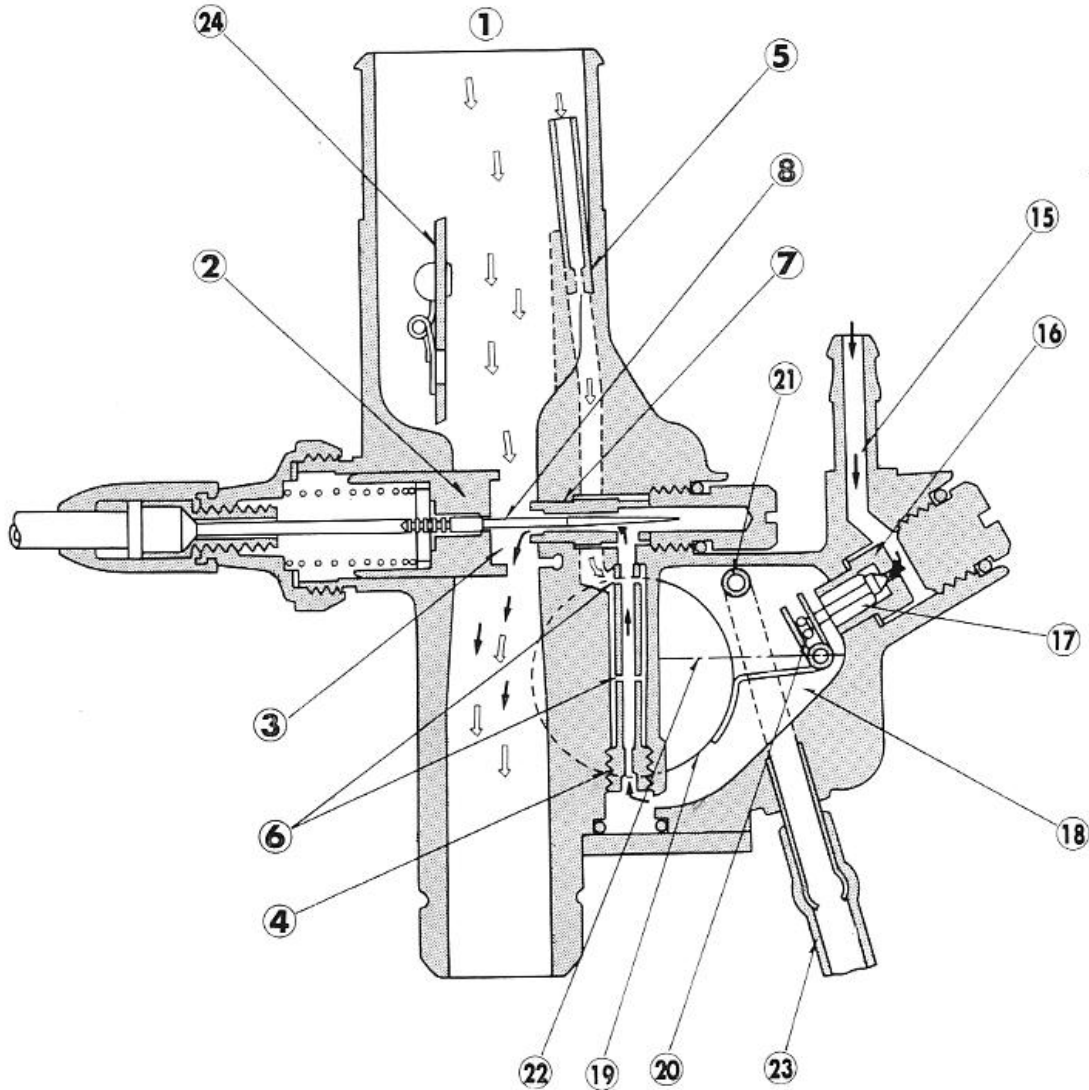


Fig. 3-15

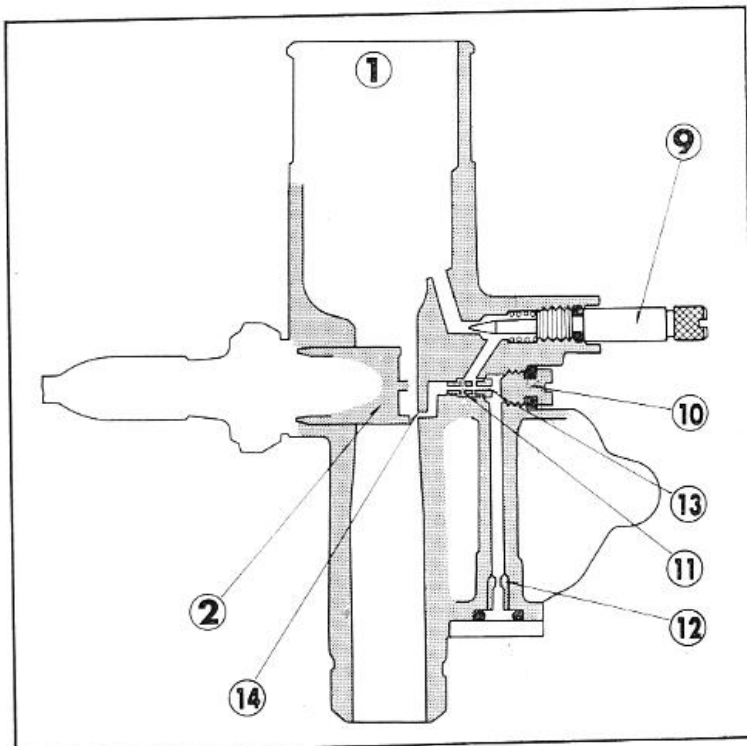


Fig. 3-16

1. Air System

The carburetor used is a down draft type which draws the air into the carburetor from the top.

As shown in the figure 15, the air from the air cleaner enters the inlet opening ①, passes by the throttle valve ② and is drawn into the engine after passing through the venturi ③.

The engine power output is determined by the volume of air flow which is controlled by the movement of the throttle valve ② to vary the opening of the venturi.

2. Fuel System

The air flow passing through the venturi ③ produces negative pressure at the restriction under the throttle valve ②, where the fuel nozzle is located. There are two systems, the main and the slow system, in the fuel system.

a. Main system

The fuel enters the main jet ④, and in the main jet, it mixes with the air from the air bleed

⑥ after the air have been metered by the air jet ⑤. The fuel and air mixture passes through the opening between the needle jet ⑦ and jet needle ⑧ to be discharged as a spray at the throttle valve ②. The fuel spray mixes with the main incoming air and becomes atomized before being taken into the engine.

#### b. Slow system

The air which enters from the inlet opening ① passes around the outside of the air screw ⑨ where it is metered and then enters the bleed hole ⑪ of the slow jet ⑩. On the other hand, the fuel from the float chamber after being metered by the pilot ⑫ and metered again at the jet area ⑬ of the slow jet ⑩, mixes with the air from the bleed hole ⑪ within the slow jet and is discharged at the bottom of the throttle valve ② from the pilot outlet ⑭, to mix with the main flow of air from the carburetor air inlet ① and is taken into the engine.

### 3. Float Chamber

It is necessary for the carburetor to supply the proper fuel mixture to the engine under all different throttle opening and engine speed; in order to do this, the fuel level must be maintained at a constant level. It is the function of the float chamber to perform this task.

The fuel from the tank flows through the passage ⑮, passes between the valve seat ⑯ and the float valve ⑰, and then enters the float chamber ⑱. As the fuel level in the float chamber rises, the float ⑲ becomes buoyant, float arm ⑳ applies pressure against the float valve forcing it against the valve seat to shut off the flow of the fuel. When the fuel in the float chamber is consumed, the fuel level drops with the consequent lowering of the float, this causes the float valve to unseat and permits the fuel to enter the float chamber. This cycle is repeated to maintain a constant fuel level ㉒ in the float chamber.

### 4. Overflow Pipe

When dirt becomes clogged in the float valve, fuel overflows from the needle jet and the slow jet, overflowing into the cylinder to dilute the lubricating oil. Therefore, to prevent a condition where the fuel rises above a certain level, an overflow pipe ㉓ is inserted in the float chamber to drain any excess fuel. The location of the overflow pipe is such that only the fuel rising above the overflow opening is drained out.

### 5. Choke

During cold weather starting, it may be necessary to initially use a rich fuel mixture. For this purpose, a choke valve ㉔ is incorporated.

When the choke button is pulled the choke valve is closed, however, there is a relief valve ㉕ installed on the choke valve and is kept closed by a relief spring ㉖. When the throttle valve ② is opened approximately 1/4, and the engine pedalled, the cylinder suction pressure causes the relief valve to open and permitting the air to enter the carburetor. As this air passes the throttle valve, a negative pressure is created which draws the fuel out of the pilot outlet ⑭ and the needle jet ⑦; mixing with the air to form a rich fuel air mixture ideal for starting. This mixture is taken into the cylinder for combustion.

After the engine has started, the suction pressure of the intake air increases, resulting in a corresponding wider opening of the relief valve to maintain the same rich fuel air mixture.

The opening of the relief valve ㉕ changes according to the opening of throttle valve ②.

The choke valve ㉔ can be kept completely closed during warm-up driving and fully opened after warm-up. (Fig. 3-17)

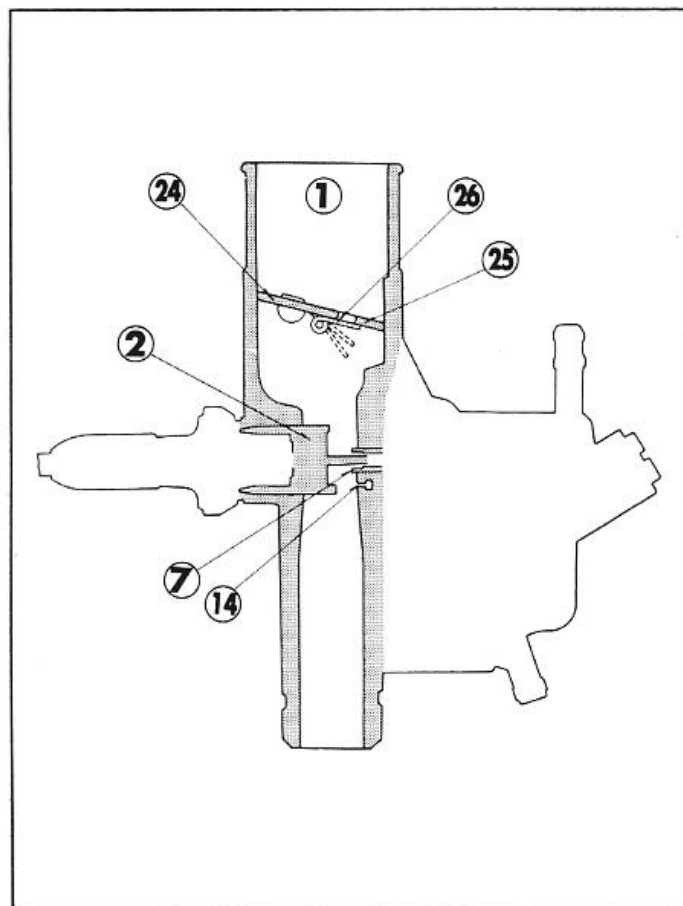


Fig. 3-17

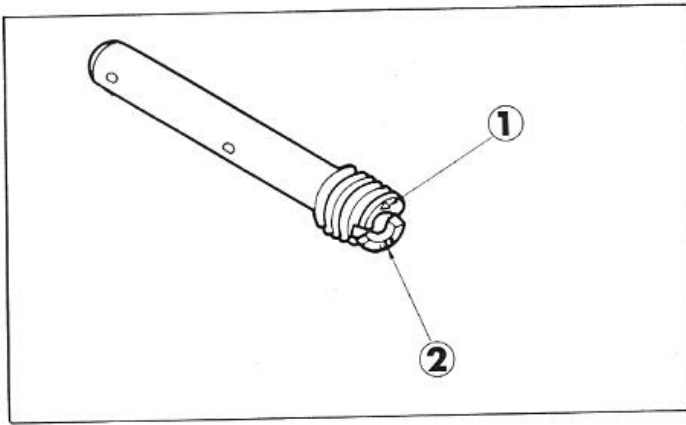


Fig. 3-18 Main jet

- ① Genuine parts mark
- ② Main jet NO.

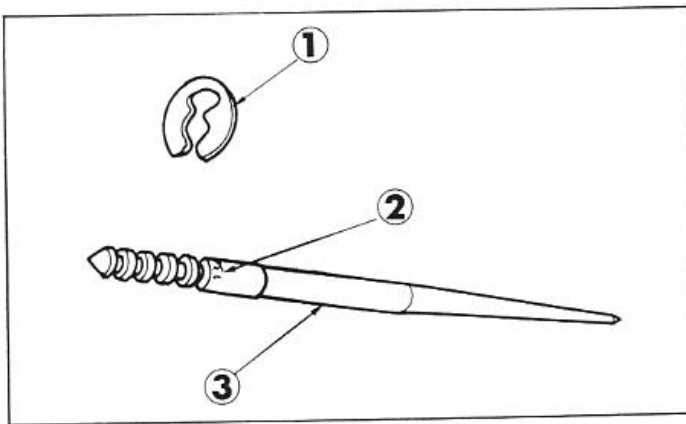


Fig. 3-19 Jet needle

- ① Needle clip
- ② Type mark and genuine parts mark
- ③ Jet needle

## Operation of P-50 Carburetor Component Parts

### 1. Main Jet

It meters the fuel flow during full throttle condition (top speed) to provide a proper fuel mixture. Not only does it function at top speed but it also is effective to a certain degree at intermediate speed. The larger the main jet size number, greater will be the nozzle opening and consequently the fuel flow, providing a richer fuel mixture. (Fig. 3-18)

### 2. Air Jet

During full throttle opening, the fuel mixture at high engine speed will become rich, and at slow speed the mixture becomes lean. To prevent such a condition, air is bled into the main jet to maintain a uniform mixture. The function of the air jet is to control the amount of the bleed air.

As the air jet becomes larger, the amount of bleed air is increased, resulting in a lean fuel mixture, however, at a set throttle opening, a high engine speed will produce a leaner mixture. There is only a small variation in fuel consumption between high and low engine speed.

### 3. Needle Jet

During full or half throttle opening, the fuel which had been metered by the main jet is again metered by the needle jet. The adjustment is performed in conjunction with the jet needle which is explained in the following section. The needle jet opening is made exceptionally accurate for precise control.

### 4. Jet Needle

The jet needle, in conjunction with the needle jet described earlier, regulates the fuel mixture at the intermediate throttle opening (principally between 1/4 to 3/4 throttle opening). The long tapered jet needle is located within the center hole of the throttle valve with the tapered end inserted into the needle jet. The vertical movement of the throttle valve to which the jet needle is attached controls the flow of the fuel in respect to the throttle opening to afford a correct fuel mixture ratio.

There are five clip grooves (which are counted from the top) on the head of the jet needle to regulate the richness of the fuel mixture.

The fuel mixture becomes richer as the clip is moved progressively from the No. 1 groove to the No. 5 groove. (Fig. 3-19)

### 5. Throttle Valve

The function of the throttle valve is to control the amount of air taken into the engine; this determines the engine speed, the power output, and in addition, performs the important function of controlling the fuel air mixture.

The throttle valve has a cut-away on the air inlet side.

Changing the size of the cut-away (designated by cut-away No.), the pressure actuating the needle valve can be altered to change the amount of fuel flow and causes a change to the fuel mixture. The valve with a larger cut-away number will produce a leaner fuel mixture. However, the range of its effectiveness is mainly at low speed, from idling speed to approximately 1/4 throttle opening and has no effect above 1/2 throttle opening.

A throttle stop screw sets the throttle valve in the idle position. Screwing in on the stop screw will cause the throttle valve to rise, and backing off will lower the throttle valve.

**6. Slow Jet**

The slow jet regulates the fuel flow during idling and small throttle opening, and permits the air to enter through the air bleed to mix with the fuel for atomization. The slow jet is similar to the main jet in that the larger the jet size number, the greater will be the fuel flow and consequently a richer fuel air mixture. (Fig. 3-20)

**7. Air Screw**

The air screw regulates the amount of air mixing with the fuel in the slow speed system by controlling the amount of pilot air bleeding with the fuel entering through the slow jet. In this way, the proper fuel air mixture is maintained. Screwing in the air screw will produce a rich fuel-air mixture by restricting the air bleed hole and backing off on the screw will result in a lean mixture.

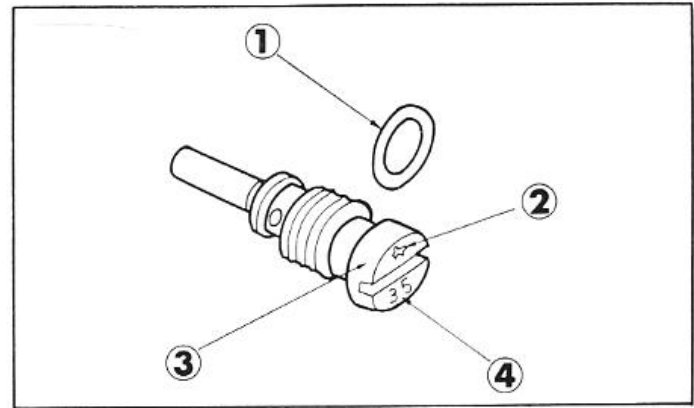
**COMPRESSION (Compress the fuel air mixture in the cylinder)**

**Piston**

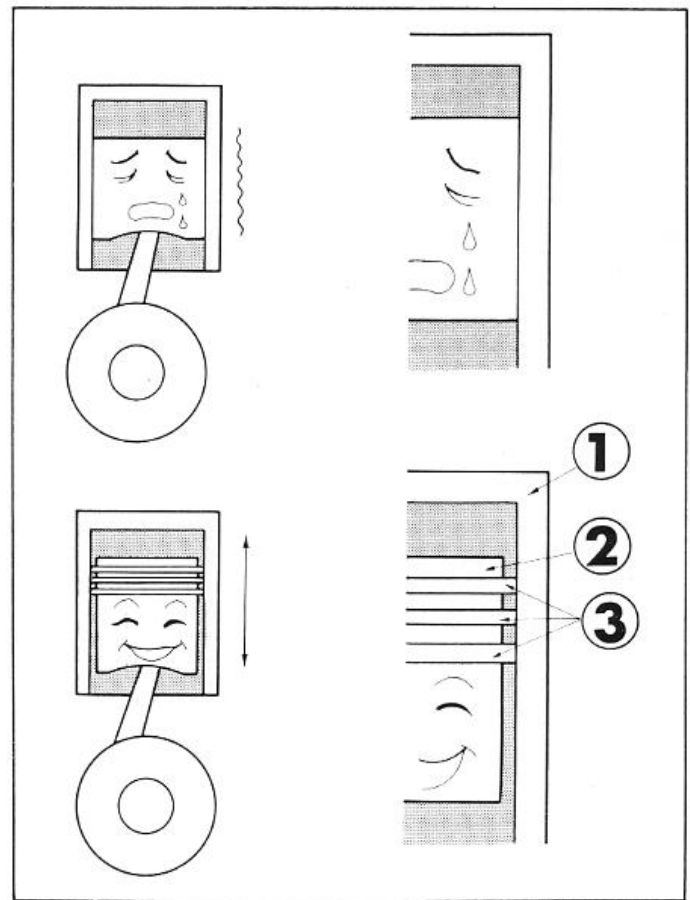
The piston plays an important role by performing the intake, compression, power and exhaust functions. It is alternately cooled by the intake fuel-air mixture or exposed to the hot gases resulting from the combustion. If the piston is closely fitted against the cylinder wall without clearance as shown in the fig. 3-21, it would not operate smoothly and may result in seizure.

On the other hand, excessive clearance between the piston and cylinder wall will result in insufficient intake of fuel-air mixture, causing low compression, oil pumping (oil enters the combustion chamber), etc., and consequence poor engine performance. Therefore, a good seal must be maintained between the piston and cylinder wall. For this purpose, piston rings are installed to provide the necessary seal.

The piston is made of aluminum die casting equivalent to SAE 8630. This material is light and has good heat conducting property so that the heat from the combustion can be dissipate rapidly. Furthermore, this material has a small coefficient of expansion, thus minimizing the expansion of the piston at elevated temperature and permits a small piston to cylinder clearance design.



**Fig. 3-20 Slow jet** ① O ring ② Genuine parts mark ③ Slow jet ④ Slow jet NO.



**Fig. 3-21 Piston** ① Cylinder ② Piston ③ Piston rings

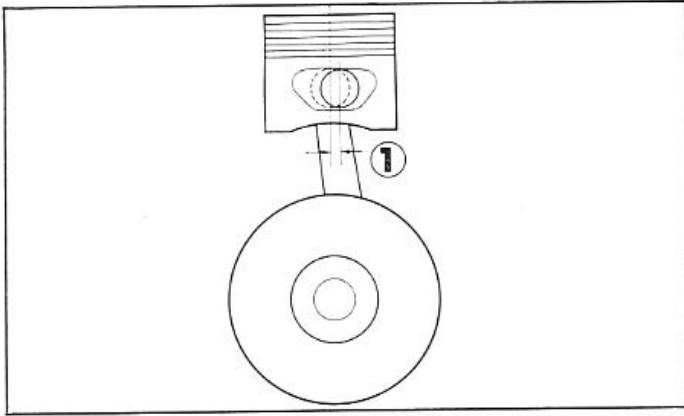


Fig. 3-22 ① Offset

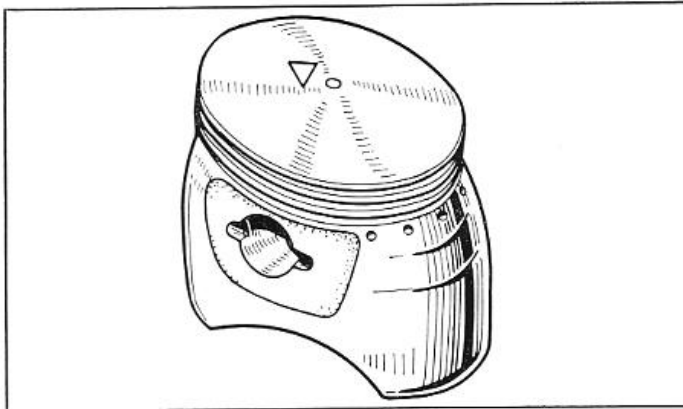


Fig. 3-23 Piston configuration

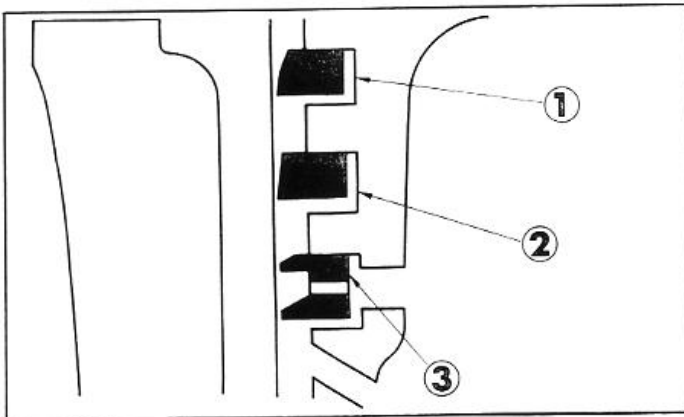


Fig. 3-24 Piston ring ① Top ring  
② Second ring ③ Oil ring

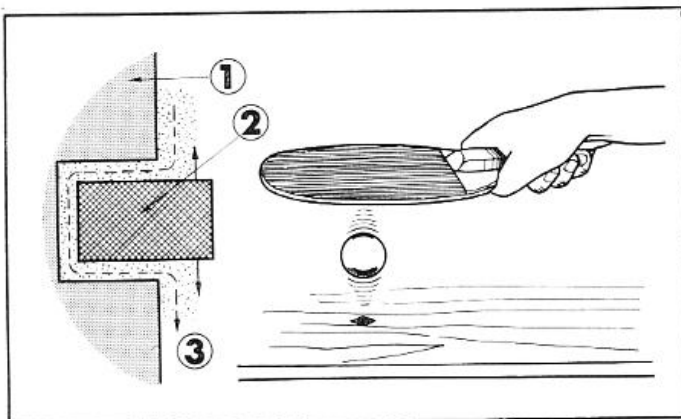


Fig. 3-25 ① Piston ② Piston ring ③ Blow-by

### Piston Offset

As shown in the figure 3-22, the piston pin is offset slightly from the piston centerline. This is to reduce the side load against the cylinder wall and by so doing prevent piston slap. (Fig. 3-22)

### Piston Shape

The shape of the piston is an elliptical taper. This is because the head of the piston, compared to the skirt, is exposed to much higher temperature and since the expansion is greater, it is tapered smaller toward the top. The tapering of the piston also tends to lessen the piston slap when the throttle is lightly snapped at light engine loading at low speed. (Fig. 3-23)

### Piston Rings

Usually three piston rings are installed on the piston. Starting with the top, they are called the top ring, second ring and oil ring.

#### The top and second rings:

Serve as a seal for the combustion chamber and also to transmit the high temperature of the piston to the cylinder wall where it is dissipated through the cylinder cooling fins.

#### The oil ring:

Serves to scrape off excessive amount of oil from the cylinder wall and to prevent oil from entering the combustion chamber.

To prevent flutter, the rings are made narrower in width and increased in thickness so that the inertia is decreased while the ring pressure against the cylinder wall is increased. Further the top and the second rings are made at a slight taper where it contact the cylinder wall so that the time required for swear-in is lessened.

The groove in the oil ring as well as the bevel of the second ring serves to assist oil scraping and prevents oil from penetrating into the combustion chamber.

Thus, carbon deposit on the plug, piston rings, etc. is prevented and the oil consumption kept to a minimum. (Fig. 3-24)

#### Piston Ring Flutter

At low speed, the piston ring is forced against the upper side of the ring groove only during the intake stroke. At high speed, however, the inertia of the ring

overcomes the gas pressure and friction, and floats to the top of the groove immediately before the top-dead-center in the compression stroke. At this moment, combustion occurs and the ring is forced against the bottom side of the ring groove by the combustion pressure. This up and down movement during exhaust-intake-compression becomes more and more intense coupled with the increasing inertial force. As this sequence is repeated, ultimately, the ring vibrates violently within the ring groove like a pingpong ball between the racket and the table as shown in the figure 25 and thus allow the gas to "blow-by". (Fig. 3-25, 26)

**Cylinder**

The piston cannot operate without the cylinder.

The cylinder wall is exposed to high temperature and pressure together with the wearing action of the reciprocating piston moving at high speed to produce a great wearing effect. Therefore, adequate attention must be given to the material and construction of the cylinder as well as the piston. The cylinder has many cooling fins on the outside so as to increase the heat dissipating area and prevent the cylinder and piston from overheating.

**COMBUSTION**

(Ignition of the compressed air-fuel mixture by the spark plug to cause combustion)

When the piston reaches the top-dead-center at the end of the compression stroke, the compressed air-fuel mixture must be ignited.

**Ignition System**

**Magneto system**

- a. Flywheel magneto (rotating permanent magnet)
- b. Box magneto

P-50 incorporates a flywheel magneto (flyweel AC generator).

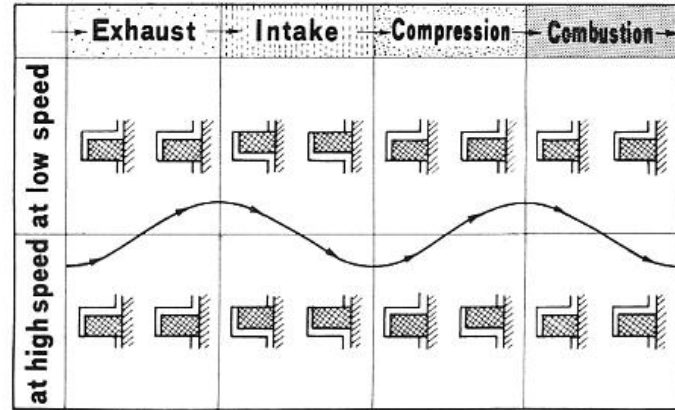


Fig. 3-26

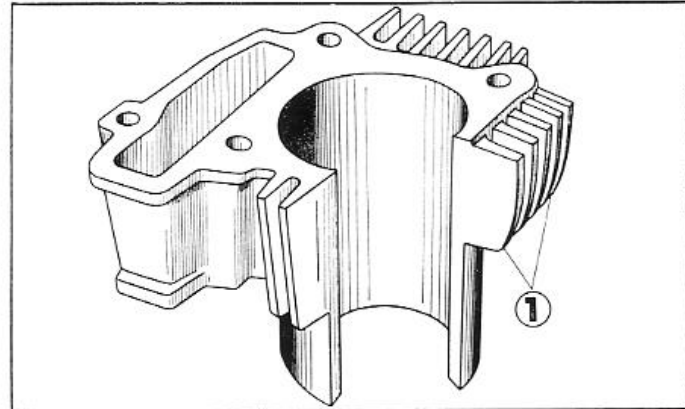


Fig. 3-27 Cylinder ① Cooling fins

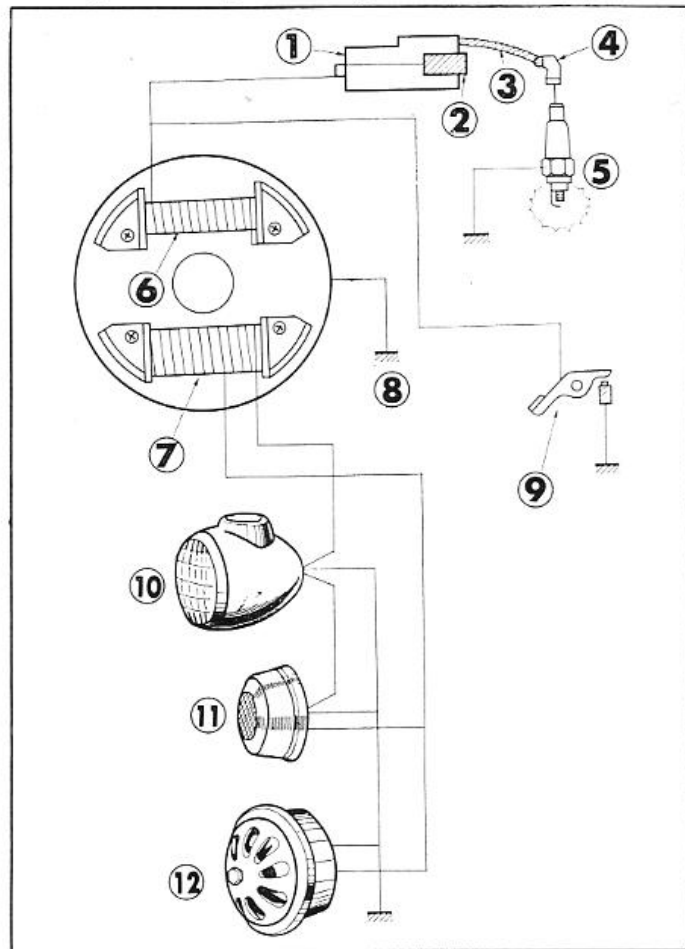


Fig. 3-28 Flywheel A. C generator ① Ignition coil ② Condenser ③ Hightension cord ④ Spark plug cap ⑤ Spark plug ⑥ Primary coil ⑦ Lighting coil ⑧ Ground ⑨ Contact breaker ⑩ Head light ⑪ Tail/stop light ⑫ Horn



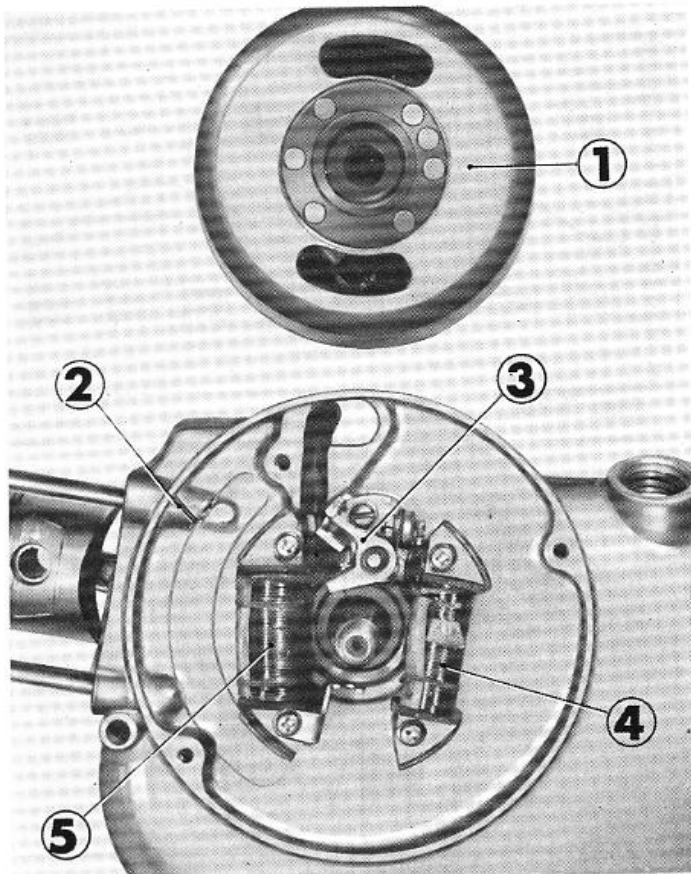


Fig. 3-29 Flywheel A.C. generator  
 ① Flywheel ② Groove ③ Contact breaker  
 ④ Primary coil ⑤ Lighting coil

### Flywheel AC Generator

By rotating the flywheel (permanent magnet), electrical current is generated at the stationary primary coil. The primary current of this voltage is interrupted by the contact breaker to produce a high tension voltage from the ignition coil.

This high-tension voltage is transmitted by the high tension cord to produce a spark at the spark plug which ignites the air fuel mixture. The flywheel magneto in addition to the primary ignition coil incorporates the lamp coil for lighting use to operate lamps, horn, etc.

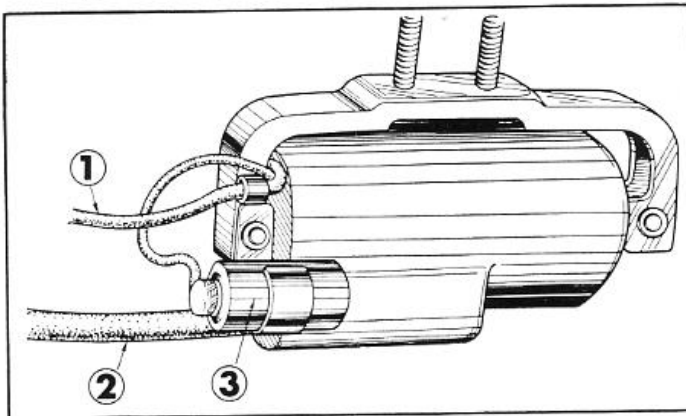


Fig. 3-30 Ignition coil ① Primary wire  
 ② High tension cord ③ Condenser

### Ignition Coil

The ignition coil is composed of a primary coil having approximately 300 turns of 0.44 mm (0.017 in) diameter enamel or polyester coated copper wire and a secondary coil having 20,000 turns of 0.06~0.07 mm (0.0024~0.0028 in) diameter enamel or polyester coated copper wire wound around an iron core.

Essentially, it is a transformer to change the 6~12 V primary voltage to 10,000~15,000 V secondary voltage. The change in the magnetic flux due to the sudden opening and closing of the contact breaker points is utilized to generate high voltage.

The ignition coil is located in the frame where it is not restricted as in case of being installed in the flywheel and where it is not directly affected by the heat of the engine. Further it is accorded adequate cooling.

The ignition coil is made durable and of heat resistant material. This greatly assists in prolonging the service life of the breaker points. (Fig. 3-30)

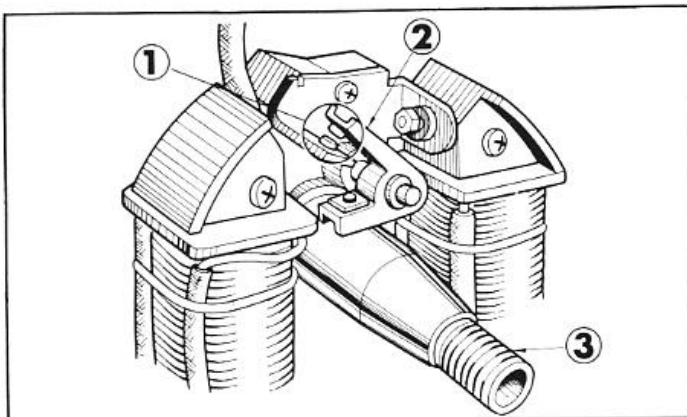


Fig. 3-31 Contact breaker point ① Breaker point  
 ② Breaker arm ③ Crankshaft

### Breaker Points

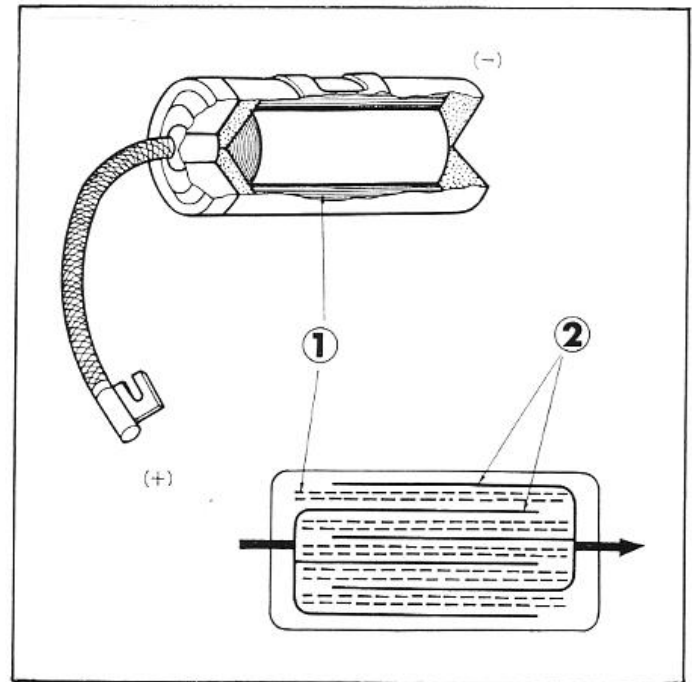
The breaker points interrupt the primary circuit of the ignition coil. Points are kept closed by force of the spring and opened by the breaker point cam incorporated in the hub of the flywheel to interrupt the primary circuit.

At this moment, induction occurs at the primary coil and the high voltage is induced in the secondary coil in proportion to the number of windings in the coils.

## Condenser

In a household electrical circuit, if the circuit breaker is opened, sparks will be noticed across the points. Similarly, when the breaker points are opened, sparks are produced in most cases. This prevents the sudden collapse of the primary circuit and thereby reduces the high voltage required for the secondary coil and further causes sparking across the point which eventually results in burning or pitting of the breaker points. The condenser is installed in parallel across the breaker points to prevent this undesirable condition.

Condenser can be considered as a device to store electricity. It is made from sheets of mica or paraffin paper and tin foil in alternate layer. (Fig. 3-32)



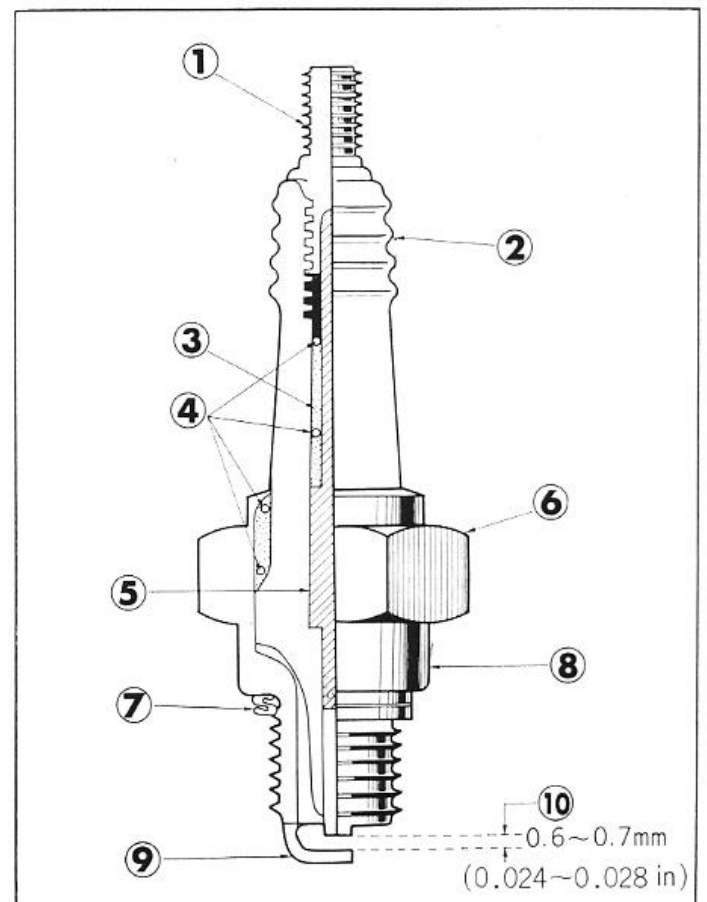
**Fig. 3-32 Construction of condenser**  
① Mica ② Tin foil

## Spark Plug

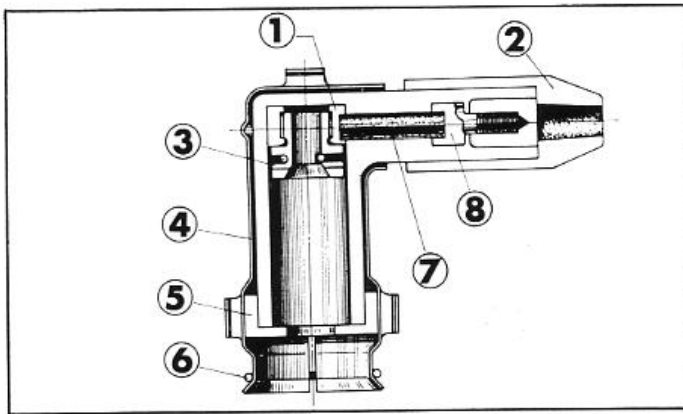
The spark plug plays the role of igniting the compressed air-fuel mixture within the cylinder. The spark plug is securely screwed into the cylinder head with a gasket installed. It is exposed to high voltage, high compression and high temperature; hence, high strength, heat resistance and reliability are essential.

At the end of the plug are located the center electrode and the grounded side electrode with clearance of 0.6~0.7 mm (0.024~0.028 in) between the electrodes.

If the spark plug clearance or gap is too wide, resistance to the high voltage to bridge the gap is increased and prevents the spark from being produced; if the plug gap is too narrow, a short is likely to occur due to carbon deposits, and in which case, a misfire will result. Therefore, the plug gap should be maintained at the specified clearance and the electrode surfaces always be kept clean. The high voltage produced by the ignition coil is received by the spark plug and causes a hot spark to jump across from the center electrode to the side electrode and ignites the combustible mixture within the engine combustion chamber.



**Fig. 3-33 Construction of spark plug**  
① Terminal ② Insulator ③ Filler powder  
④ Wire packing ⑤ Center electrode  
⑥ Wrenching surface (hex) ⑦ Gasket  
⑧ Main body ⑨ Electrode ⑩ Spark gap



**Fig. 3-34 Sectional view of noise suppressor**  
 ① High tension terminal bushing ② Terminal water proof cap ③ High tension terminal cap ④ Shield case ⑤ High tension terminal seal ⑥ Earth band ⑦ Carbon resistor

**Noise Suppressor**

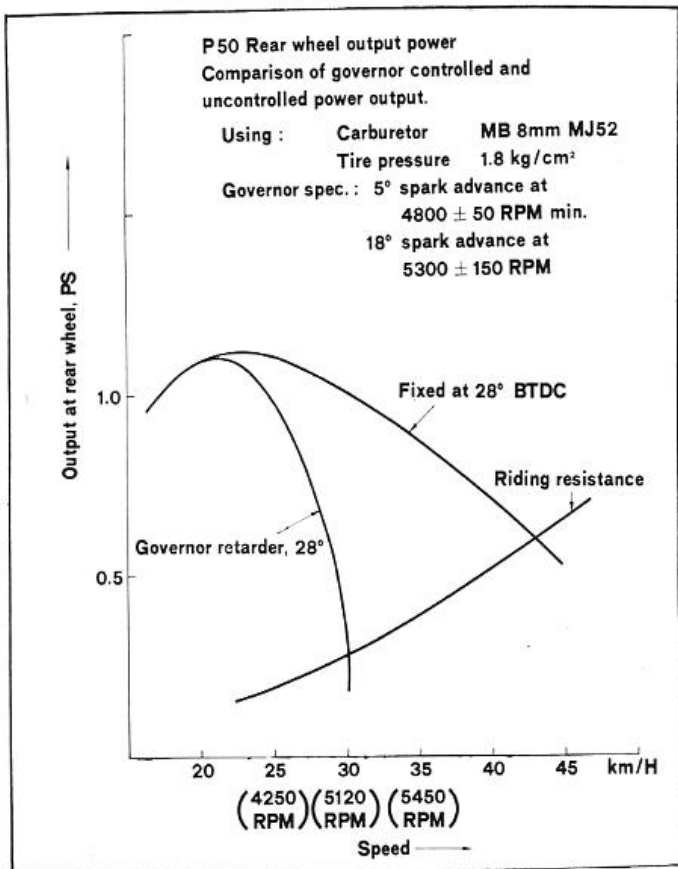
Oscillating current which includes high frequency wave generated in the high tension ignition circuit radiates from the high voltage circuit and the frame body and causes interference (by causing noise, distortion to image) to the television set, radio, etc. To prevent this, a noise suppressor, is installed. It incorporates a carbon resistor, as shown in figure 34, within a sealed case. The carbon resistor functions as an attenuation resistor and the sealed case serves to help prevent high frequency radiation in conjunction with the carbon resistor. (Fig. 3-34)

**Automatic Spark Advancer**

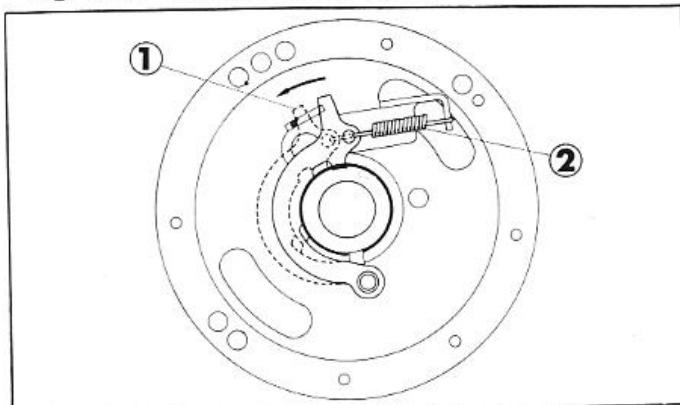
To obtain the most effective use of the combustion pressure, the timing of the ignition must be advance as the engine speed increases. Considerable time will lapse before the combustible fuel mixture is completely burned after being ignited and the maximum combustion power is produced. The movement of the piston is very rapid and if the ignition should take place when the piston is a top-dead-center, the combustion will take place after the piston has started its downward movement and the maximum utilization of the combustion pressure cannot be realized. Therefore, the breaker points should open to produce the spark ignition just prior to the piston reaching top-dead-center, and as the engine speed increases, the ignition must take place that much earlier.

Normally, centrifugal force is used and the amount of ignition advance is automatically controlled by the engine speed. This type advancer is known as the automatic centrifugal spark advancer.

From the standpoint of safety, this automatic spark advancer is employed as a speed governor in the P50. Up to the engine speed of 4500 RPM., the ignition will advance to 28° before top-dead-center, however, as the speed increases beyond this point, the governor will start retarding the amount of spark advance until at 5200 RPM, the ignition will take place at 10° before top-dead-center and this will hold the speed of the motorcycle to maximum of 30 km/h. The P 50 is, in this way controlled to operate at the speed of maximum economy and performance which is 4500RPM (25 km/h), (Fig. 3-35, 36)



**Fig. 3-35 Performance curve**



**Fig. 3-36 Governor operation ① Governor operating ② Spring (For Holland export)**

### Crankshaft

The crankshaft, in conjunction with the connecting rod, converts the reciprocating motion of the piston to the rotary motion.

The crankshaft consists of three major parts, the right crankshaft, left crankshaft and crank pin; which are assembled into an integral unit by press fitting. It is supported at the both ends with 6202 ball bearings.

The right and left crankshafts, are proportionally balanced to reduce vibration and they also serve as a flywheel. (Fig. 3-37)

The crankshaft balance affects the riding comfort, therefore, this balance has been designed to 60%.

#### (Crankshaft Balance)

The balance "A" (%) is computed by the following equation:

$$A = \frac{m}{M} \times 100$$

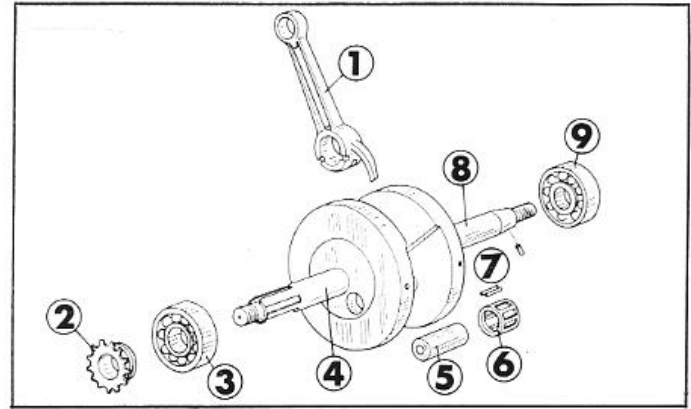
m: Gyrating mass (unbalance value)  
M: Reciprocating mass

Gyrating mass (m) is obtained by subtracting the gyrating mass of the crankpin and the connecting rod from the total weight of the counterweight. Reciprocating mass (M) includes the reciprocating mass of the piston, piston pin, and connecting rod. It determines the balance in the X-X direction and Y-Y direction as shown in the figure 38.

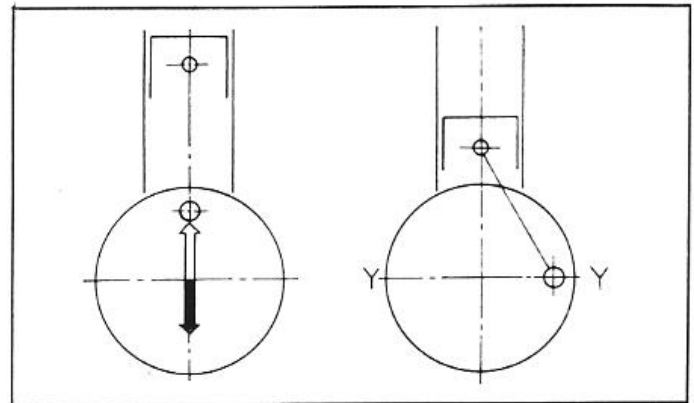
First of all, consider the case in which the rotating unit is in perfect balance (m=0). The inertia in the direction of X-X produced by the reciprocating motion of M acts intermittently, and sets up vibration within the engine. This is referred to as "0% balance". (Fig. 3-38)

Next, 30% of the weight of M is placed on the opposite side of the crank pin, the inertia in the X-X direction is reduced to  $0.7 \times M$ . However, the rotating section becomes unbalanced ( $m=0.3 \times M$ ), and vibration is set up in Y-Y direction due to the centrifugal force. This is called "30% balance". To be more specific, the amount of vibration reduced in the X-X direction will be transferred to the Y-Y direction with the total always being equal regardless of the ratio of distribution. (Fig. 3-39)

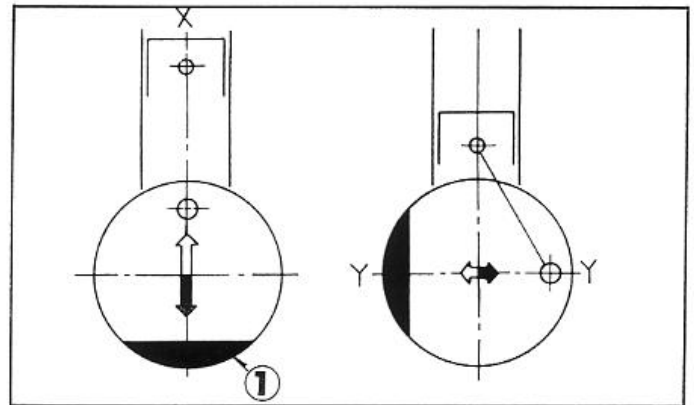
Further, if the counter weight is made equal to the M, all vibration in the X-X direction is transferred to the Y-Y direction. This is called "100% balance". (Fig. 3-40)



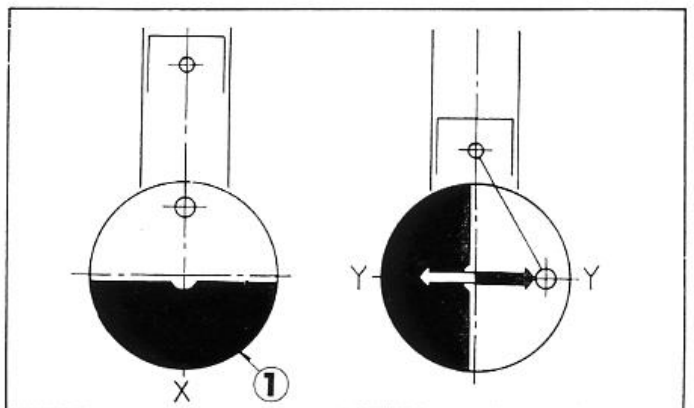
**Fig. 3-37 Crankshaft** ① Connecting rod  
② Timing sprocket ③ 6203 ball bearing  
④ R. crankshaft ⑤ Crankpin  
⑥ Roller retainer ⑦ 2×8 roller  
⑧ L. Crankshaft ⑨ 6202 ball bearing



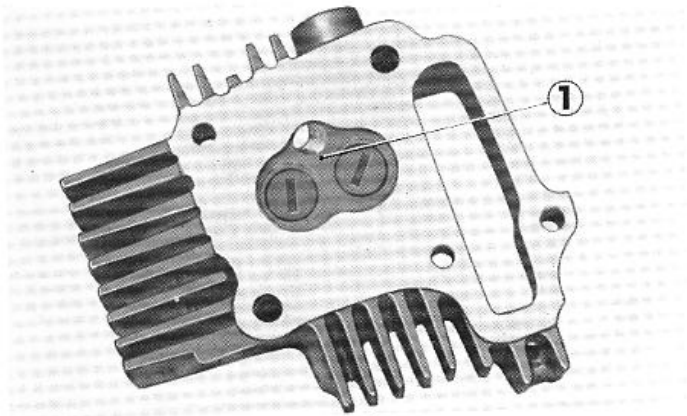
**Fig. 3-38 0% balance**



**Fig. 3-39 30% balance, ① 30% of M**



**Fig. 3-40 100% balance, ② 100% of M**



**Fig. 3-41 Cylinder head**  
 ① Combustion chamber

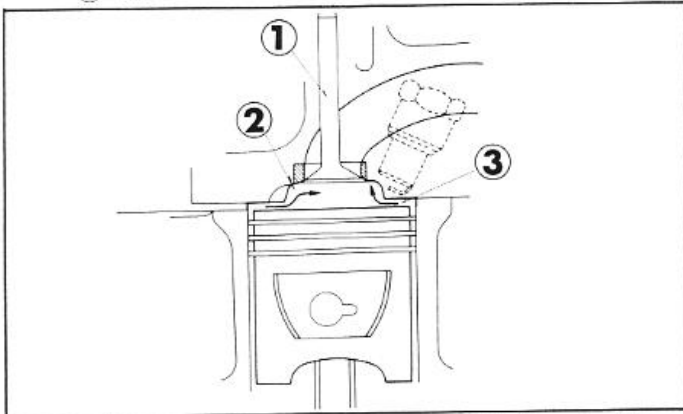
**Combustion Chamber**

The combustion chamber of P-50 is heart shaped, this allows the cylinder head to be made more compact in comparison with the spherical combustion chamber, and is possible to obtain a higher compression ratio.

In addition, its constructed affords better cooling as well as combustion efficiency. (Fig. 3-41)

**Squish area**

This is an area provided between the piston and the cylinder head to further compress part of the fuel air mixture at the end of the combustion stroke to create a turbulence within the main fuel mixture. As the swirling fuel mixture is diverted toward the spark plug the flame propagation is accelerated, allowing the the leaner than normal fuel-air ratio or the slower burning fuel mixture to burn smoothly, and decreasing the tendency for knocking. (Fig. 3-42)



**Fig. 3-42 Squish area** ① Valve ② Combustion chamber ③ Squish area

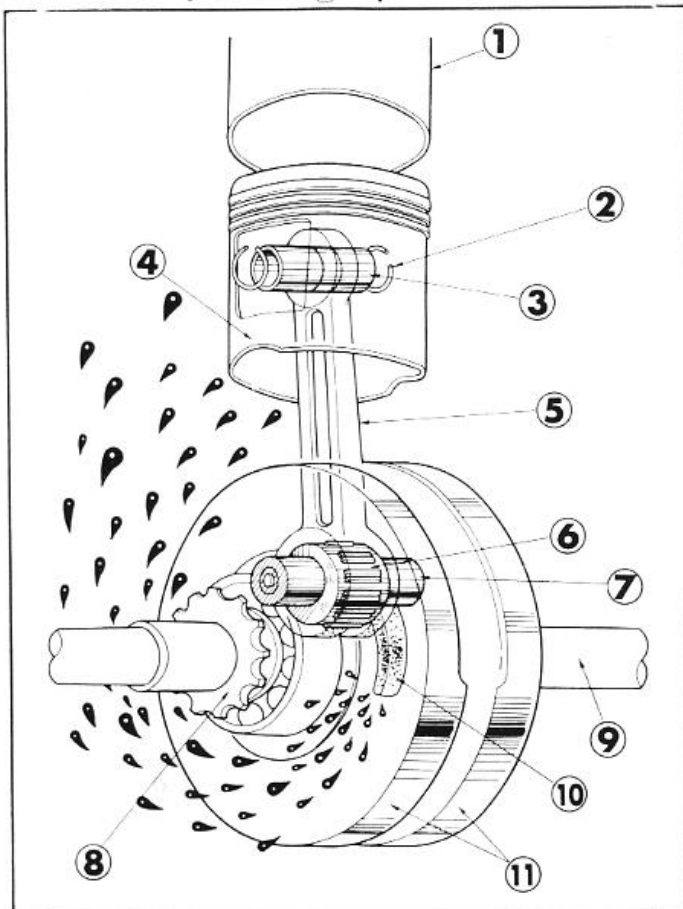
**Connecting Rod.**

The connecting rod plays the important role of converting the reciprocating motion of the piston caused by the combustion of air-fuel mixture to the rotary motion of the crankshaft.

It also transmits the inertia from the crankshaft to the piston so that the intake, compression, combustion and exhaust strokes can be performed. The material of construction must be light and rigid; therefore, "I" shaped nickel chrome steel is used in most cases.

The piston end is called the small end and is connected by a piston pin and locked with snap rings to prevent the piston pin from moving in the axial direction.

The crankshaft end is called the large end. The large end is fitted with the needle roller bearing to reduce friction and is assembled on the crankshaft with the crank pin. An oil splasher in shape of a scoop is attached to the large end to splash lubricate the crankshaft, cylinder and piston. (Fig. 3-43)



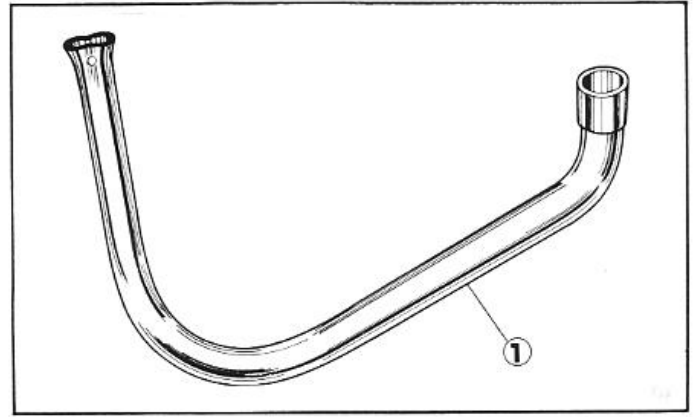
**Fig. 3-43 Operation of connecting rod** ① Cylinder ② Snap ring ③ Piston pin ④ Piston ⑤ Connecting rod ⑥ Roller retainer ⑦ Crank pin ⑧ Timing sprocket ⑨ Crankshaft ⑩ Oil splasher ⑪ Crankshaft (R. L.)

**EXHAUST (Exhausting the burned gases)**

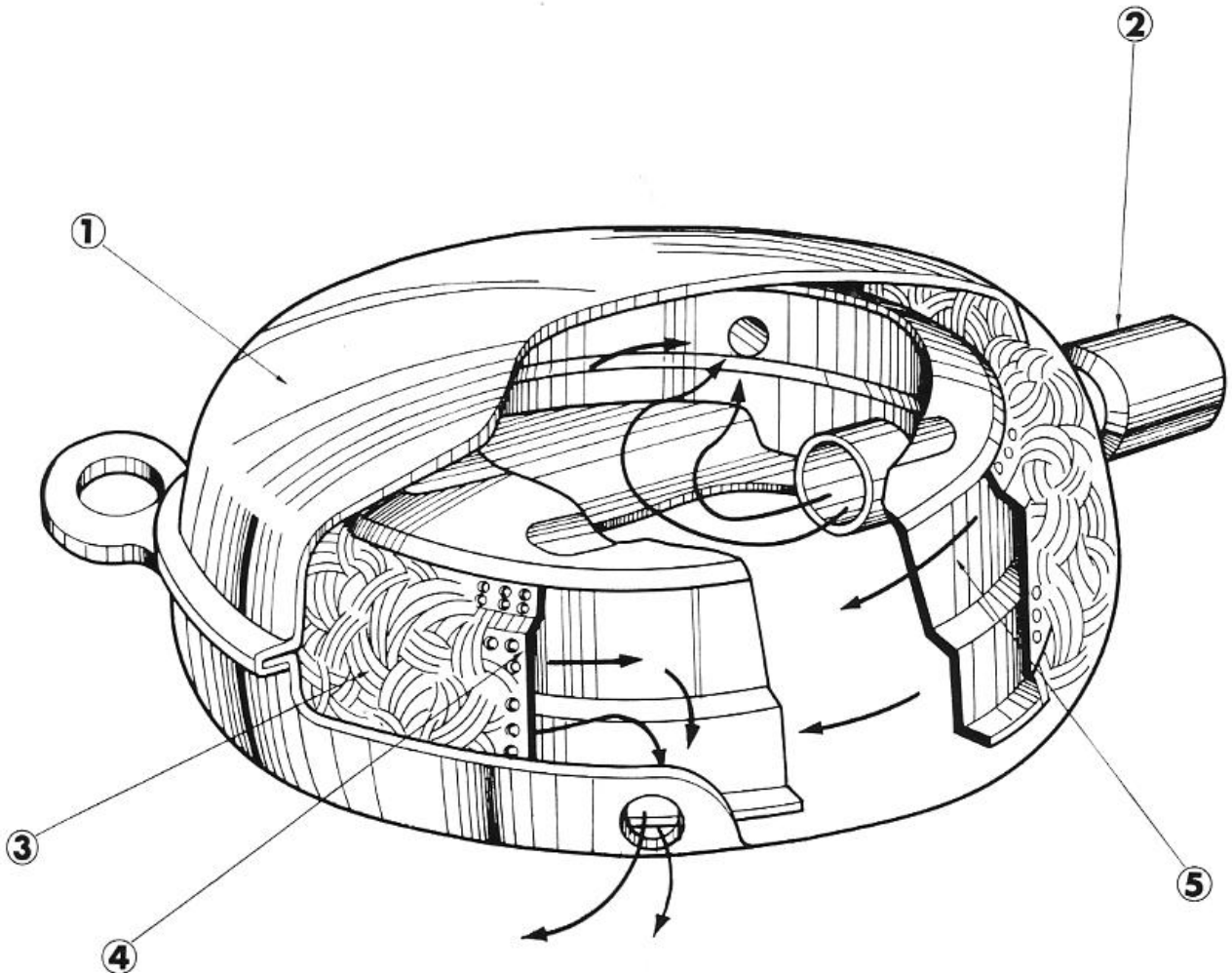
**Exhaust Pipe and Muffler**

If the hot combustion gas and high pressure is exhausted from the cylinder, the gas under pressure will attempt to expand suddenly and produce a loud noise.

In order to prevent this, the temperature and pressure of the burned gas must be reduced gradually, must be routed from the cylinder to the muffler through the exhaust pipe where the gas can gradually be reduced in temperature and pressure before it is exhausted out side. (Fig. 3-44, 45)



**Fig. 3-44 Exhaust pipe**



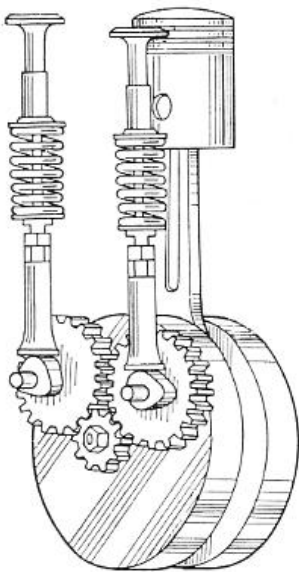
**Fig. 3-45 Construction of muffler** ① Outer half ② Inlet pipe ③ Steel wool ④ Guide plate ⑤ Separator

**Valve Operating Mechanism**

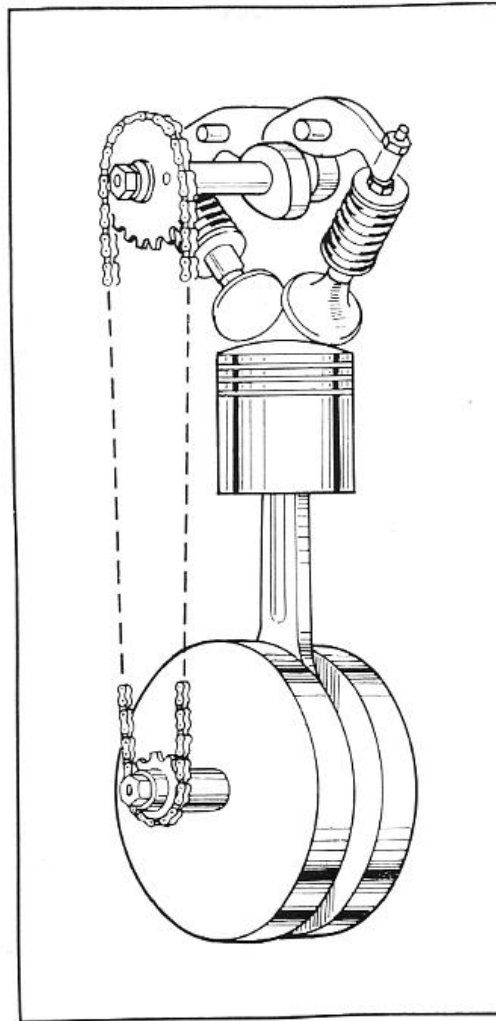
The inlet and exhaust valves are installed in the cylinder head of the four-cycle engine. These are opened and closed to assist in performing the intake, compression, combustion and exhaust functions.

**Types of valve operating mechanism**

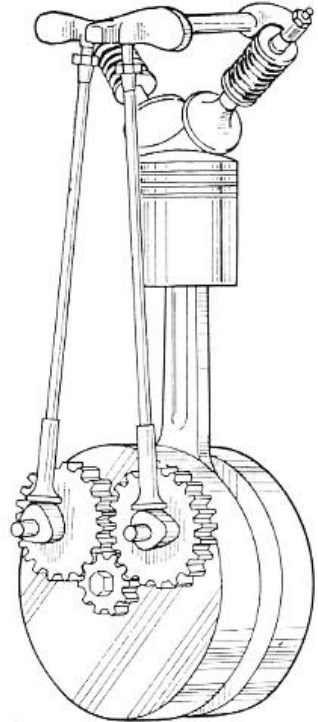
- Side valve (SV) type
- Overhead valve (OHV) type
- Overhead camshaft (OHC)
  - Chain type
  - Gear type



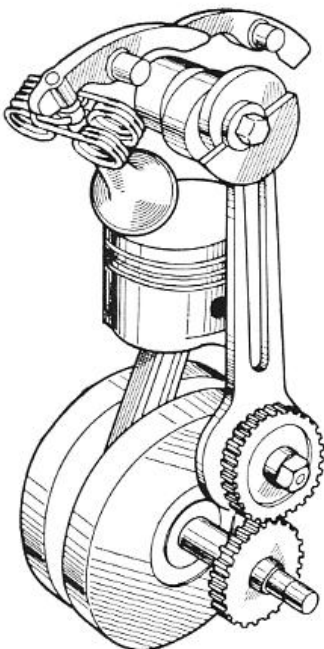
**Fig. 3-46 Side valve type**



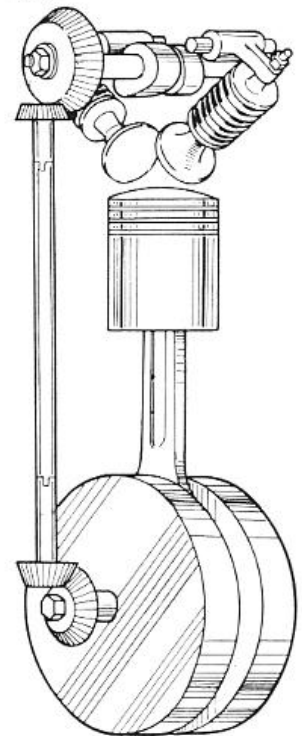
**Fig. 3-50 Overhead camshaft type**



**Fig. 3-47 Overhead valve type**



**Fig. 3-48 Overhead camshaft type**

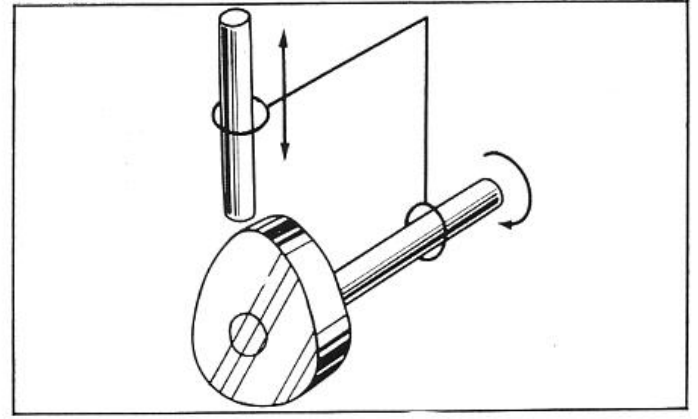


**Fig. 3-49 Overhead camshaft type**

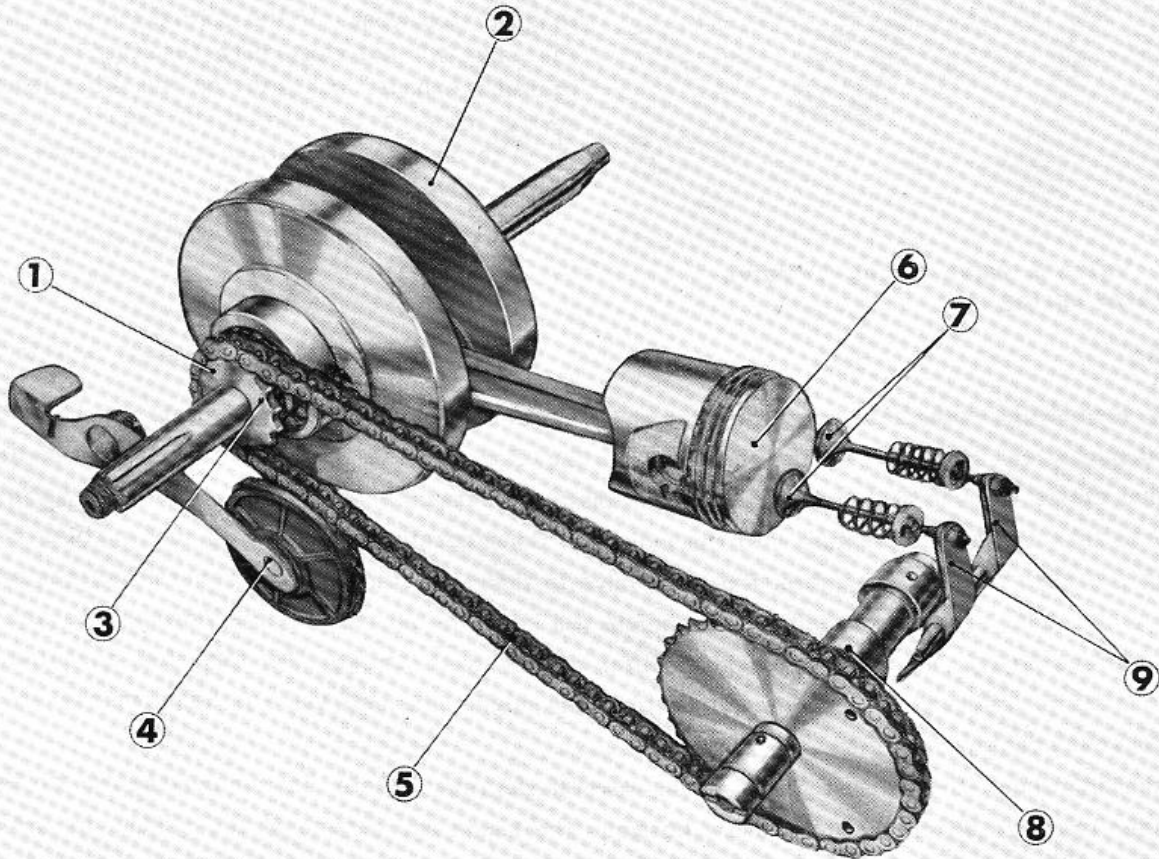
### Overhead Camshaft

When the part shown in the figure is revolved, the vertical rod moves up and down. (Fig. 3-51)

The camshaft installed the cylinder head is revolved by the timing sprocket installed on the crankshaft through the cam chain. The camshaft actuates the rocker arms by providing a rocker movement which operates the valve. In order to maintain the cam chain at a specific tension so that the valve timing is not effected, a cam chain tensioner is installed within the crankcase to apply pressure against the chain by means of a roller through a spring. (Fig. 3-52)

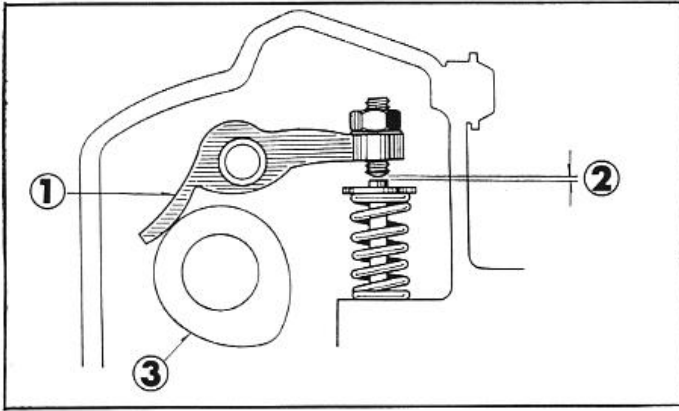


**Fig. 3-51 Principle of cam**



**Fig. 3-52 Over head camshaft mechanism ① Timing sprocket ② Crank shaft ③ O mark ④ Camchain tensioner ⑤ Camchain ⑥ Piston ⑦ Valve ⑧ Camshaft ⑨ Rocker arm**





**Fig. 3-53 Valve tappet clearance** ① Valve rocker arm ② Valve tappet clearance ③ Cam shaft

### Tappet Clearance

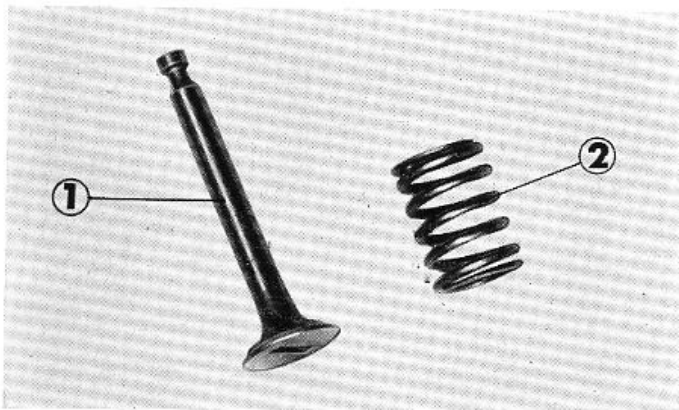
The clearance between the valve and rocker arm is referred to as the tappet clearance. Proper clearance is required for the valve to fully close. If the clearance is too small, it will keep the valve from completely closing, producing a low compression; on the other hand, if the clearance is too large, tappet noise results.

The tappet clearance will greatly affect the engine output, revolution and noise. Standard tappet clearance measured cold is 0.05 mm (0.002 in) for both the inlet and exhaust valves. (Fig. 3-53)

### Valve Spring

Without the proper sealing of the valves maximum engine output and speed performance cannot be realized.

The valve spring applies force on the valve to keep it closed. The spring force should neither be too strong nor too weak. If the spring force is too weak, the valve will not close fully, resulting in loss of compression, exhaust leak, etc; on the other hand, if the spring force is too strong, it requires unnecessary force to operate the valves and also cause rapid wear to the valve seat. (Fig. 3-54)



**Fig. 3-54 Valve & valve spring** ① Valve ② Valve spring

### Valve Timing

It may seem to be correct to have the inlet and exhaust valves opening and closing at top-dead-center and bottom-dead-center. However, as can be seen from Fig. 3-55, the valves are not timed in this manner. If the inlet valve starts to open at top-dead-center, the piston will travel some distance before the valve becomes fully opened to take the air-fuel mixture into the cylinder. Consequently, sufficient air-fuel mixture is not obtained during the inlet stroke. Therefore, the inlet valve is timed to start opening several degrees before top-dead-center of the inlet stroke. In addition, the inertia will keep the air-fuel mixture flowing into the cylinder for several degrees beyond the bottom-dead-center of the inlet stroke. To take full advantage of the intake fuel inertia to obtain greater power output from the engine, the inlet valve is kept open several degrees beyond bottom-dead-center.

In a similar manner, the exhaust valve opens several degrees before bottom-dead-center of the power stroke in order to utilize difference in pressure between the inside and outside of the cylinder for greater scavenging of the exhaust gas from the cylinder. The valve closes several degrees past top-dead-center beyond the exhaust stroke in order to utilize the exhaust gas inertia to completely rid the cylinder of the exhaust gas.

During the period of several degrees before and after top-dead-center of the exhaust stroke, both the inlet and exhaust valves are opened; this period is called "valve overlap", and it serves to prevent the residual exhaust gases from blocking the entry of the air-fuel mixture. (Fig. 3-55)

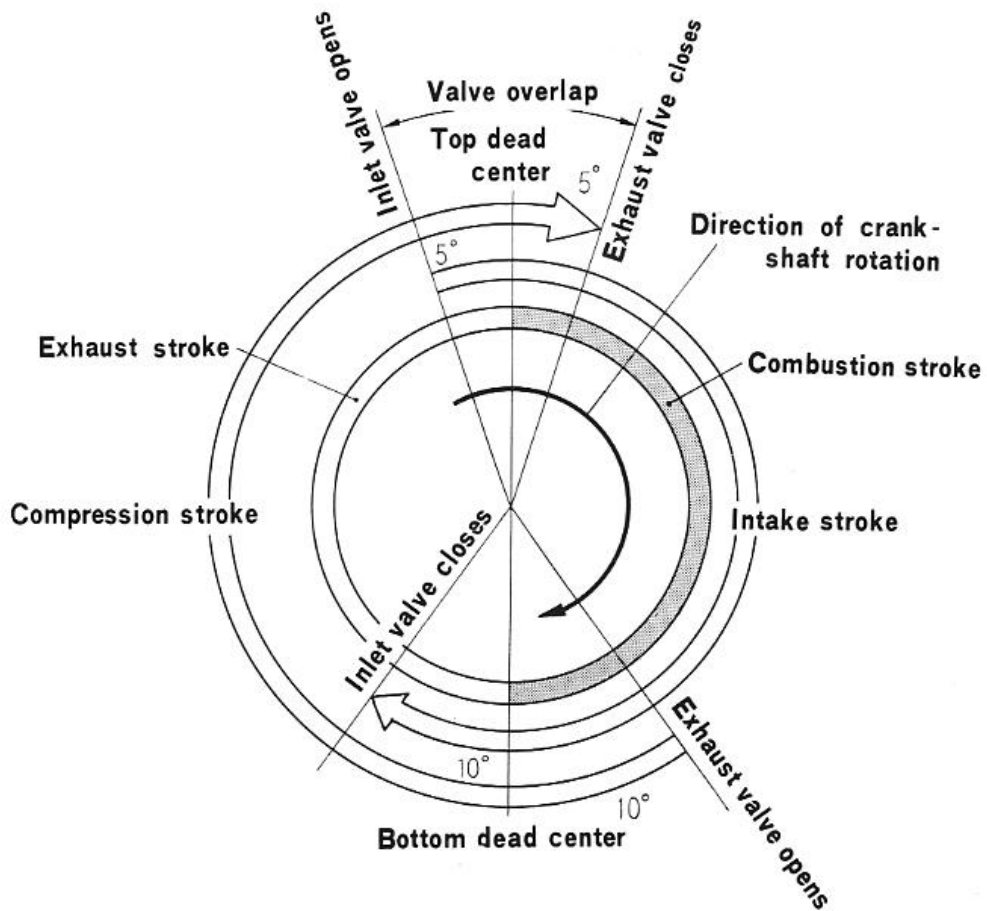


Fig. 3-55 Valve timing diagram

### Correct Valve Timing Procedure

Position the "O" mark on the timing sprocket in line with the upper alignment hole in the cam sprocket when both of the alignment holes are in parallel with the cylinder head parting surface, as shown in the figure. Install the cam chain in this position, the valve timing will then be correct.

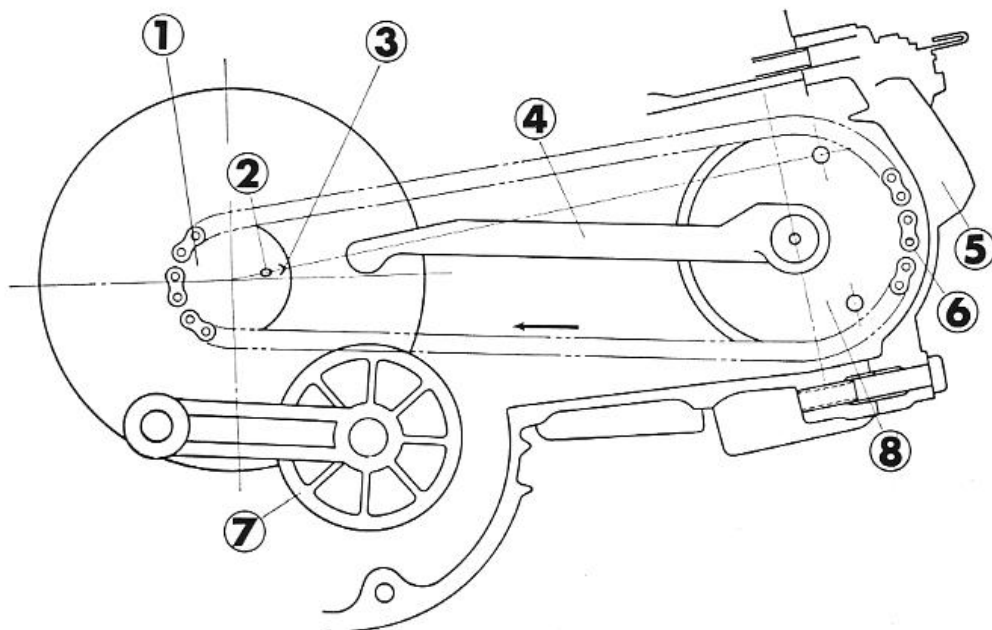


Fig. 3-56 Valve timing ① Timing sprocket ② O mark ③ Case index mark ④ Oil guide ⑤ Cylinder head ⑥ Chain ⑦ Chain guide roller ⑧ Cam sprocket

## Power Transmission Mechanism

The transmission of the rotating power generated at the engine to the rear wheel is made possible by the power transmission mechanism. The P50 is not equipped with a transmission, however, all the speed reducing operations is performed by chains which also drives the rear wheel. (Fig. 3-57)  
(Gears are used on P-50 for Holland export type)

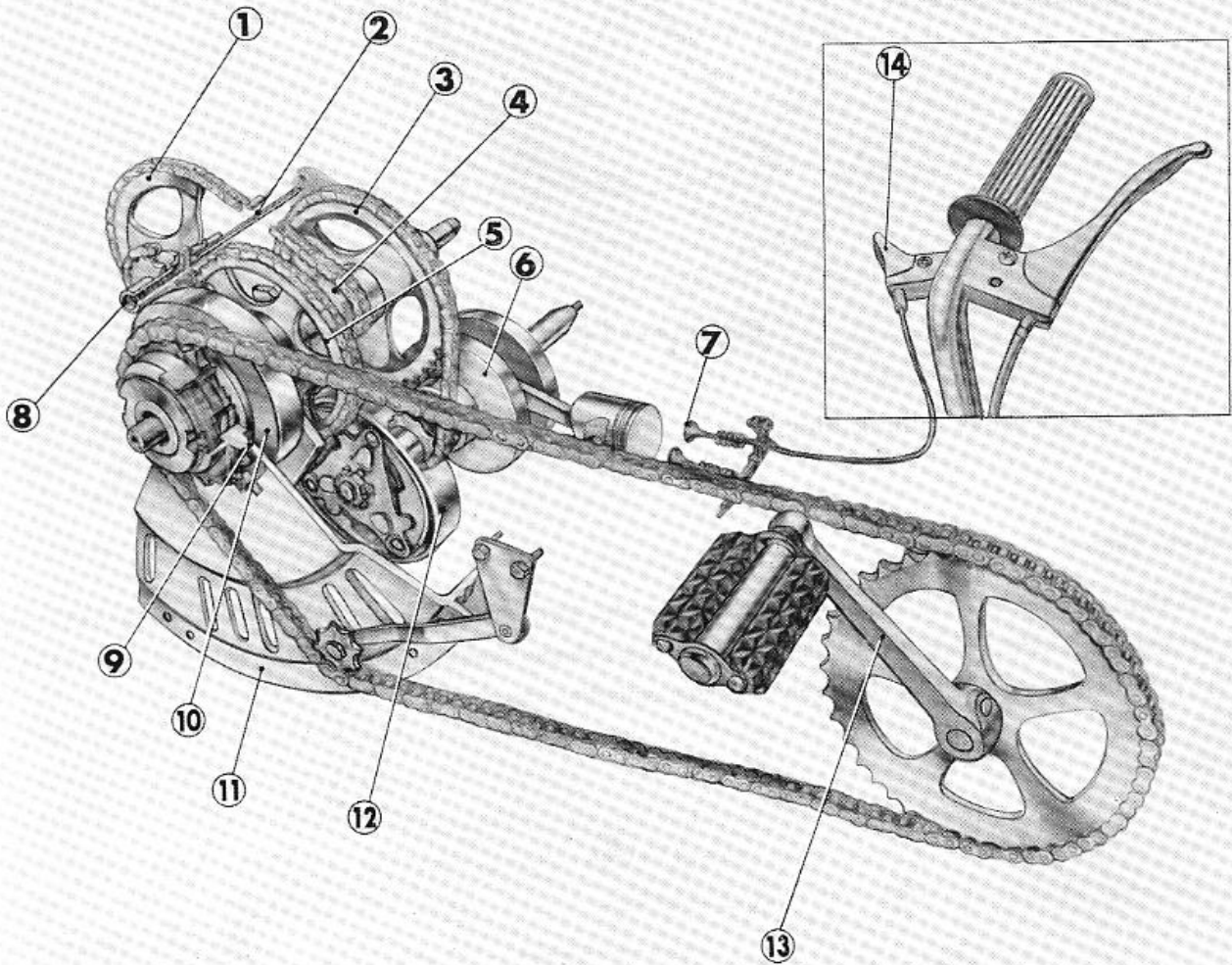


Fig. 3-57 Power transmission mechanism ① Secondary driven sprocket ② Riding lever ③ Primary driven sprocket ④ Secondary drive sprocket ⑤ Final driven sprocket ⑥ Crankshaft ⑦ Exhaust valve ⑧ Final drive shaft ⑨ Final driven shaft ⑩ Free wheel ⑪ Rear wheel hub ⑫ Clutch (Primary drive sprocket) ⑬ R crank arm ⑭ Decompression

## Clutch

The clutch engages and disengages the power from the crankshaft to the rear wheel.

When changing speed, the power must be disengaged temporarily; when starting, the power must be transmitted smoothly to the rear wheel.

P-50 has adopted the centrifugal clutch which performs the operations automatically. (Fig. 3-59)

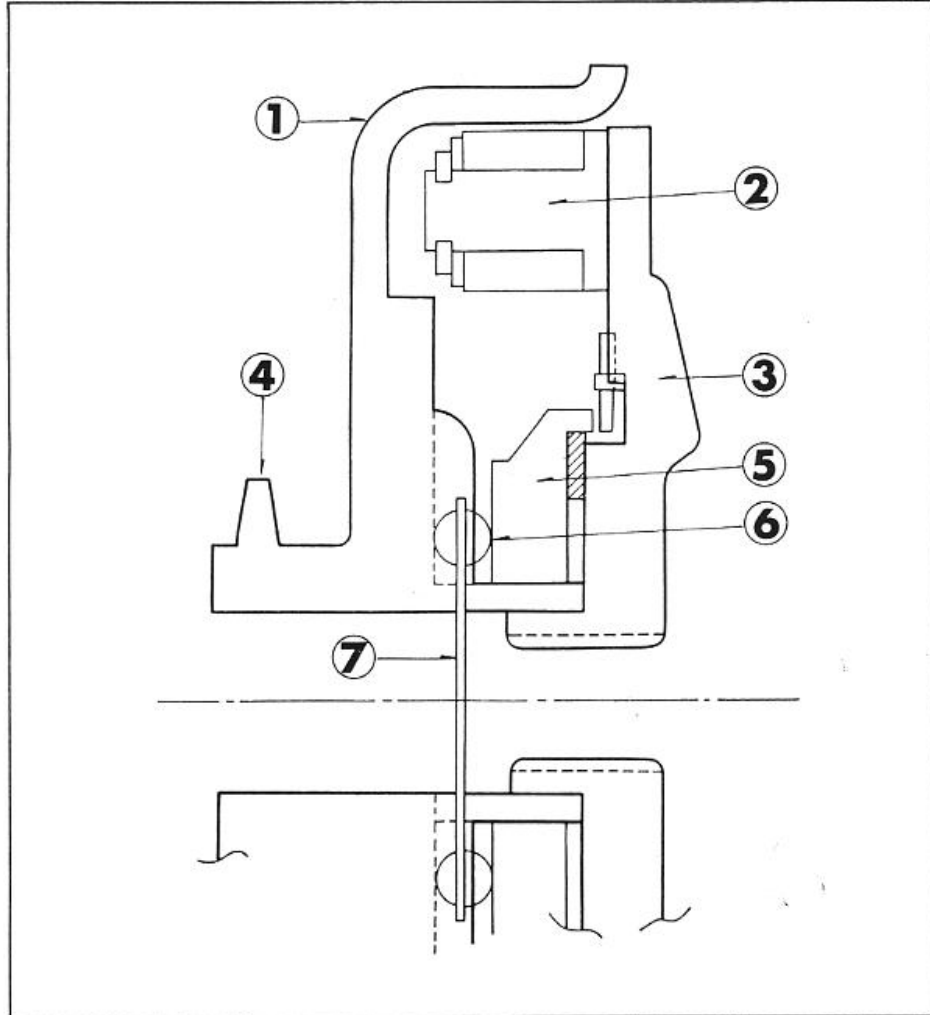


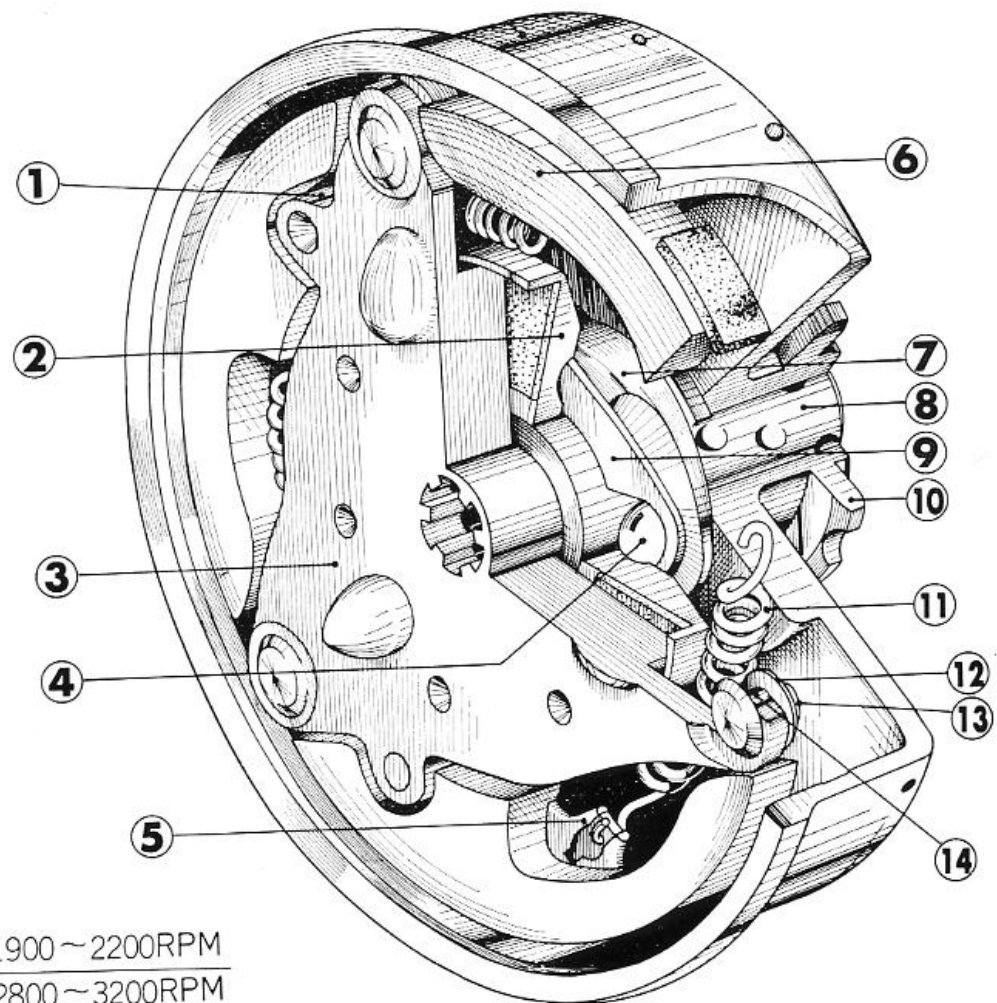
Fig. 3-59 Sectional diagram of clutch ① Clutch outer ② Clutch weight ③ Drive plate ④ Primary drive sprocket ⑤ Friction plate ⑥ Steel ball ⑦ Ball retainer

## Automatic Centrifugal Clutch

By utilizing centrifugal force, the clutch engages and disengages the power automatically in accordance with the engine RPM. The drive plate and clutch weights are fixed on the crankshaft, while the primary drive sprocket rotates freely around the crankshaft. At low speed, the clutch weights are not actuated so that the crankshaft rotation is not transmitted to the primary drive sprocket. As the speed increases, centrifugal force causes the weights to move outward, overcoming the clutch spring force, to make contact with the primary drive sprocket so that the power may be transmitted to the secondary driven gear. (Fig. 3-60)

In P-50 the engine is started by pedaling. Therefore, if the clutch fails to transmit the force produced by pedaling to the crankshaft, the engine will not start.

When the pedal is depressed, the primary drive sprocket starts rotating and causes the three steel balls incorporated therein to apply force against the friction plate which in turn makes contact with the drive plate (the friction plate is restricted in the direction of rotation by the clutch weights), so that the power is transmitted from the drive plate to the crankshaft.



**Clutch in 1900 ~ 2200RPM**  
**Clutch lock 2800 ~ 3200RPM**

**Fig. 3-60 Sectional view of clutch ① Clutch damper rubber ② Friction plate ③ Drive plate ④ Steel ball ⑤ Hook protector ⑥ Clutch weight ⑦ Lifter cam ⑧ Clutch center guide ⑨ Ball retainer ⑩ Primary drive sprocket ⑪ Clutch spring ⑫ 6mm thrust washer ⑬ 6mm cir-clip ⑭ Clutch weight 6mm pin**

### Engine Disengage Lever

By shifting the engine disengage lever, P-50 can be pedalled. The lever is located at the rear of the left crankcase.

By shifting the lever in the vertical direction, the engine is either engaged or disengaged from the rear wheel

Engine engaged → Position the lever to ON

Engine disengaged → Position the lever to OFF

### CAUTION :

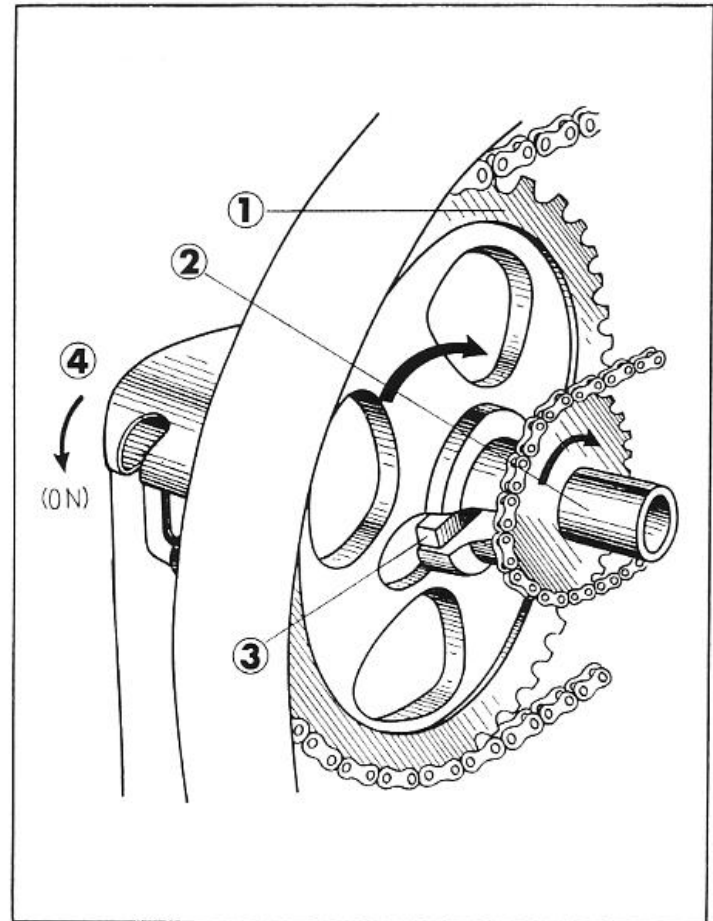
**Shifting must be done while the engine is stopped.**

#### Position the lever to ON

(Engine engaged)

With the lever is positioned to ON, the free pawl is held in the groove of the secondary driven gear by the force of the pawl spring.

The power from the engine is transmitted to the final drive shaft, which rotates the final driven gear and the final driven shaft (coupled to the rear wheel hub). (Fig. 3-61)

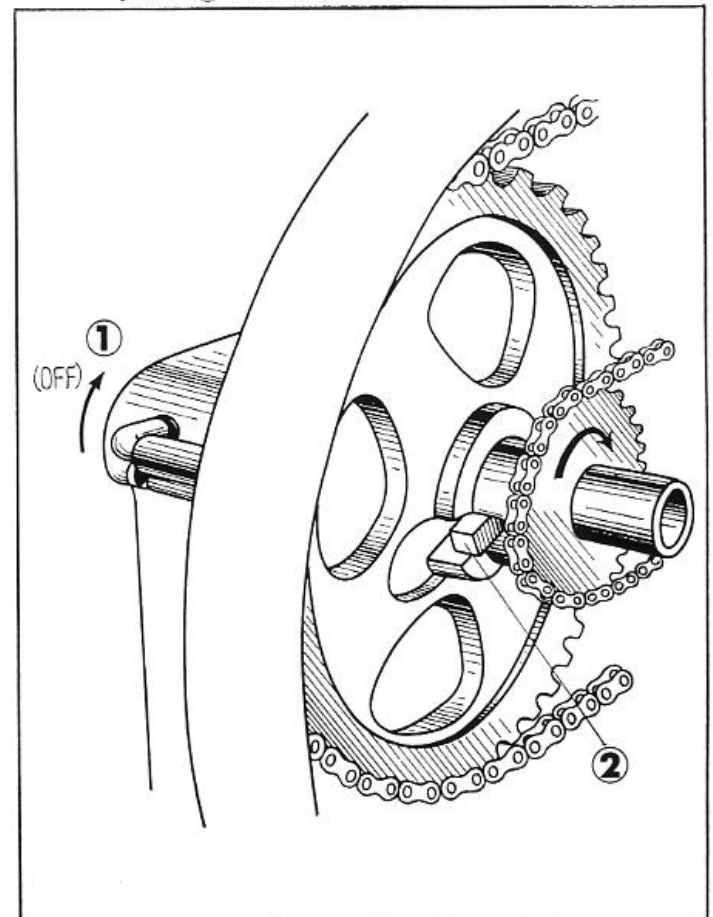


**Fig. 3-61 Motorcycling** ① Secondary driven sprocket ② Final drive shaft ③ Free pawl ④ Lower the lever

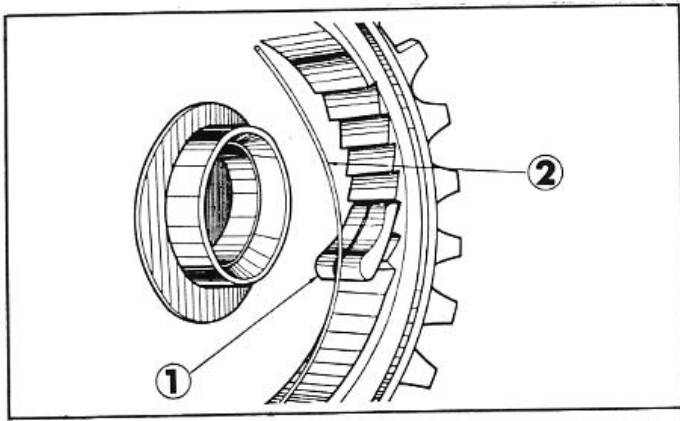
#### Position the Lever OFF

(Pedal engaged)

With the lever positioned to OFF, the free pawl unlocks from the secondary driven gear groove so that the secondary driven gear rotates freely around the final drive shaft. Therefore, the power produced by pedaling rotates the freewheel sprocket and the rear wheel hub by means of the drive chain and is transmitted to the secondary driven gear. Thus, the cycling can be enjoyed, similarly as with the bicycle. (Fig. 3-62)



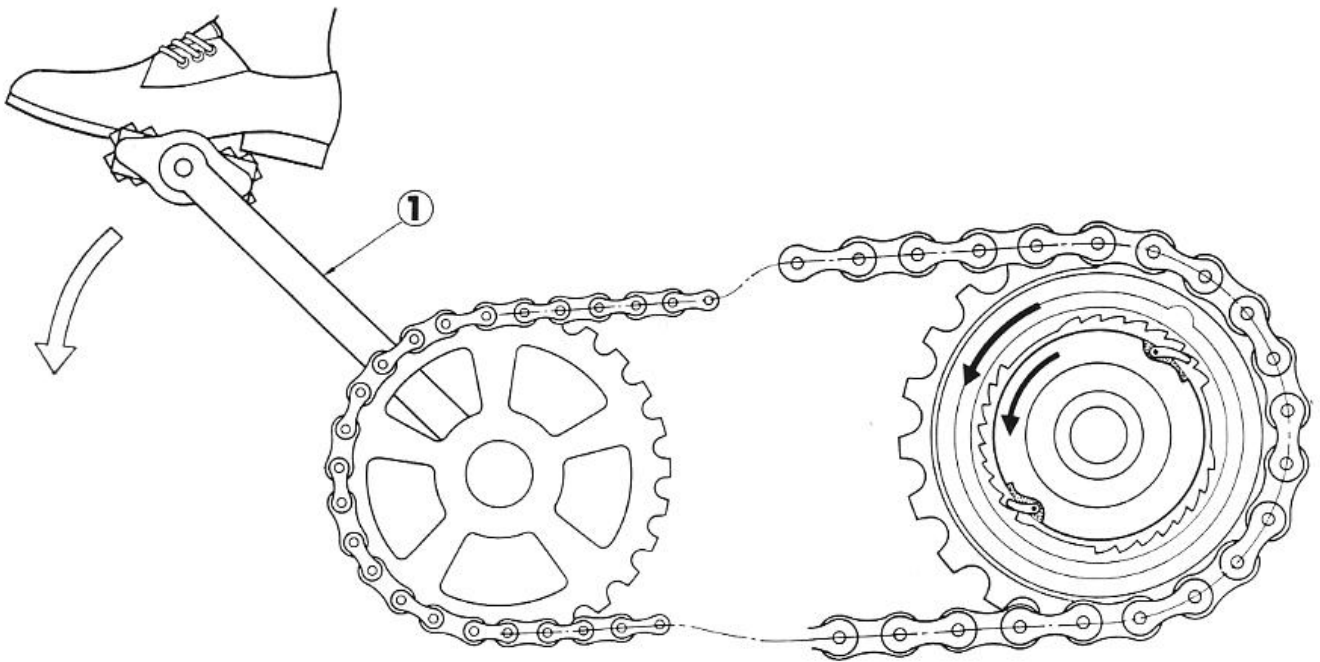
**Fig. 3-52 Pedaling** ① Raise the lever ② Free pawl (disengaged)



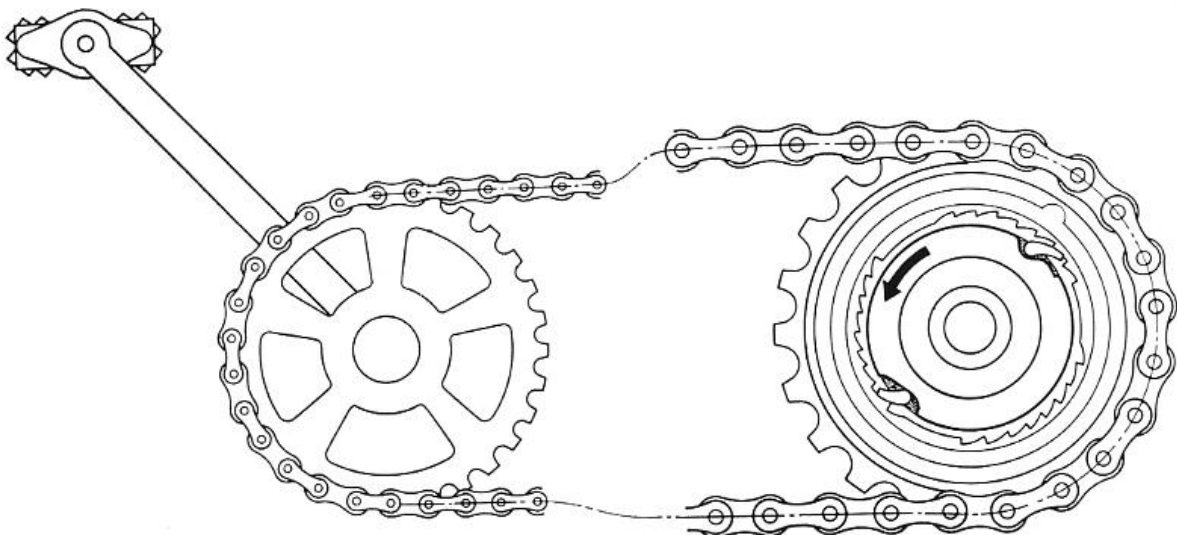
**Fig. 3-63 Freewheel sprocket** ① Ratchet pole ② Freewheel spring A

**Freewheel Sprocket**

When the freewheel sprocket is rotated by pedaling, the ratchet pawl engages with the freewheel sprocket to bring the final driven shaft (rear wheel hub) to rotate together. On the other hand, when the freewheel sprocket rotates in the reverse direction or when the final driven shaft rotates, the ratchet pawl does not engage with the freewheel sprocket but slides over the teeth. In other words, the freewheel sprocket is free when it rotates in the reverse direction. (Fig. 3-63, 64, 65)



**Fig. 3-64 Operation of freewheel sprocket in pedaling** ① Crankarm



**Fig. 3-65 Operation of freewheel sprocket in motorcycling**

## Drive Chain Tensioner

When the drive chain becomes slack, adjustment is usually made by the chain adjusters on the rear wheel; however, in the case of P-50, a drive chain tensioner is installed to provide a constant, specified tension for the drive chain making adjustments unnecessary. (Fig. 3-66)

## Starting and Stopping the Engine

### (Operation of engine lever)

To start the engine of the P-50, start pedalling, this will rotate the crankshaft. However, because of the engine compression, pedalling is difficult; this is overcome by releasing the cylinder compression so that the crankshaft will turn lightly. A decompression lever is located on the left handle.

To be more specific, with the decompression lever held down, continue pedaling until a certain speed is attained; then, release the lever to start the engine.

To stop the engine, on the other hand, turn the throttle grip back and depress the decompression lever. (Fig. 3-67)

### CAUTION:

1. The decompression lever must not be depressed while the engine is running, except to stop.
2. To stop the engine, the motorcycle must be brought to a full stop before depressing the decompression lever.

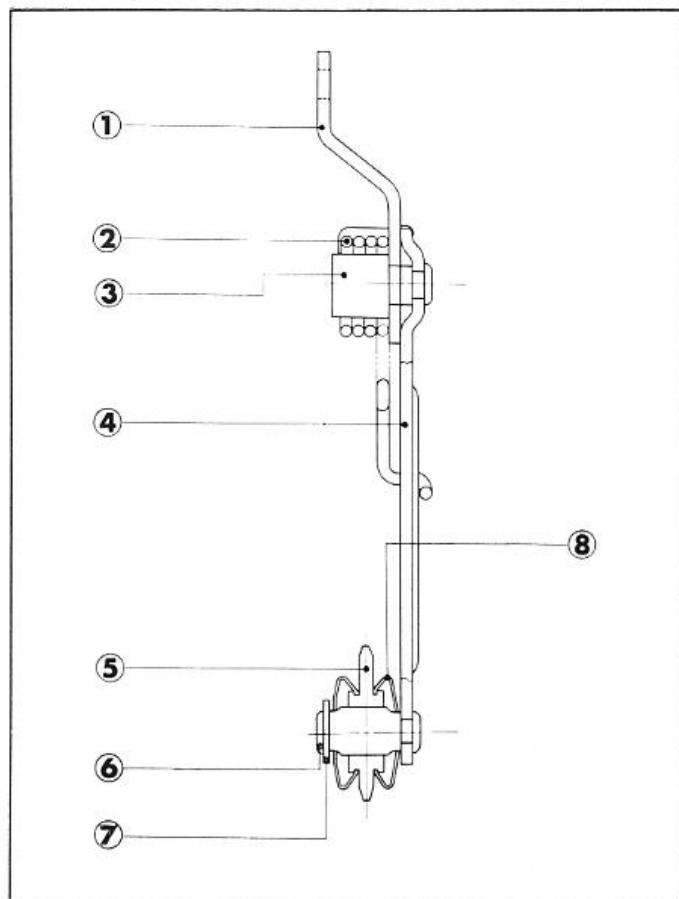


Fig. 3-66 Drive chain tensioner

- |                     |                  |
|---------------------|------------------|
| ① Tensioner arm A   | ⑦ 6mm washer     |
| ② Tensioner spring  | ⑧ Tensioner boot |
| ③ Tensioner pivot A |                  |
| ④ Tensioner arm B   |                  |
| ⑤ Tensioner roller  |                  |
| ⑥ Tensioner pivot B |                  |

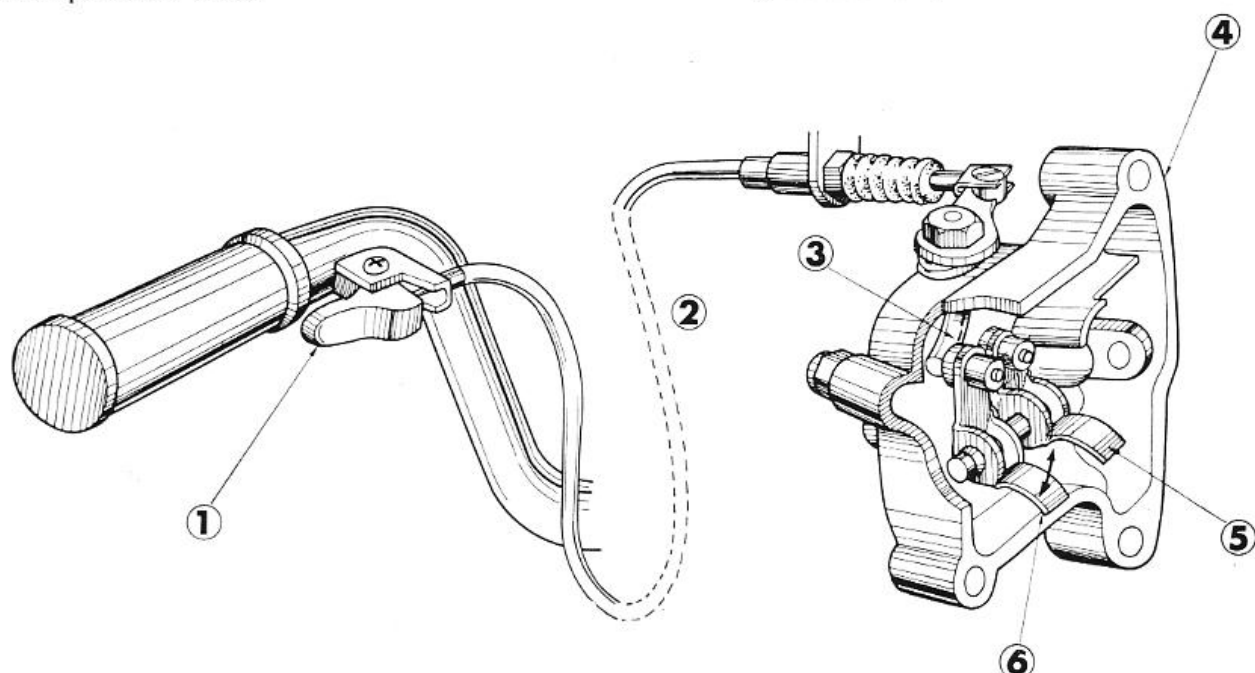


Fig. 3-67 Engine lever operation ① Engine lever ② Decompression cable ③ Decompression arm ④ Cylinder head ⑤ Rocker arm (Inlet side) ⑥ Actuate exhaust rocker to open valve



## Lubrication System

### Cylinder Head

Oil from the cam chain tensioner roller and the cam chain is carried along the crankcase ribs to drop into the oil guide, from where it is fed to the cylinder head through the oil guide.

Oil enters the camshaft center pin and by centrifugal force is drawn into the spiral groove in the center pin to lubricate the cam surface as well as the rocker arm slipper surface.

After lubricating the camshaft, oil passes through the cam chain chamber and flows back to the crankcase.

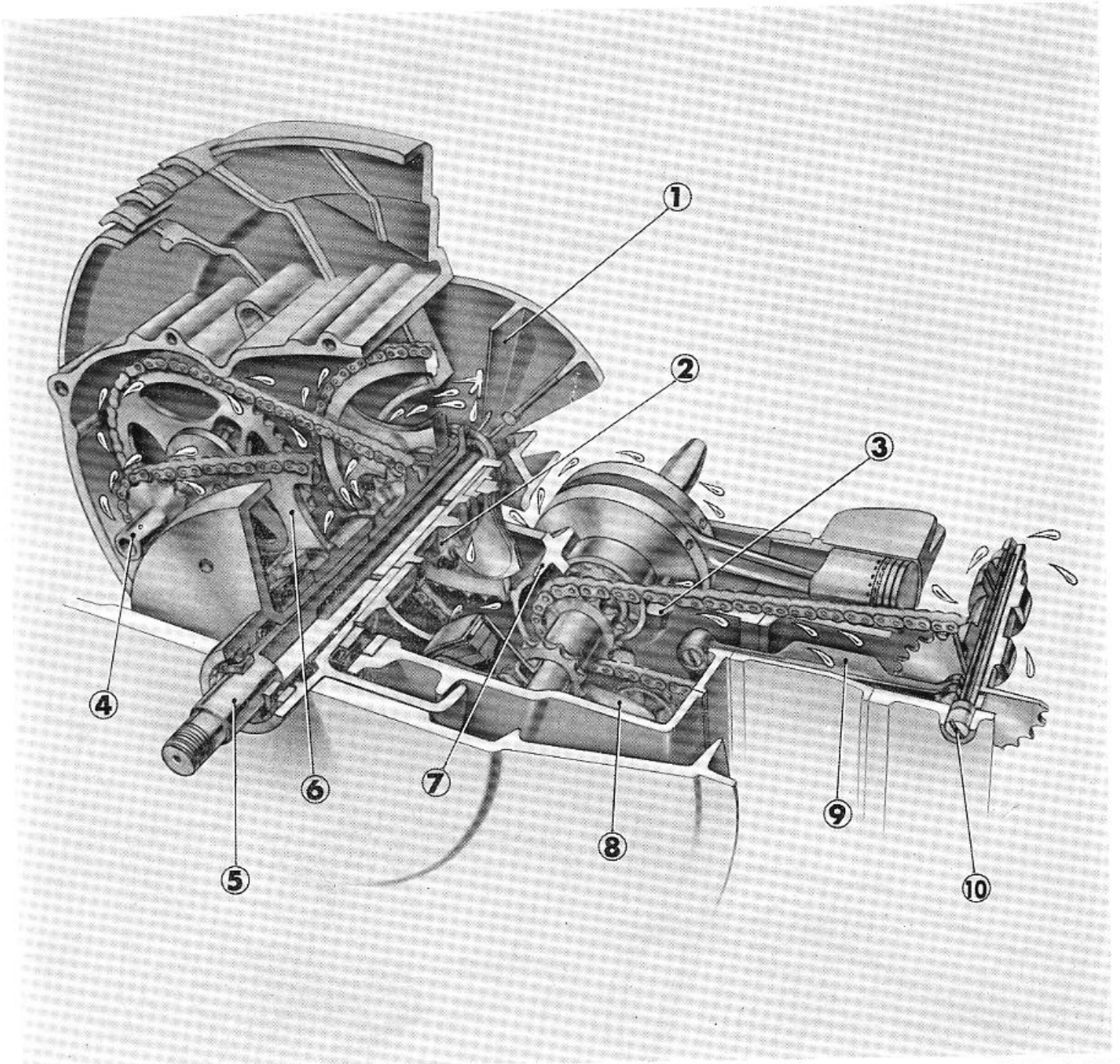


Fig. 3-68 Oil lubrication system (I) ① Rib ② Secondary drive sprocket ③ Cam chain ④ Final drive shaft ⑤ Rear wheel axle ⑥ Final driven sprocket ⑦ Rib ⑧ Cam chain tensioner roller ⑨ Oil guide ⑩ Cam shaft center pin

### Crankcase

Part of oil splashed by the oil splasher on the connecting rod large end reaches the cylinder and lubricates the piston and the piston pin; while the rest passes through the cored hole in the right crankcase to the right crankcase cover, routed along the crankcase ribs into the rear wheel axle hole and lubricates the secondary drive gear and the final driven gear.

The final drive shaft is lubricated by splashed oil coming through oil holes in the right crankcase and right crankcase cover.

Even when the amount of oil decreases and consequently the oil level in the crankcase drops, the oil which comes through the cored hole in the right crankcase is picked up by the cam chain tensioner roller and the cam chain and collected in the oil tray so that the oil level in the oil tray is maintained the same to perform the proper lubrication.

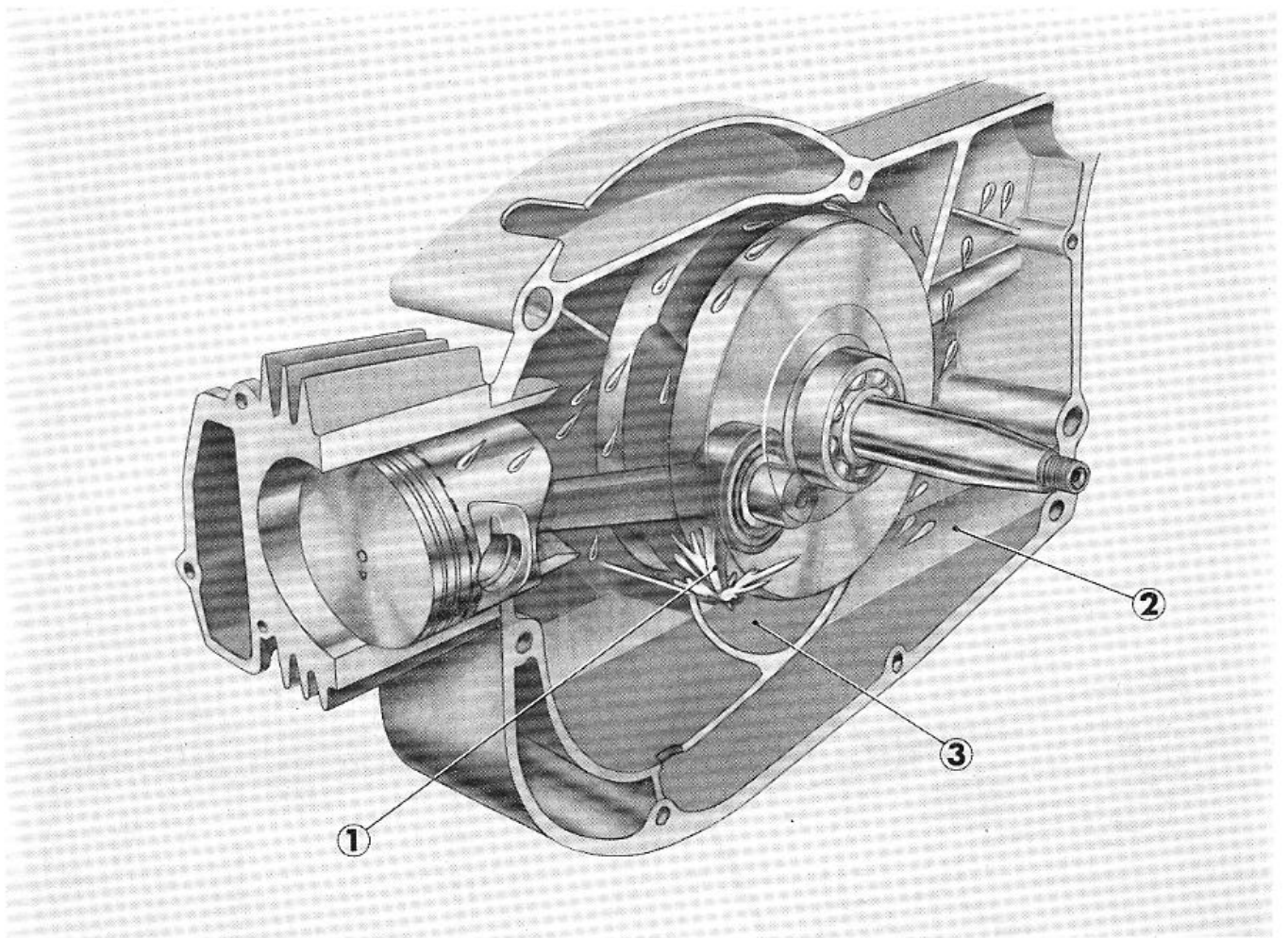


Fig. 3-69 Oil lubrication system (II) ① Oil splasher ② Oil level ③ Oil tray

### Breather

The interior of the crankcase is continually under varying pressure, built up by the reciprocating piston, in addition, the crankcase is filled with gases from the blowby of the piston and the gases produced by the heat of the crankcase. For this reason, the decomposition of the oil is hastened. Further it also increases the possibility of oil leaks at the case parting surfaces.

The breather is designed and incorporated in the case to exhaust the crankcase gases to the outside and also to maintain a constant pressure within the crankcase. To completely relieve the pressure from the oil, it is dissipated through the labyrinth. (Fig. 3-70)

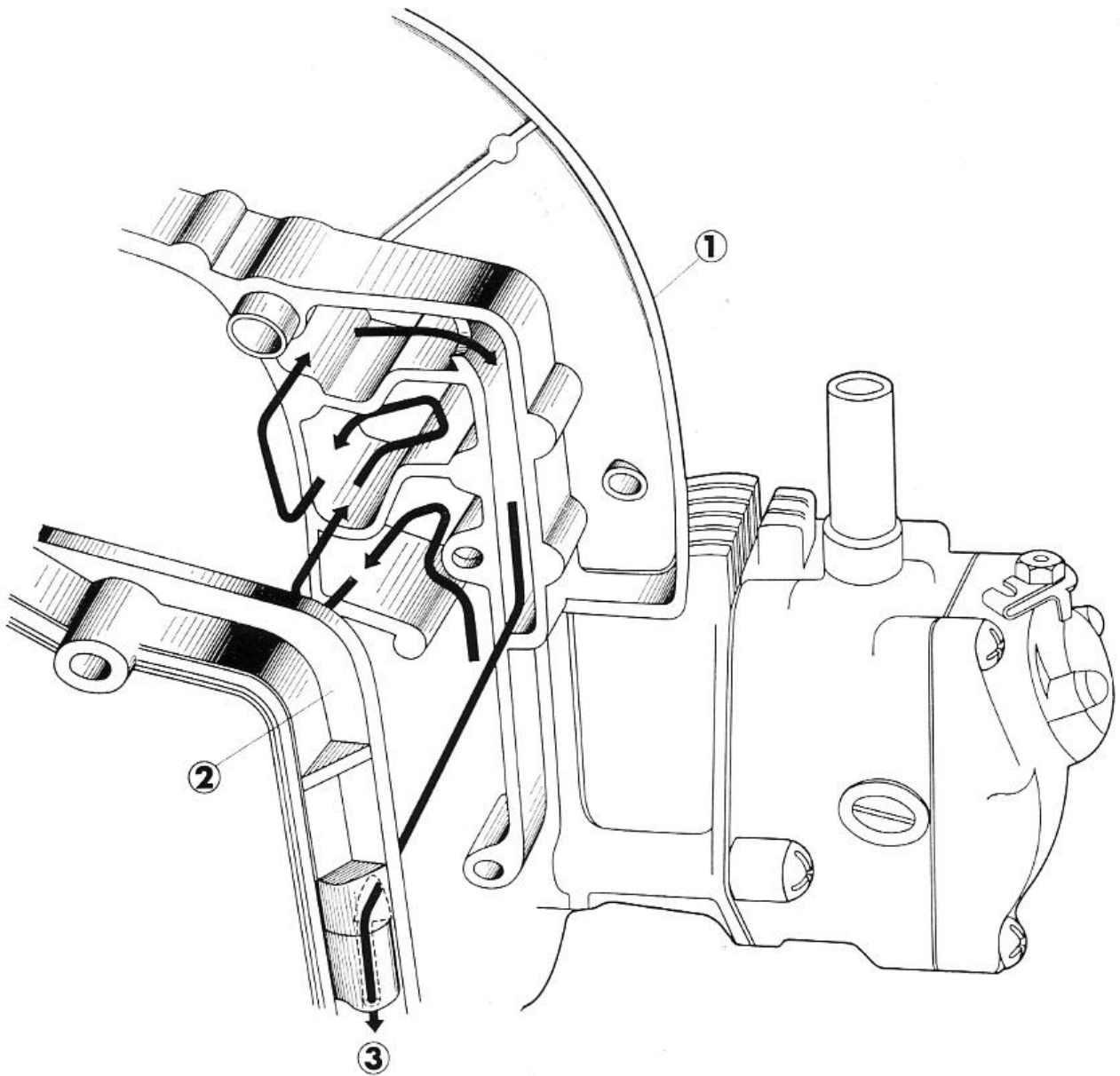


Fig. 3-70 Breather ① R. crankcase ② R. crankcase cover  
③ Dissipate the internal pressure to the outside

## 4. FRAME

### Frame Construction and Names of Parts

The power generated by the engine is transmitted to the rear wheel to produce the driving force. An ideal motorcycle should be one which is safe and easy for anyone to ride.

P-50 is of a lightweight, strong, low frame type monocoque body construction which has been designed with ultimate in safety consideration. (Fig. 4-1)

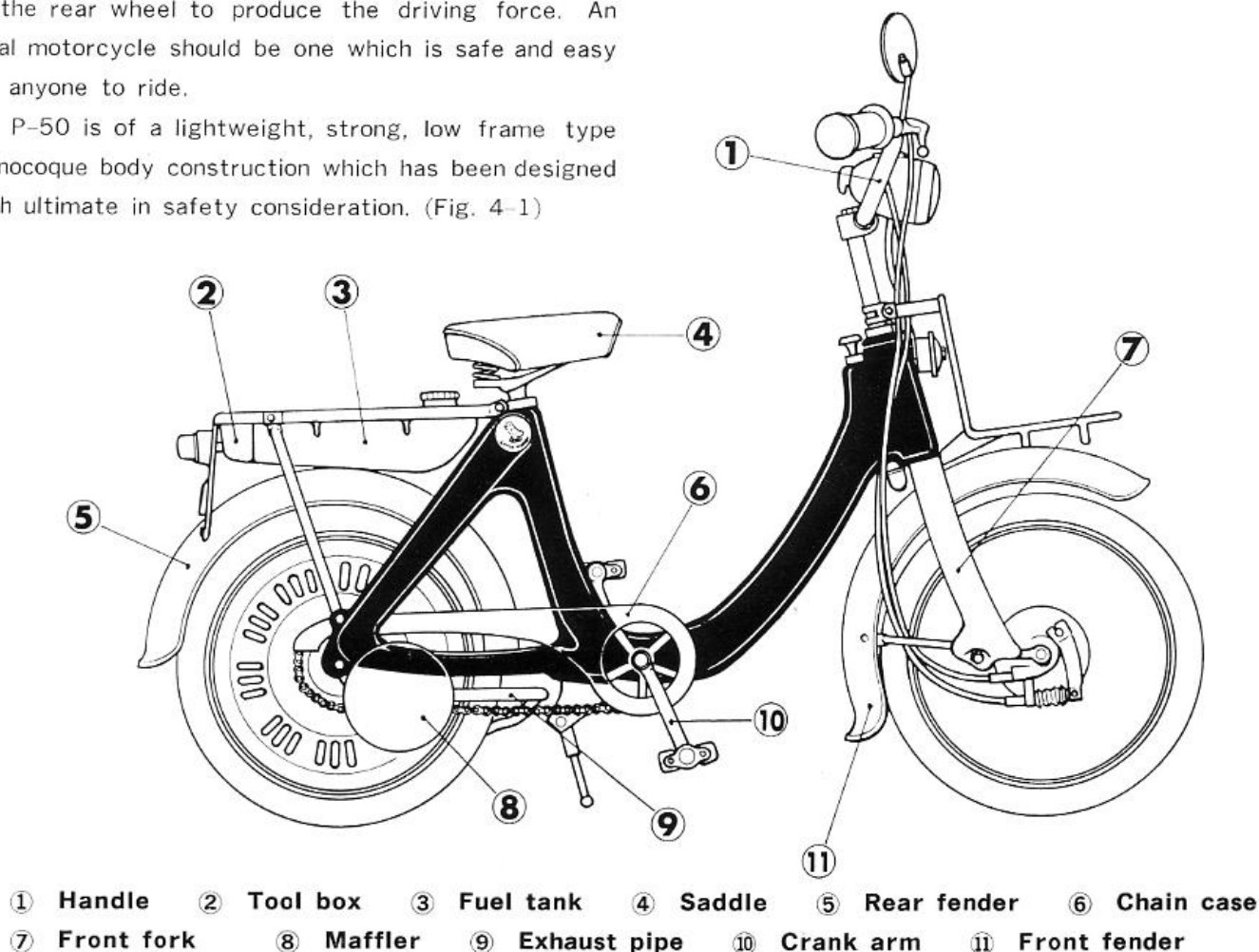
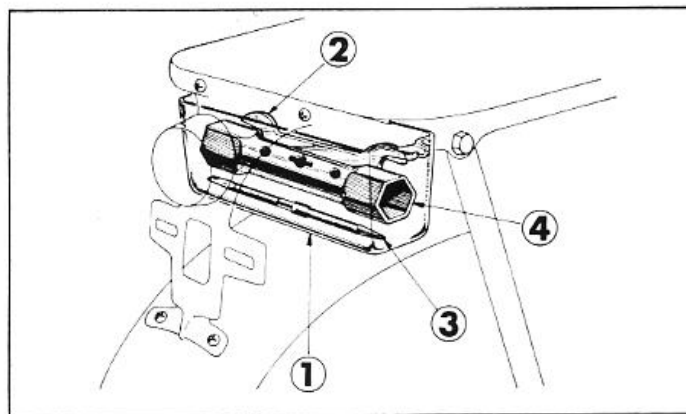


Fig. 4-1

### Tool Box

The tool box is mounted on the rear of the fuel tank and contains a spark plug wrench, a screw driver and a 10×14 spanner. (Fig. 4-2)



- ① Tool box    ② 10×14 spanner  
 ③ Screw driver    ④ Spark plug wrench

Fig. 4-2

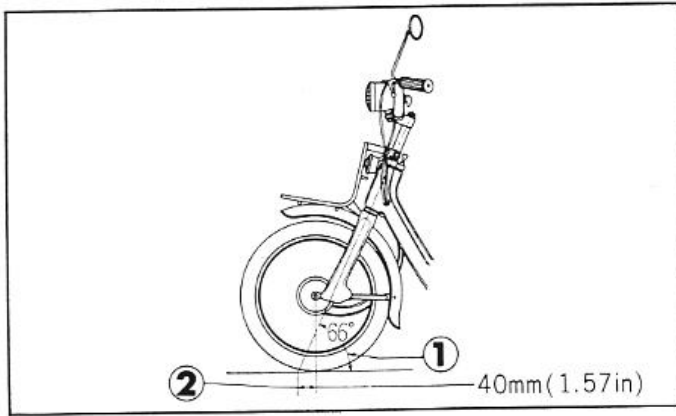


Fig. 4-3 ① Caster ② Trail

### Steerability and Stability

The steerability and stability of a motorcycle depends upon the frame construction, the handle and saddle heights, and other factors, such as caster and trail which are also important.

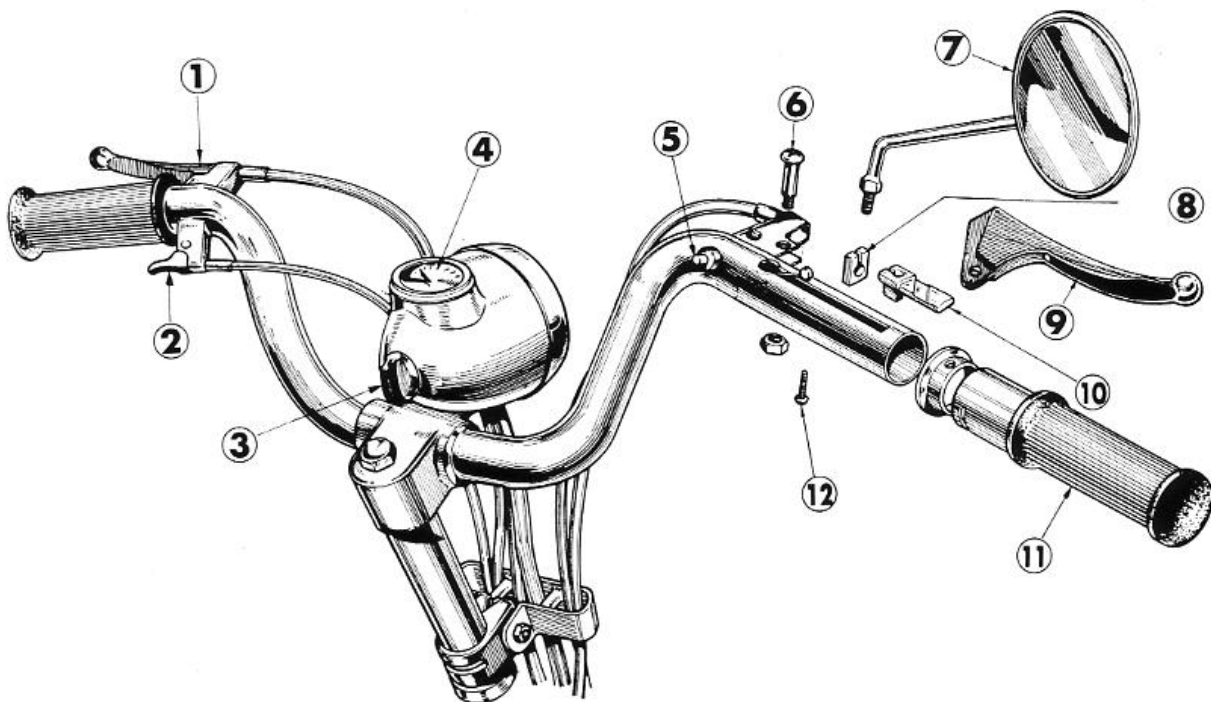
Caster is the angle formed by the ground and the extension line of the frame head pipe. Trail is the distance measured on the ground between the vertical line passing the axle center and the extension line of the frame head pipe.

For P-50, the caster is  $66^\circ$  and trail is 40 mm (1.57 in) (Fig. 4-3)

### Steering Handle

The steering handle of P-50 is identical to that of a bicycle in shape and method of mounting; however, in addition, it is equipped with a throttle grip, front brake lever and a horn button on the right side and a rear brake lever and an engine decompression lever on the left side.

A head lamp incorporating a speedometer is mounted at the center, and adjustment of the beam can be made by loosening a nut. (Fig. 4-4)



- |                              |                               |                           |
|------------------------------|-------------------------------|---------------------------|
| ① Rear brake lever           | ⑤ Horn buttonswitch           | ⑨ Front brake lever       |
| ② Engine decompression lever | ⑥ Handle lever pivot screw    | ⑩ Throttle cable hinge    |
| ③ Head light switch          | ⑦ Rear view mirror            | ⑪ Throttle grip           |
| ④ Speedometer                | ⑧ Throttle cable outer holder | ⑫ Throttle grip set screw |

Fig. 4-4

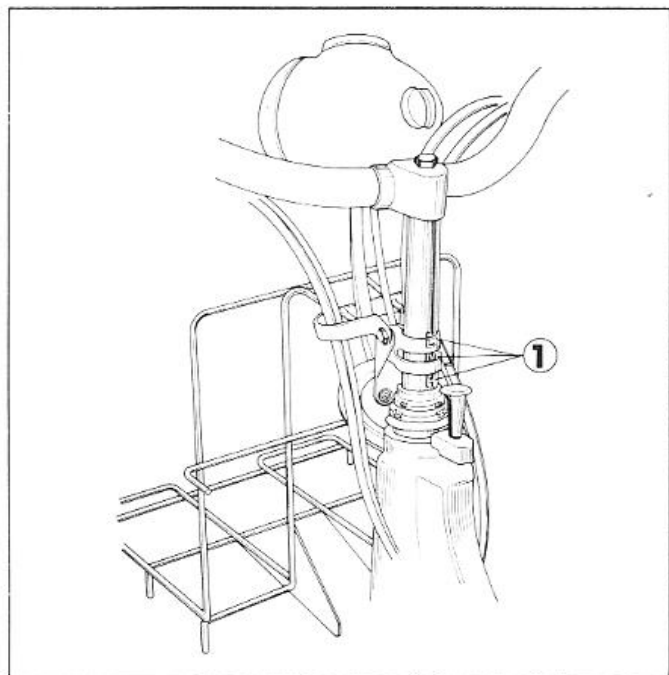


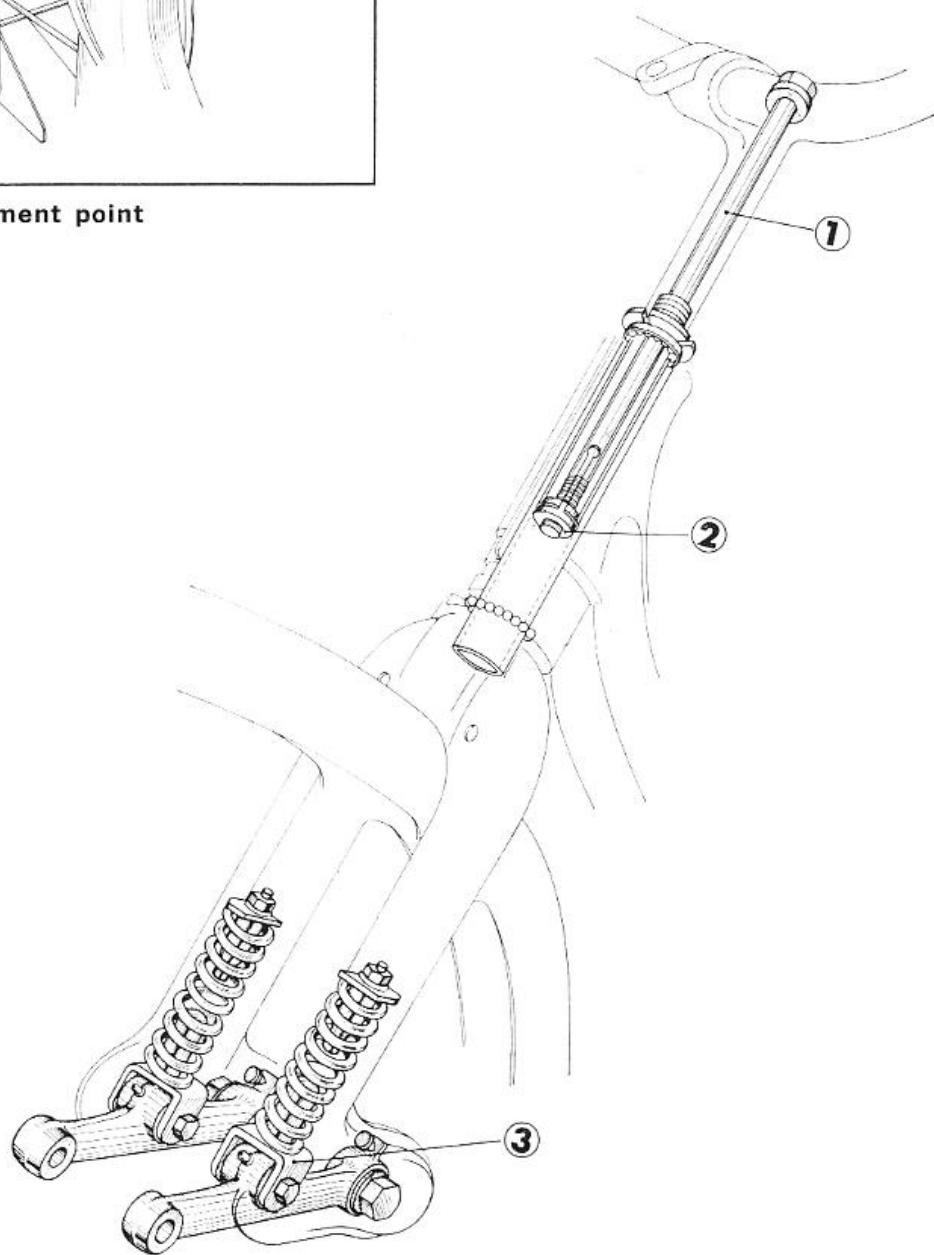
Fig. 4-5 ① Adjustment point

The steering handle is designed for easy riding with due consideration to the frame size and the saddle height. (The handle can be adjusted to any height within the range marked with L.M.H. stamped on the handle). (Fig. 4-5)

### Front Fork

The front fork is mounted on the head pipe between steel balls.

The front cushion, incorporated in the front fork, dampers and absorbs shocks from the front wheel. (Fig. 4-6)



① Handle set bolt    ② Handle set nut    ③ Front cushion

Fig. 4-6

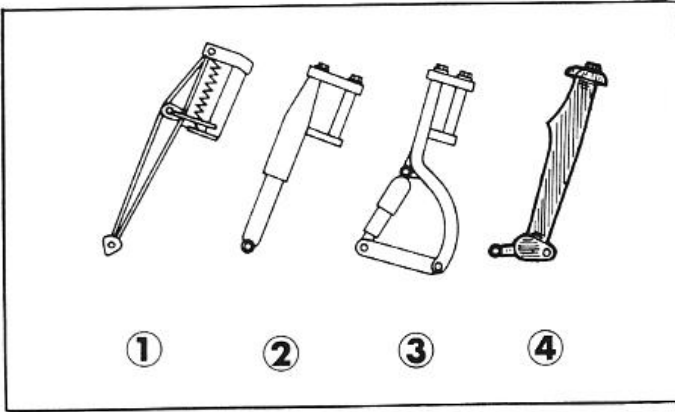
**Front Cushion**

Even though the frame may be light and of construction to permit safe and good riding consideration, riding comfort will not be realized if the road shocks are transmitted from the wheels.

P-50, with its bicycle-like lightweight frame construction, incorporates a cushion in the front fork for riding comfort.

Cushions are classified into various types according to their construction; P-50 has adopted a bottom link (leading link) type. (Fig. 4-7)

The bottom link type construction ensures smooth operation, riding comfort and good steerability; in addition, it allows wheel base to be practically unchanged.

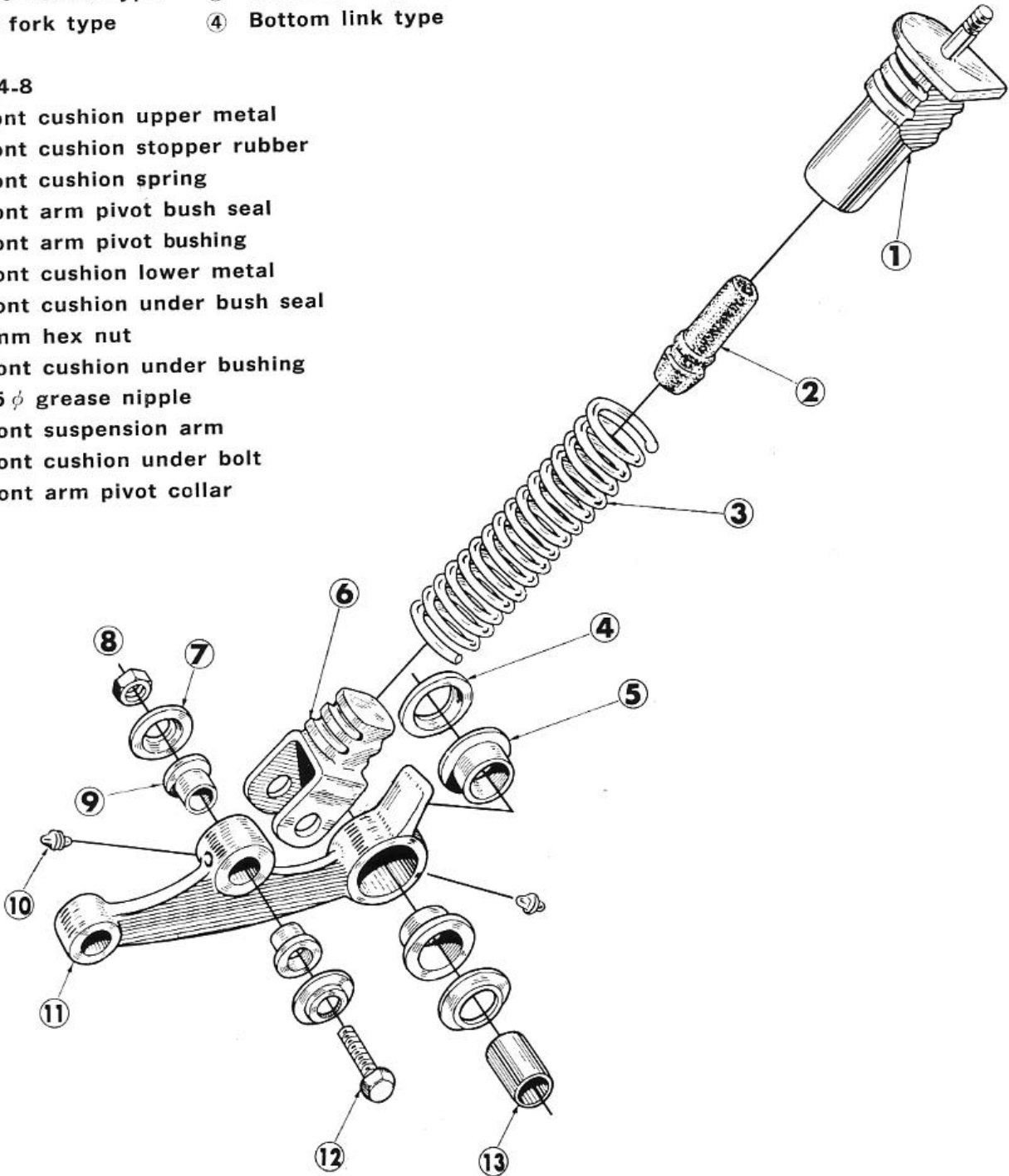


**Fig. 4-7**

- ① Pine-needle type      ② Telescopic type
- ③ R's fork type        ④ Bottom link type

**Fig. 4-8**

- ① Front cushion upper metal
- ② Front cushion stopper rubber
- ③ Front cushion spring
- ④ Front arm pivot bush seal
- ⑤ Front arm pivot bushing
- ⑥ Front cushion lower metal
- ⑦ Front cushion under bush seal
- ⑧ 6 mm hex nut
- ⑨ Front cushion under bushing
- ⑩ 4.5 φ grease nipple
- ⑪ Front suspension arm
- ⑫ Front cushion under bolt
- ⑬ Front arm pivot collar



**Front Wheel**

Tire size 2.00-17-2 PR is used on the front wheel. The front axle supports the cast aluminum alloy hub mounted on two 6201 ball bearings.

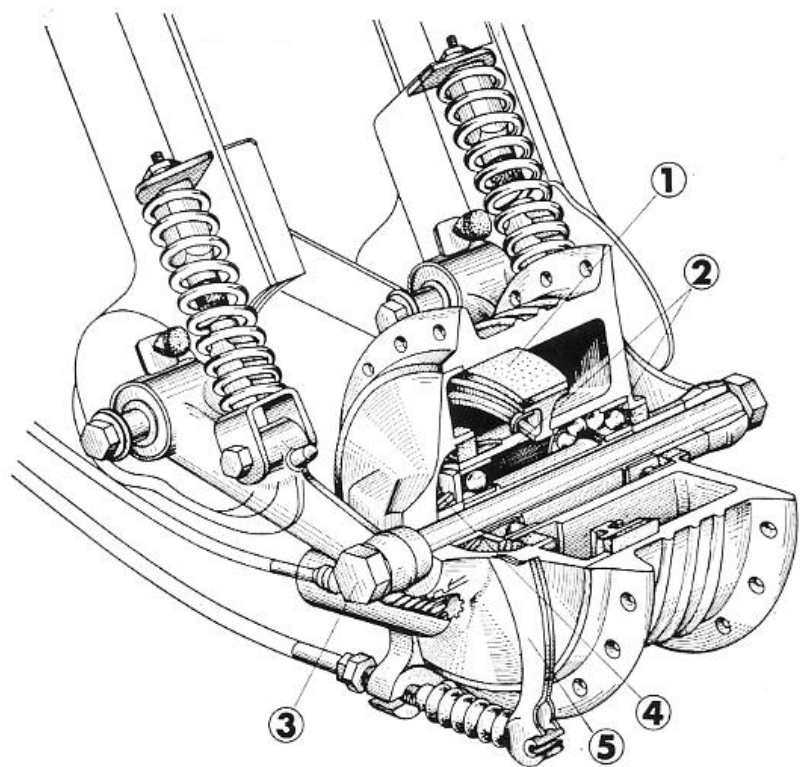
The brake panel incorporates the speedometer gear box. Oil seals are incorporated in both the brake panel and the hub to prevent the entry of dust to assure longer life. (Fig. 4-9)

Rim	HO-17	
Spoke	№13	32 ea

**Rear Wheel**

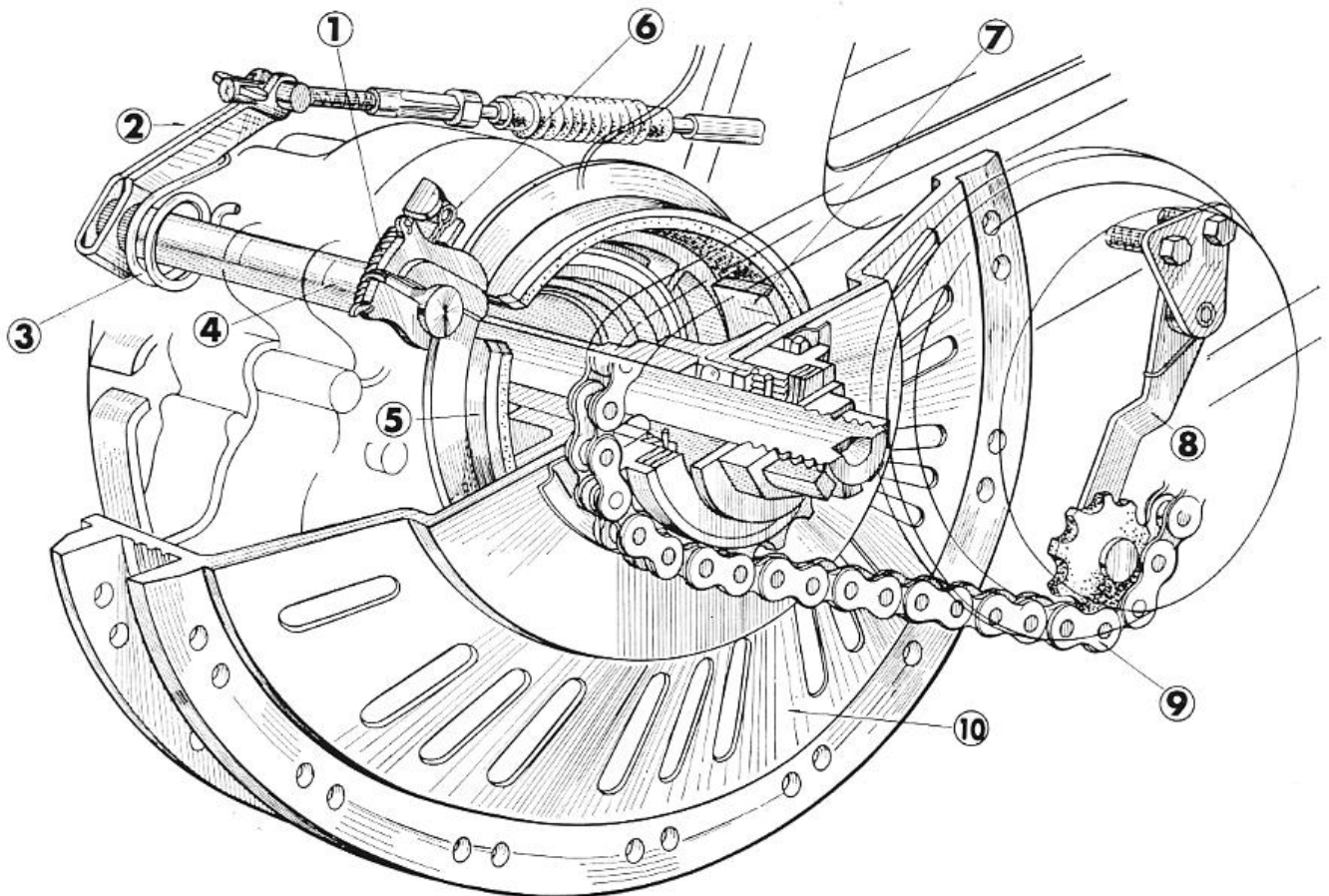
Tire size 2.25-17-2 PR is used on the rear wheel. The engine is fixed on the rear wheel hub through the final driven shaft with five bolts. The large cast aluminum alloy hub covers the engine crankcase. Holes are provided in the hub side wall for the purpose of cooling the engine, and internal fins circulates the air within the hub to further promote cooling. (4-10)

Rim	1.20-17	
Spoke	№13×№12	40 ea



- ① Brake shoe
- ② 6201 ball bearing
- ③ Front wheel axle
- ④ Speedometer gear
- ⑤ Front brake arm

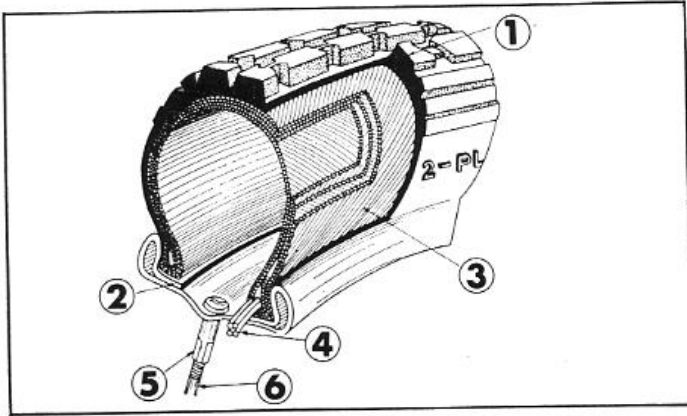
Fig. 4-9



- ① Rear brake shoe spring
- ② Rear brake arm
- ③ Rear brake arm spring
- ④ Rear brake cam
- ⑤ Rear brake shoe
- ⑥ Stop switch spring
- ⑦ Final driven shaft
- ⑧ Chain tensioner
- ⑨ Drive chain
- ⑩ Rear wheel hub

Fig. 4-10





**Fig. 4-11 Tire construction**

- ① Tread (A thick rubber layer. Design on the outside is called pattern.)
- ② Rim (A steel plate is rolled in and seam welded.)
- ③ Carcass (Cloth layers, 2 PL for two ply)
- ④ Bead (Some piano wires are enclosed along the circumference.)
- ⑤ Spoke nipple
- ⑥ Spoke nipple

Tire sizes are standardized by JIS (Japan Industrial Standard). For instance, 2.00-17-2 PR means that tire size is 2.00 inches, rim diameter 17 inches and two ply carcass. (Fig. 4-11)

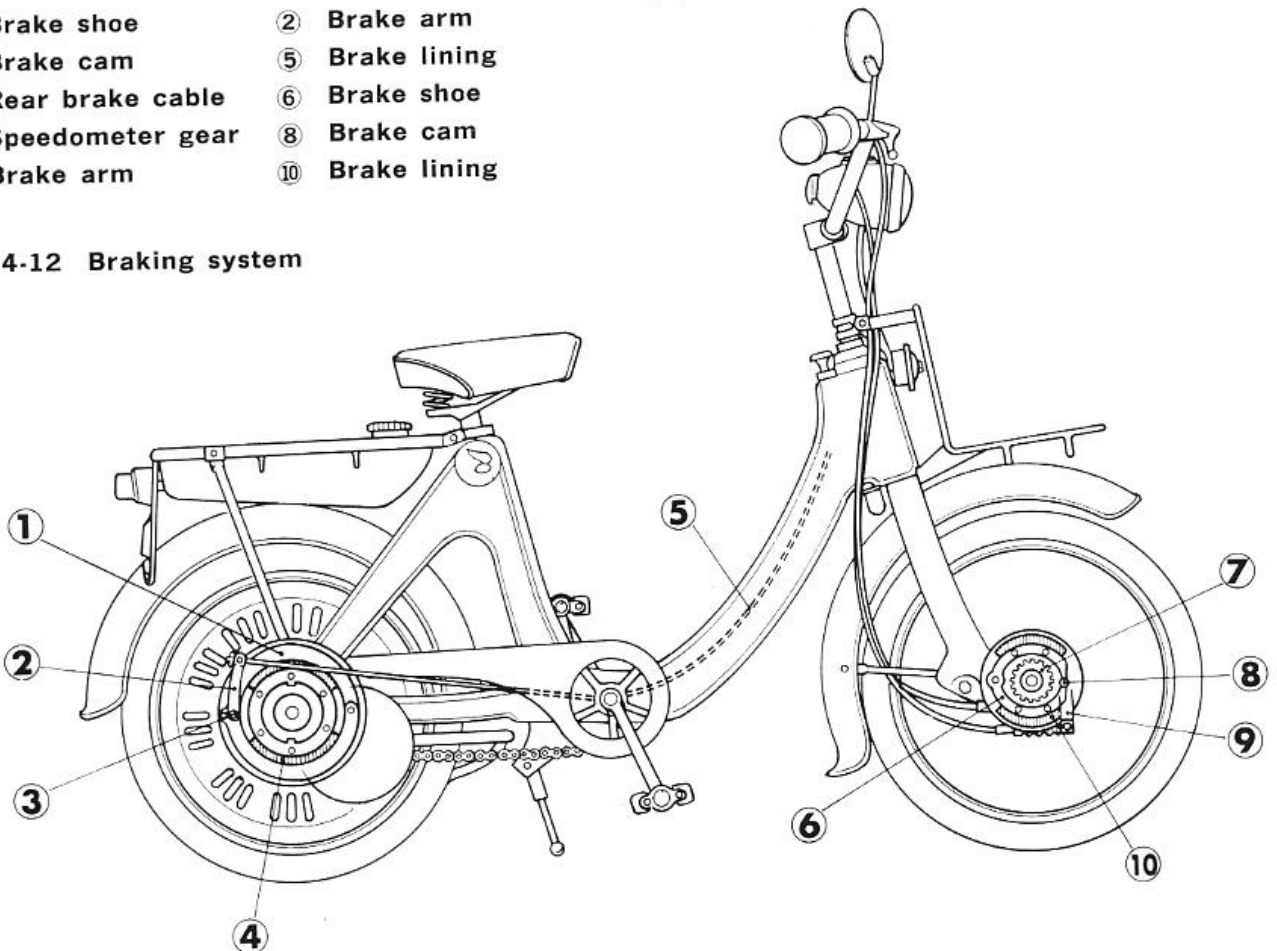
**Brake System**

The brake system employed is an outward expanding type shoe, actuating on the front wheel. In operation, the action of the right brake lever, through the brake wire and brake arm, forces the cam to rotate, and this in turn forces the brake shoe, incorporated in the front wheel hub, to move outward and come in contact with the inside of the hub.

On the rear wheel, and inward contracting type brake is employed. The action of the left brake lever actuates the rear brake cam, forcing the brake shoe to move inward and clamps the final driven shaft flange. (Fig. 4-12)

- |                    |                |
|--------------------|----------------|
| ① Brake shoe       | ② Brake arm    |
| ③ Brake cam        | ⑤ Brake lining |
| ⑤ Rear brake cable | ⑥ Brake shoe   |
| ⑦ Speedometer gear | ⑧ Brake cam    |
| ⑨ Brake arm        | ⑩ Brake lining |

**Fig. 4-12 Braking system**



In connection with the action of the rear brake cam, the stop switch is actuated to light up the stop lamp.

The stop switch is a self-adjusting type, which does not require adjustment and lights up the stop lamp by a specified movement of the left brake lever regardless of change in the cam lever position due to wear to the brake lining. (Fig. 4-13)

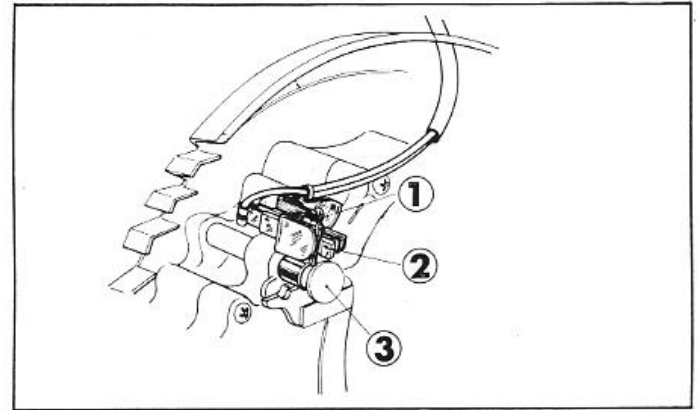


Fig. 4-13 ① Stop switch spring  
② Stop switch ③ Rear brake cam

## Saddle

The saddle can be adjusted to any height, with the bolt, within the range of the marking shown on the saddle pipe does not appear above the frame.

A hand grip is provided to the rear and on the underside of the saddle to use for raising the motorcycle on the stand. The saddle also serves as a rear cushion to dampen shocks. The saddle hinge is supported at two points to prevent the saddle from rolling. (Fig. 4-14, 15)

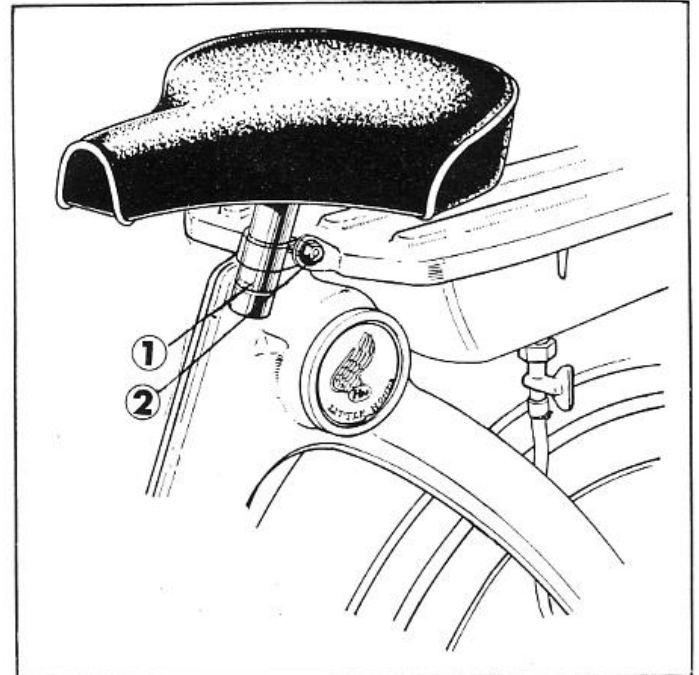


Fig. 4-14 ① Marking ② 8×42 hex bolt

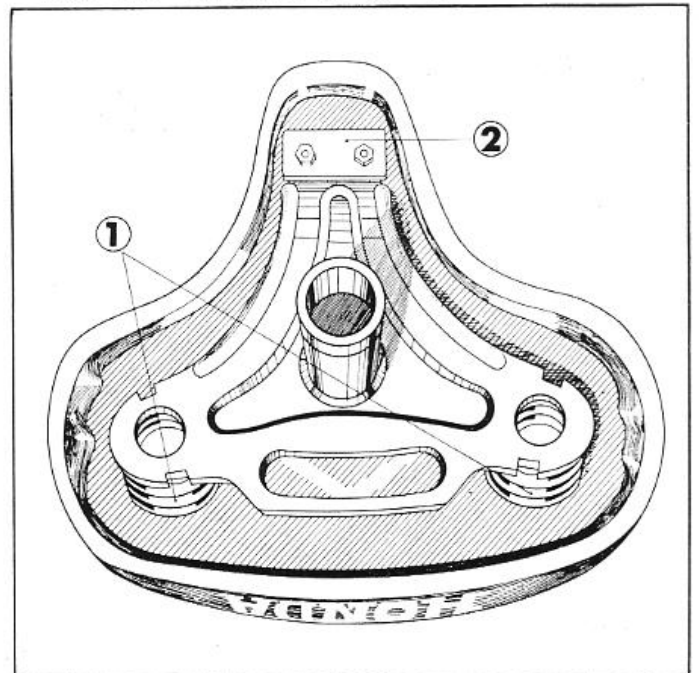
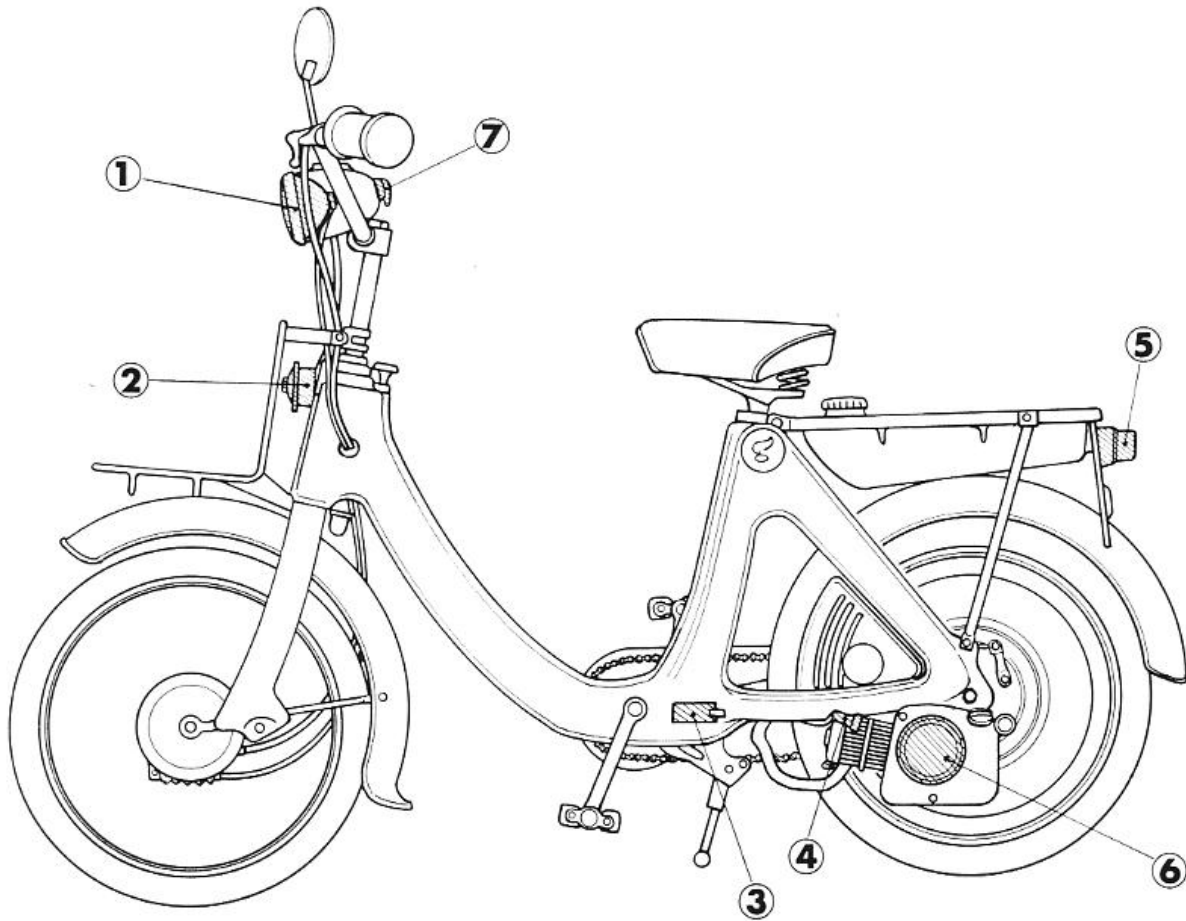


Fig. 4-15 ① Saddle cushion spring  
② Saddle hinge

## 5. ELECTRICAL EQUIPMENT

The electrical equipment used on P-50 not only generates good sparks by the AC generator but also includes many safety components for the safety of the rider. In addition, turn signal lamps are available as optional parts. They are very simple to install. (Fig. 5-1)



- ① Head light
- ② Horn
- ③ Ignition coil
- ④ Spark plug
- ⑤ Tail, stoplamp
- ⑥ Flywheel A. C. generator
- ⑦ Lighting switch

Fig. 5-1 Installed locations of electrical parts

The head light is mounted at the center of the handle bar and adjustment of the beam angle is made by loosening the head light case fixing nut.

Two different mounting grooves are provided in the socket for changing the beam adjustment. By aligning the mark (A or B) on the bulb to the corresponding mark on the socket, when installing the bulb, the best illumination is obtained. (Fig. 5-2)

A hole is provided in the head light reflector to utilize the stray light within the head light case to illuminate the speedometer. A 6 V (10W) bulb is used in the head light.

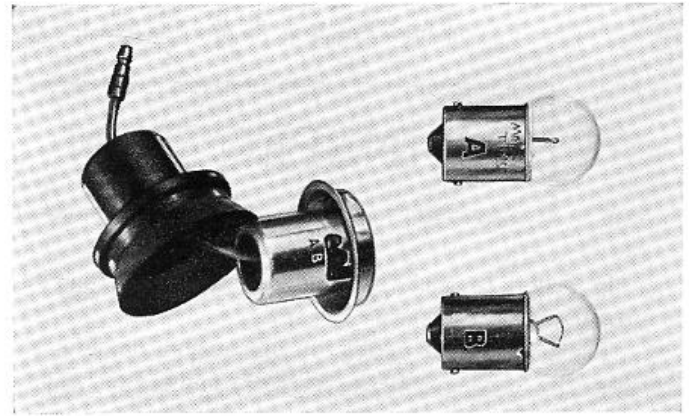
When the lighting switch is positioned "ON", the head light as well as the tail lamp light up and simultaneously the stop lamp and the horn are switched to night circuit in order to obtain the same brightness for the stop lamp and the same sound for the horn as for daytime.

A 6 V (SW) tail lamp and a 6 V (8W) stop lamp are incorporated in the same unit.

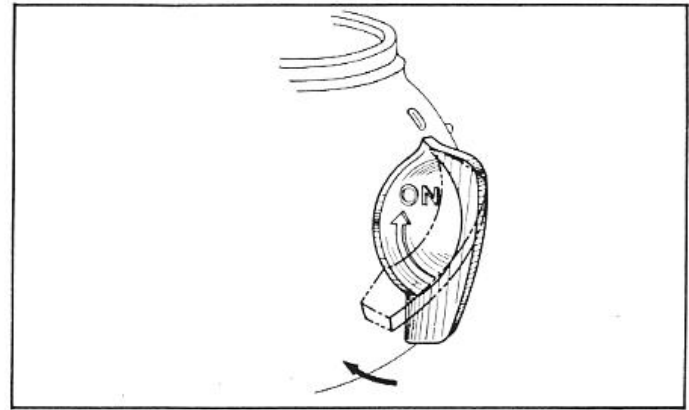
The head light will not light up when pedaling. Brackets for flashlight installation are available as optional parts.

**NOTE**

**Use only lamps of specified rating.**



**Fig. 5-2 Headlight bulbs**



**Fig. 5-3 Lighting switch**

Destination	Headlight bulb	Taillight bulb	Stoplight bulb
U. S. A.	6V—15W	6V—5.3W	6V—17W
France, Belgium	6V— 6W	6V—1.8W	6V— 5W
England General	6V—10W	6V— 3W	6V— 8W
Holland	6V—10W	6V—1.8W	6V— 3W
Germany	6V—15W	6V—1.8W	

# MAINTENANCE AND REPAIR

## 1. INSPECTION AND ADJUSTMENT

In order to maintain the vehicle in safe and best operating condition, inspections and adjustments should be properly performed.

There are two types of inspection, namely, the daily inspection which is performed by the owner before starting the engine and the periodic inspection which is performed by the dealer in accordance with the established schedule.

### 1. DAILY INSPECTION

In performing the daily inspection, ask yourself the following questions and then check those specific items to assure that the conditions are satisfactory.

- (1) Is the engine oil level correct? Check with the dipstick. Specified volume 0.7 ℓ
- (2) Is there sufficient fuel for the trip? Tank capacity 2.5 ℓ
- (3) Is the play of the front brake lever normal? It should be 10~15 mm (3/8~5/8 in) at the end of the lever.
- (4) Is the play of the rear brake lever normal? It should be 10~15 mm (3/8~5/8 in) at the end of the lever.
- (5) Are all the main components properly fastened? (See page 57)
- (6) Do the head, tail and stop lights operate?
- (7) Does the horn have the proper loudness?
- (8) Is the rear view mirror positioned correctly?
- (9) Is the front tire air pressure normal? 1.3 kg/cm<sup>2</sup> (18.5 lbs/in<sup>2</sup>) standard
- (10) Is the rear tire air pressure normal? 1.7 kg/cm<sup>2</sup> (24 lbs/in<sup>2</sup>) standard

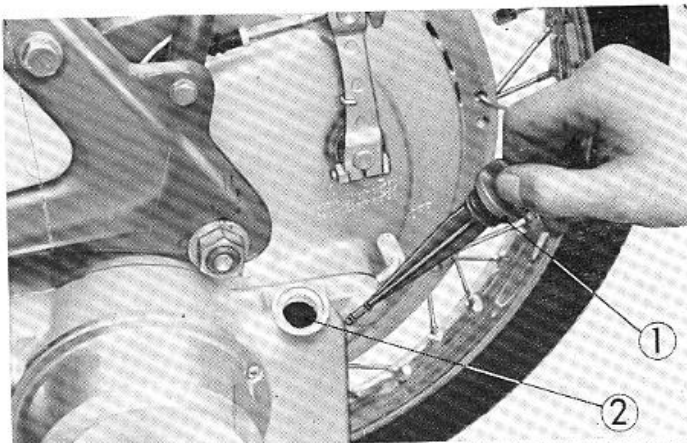


Fig. 1-1 ① Oil level gauge ② Oil filler opening

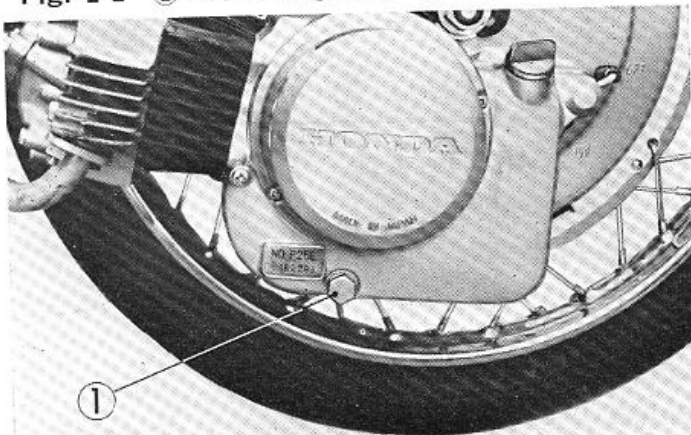


Fig. 1-2 ① Drain plug

### 2. PERIODIC INSPECTION

The schedule of periodic inspection and adjustment for the various components are shown in the following table.

PERIODIC MAINTENANCE SCHEDULE

INTERVALS	1/2 month or 250 km (160 miles)	2 months or 1,000 km (620 miles)	4 months or 2,000 km (1,250 miles)
ITEMS			
Engine oil change	●	●	●
Adjust ignition timing	●	●	●
Adjust tappet clearance	●	●	●
Servicing air cleaner		●	
Greasing fork pivots, front		●	
Tighten nuts and bolts	●	●	●
Adjust brakes		●	

**CAUTION:** A more frequent engine oil change is recommended when operated under dusty condition. Tire pressures should be checked weekly.

## A. Lubrication

Lubricant is required on the rotating or sliding surfaces of the moving parts to prevent wear and possible seizure due to the heat produced by the friction. The function of the lubricant is to provide a thin film of oil between the surfaces so that there are no direct surface to surface contact. This will prevent wear and friction, thus, minimizing the possibility of heat generation. Insufficient lubricating oil or prolonged use of dirty oil will not only reduce the service life of the mechanical components but also adversely affect the performance of the motorcycle.

### 1. Changing and Replenishing Engine Oil

- (1) Remove the oil level gauge and unscrew the drain plug at the bottom of the crankcase and drain the engine oil completely. Engine oil will drain more quickly and thoroughly if the engine is still warm.
- (2) Reinstall the drain plug securely and refill the crankcase with new engine oil. (Fig. 1-1, 2)

If the engine had been overhauled, fill the crankcase with 0.7 ℓ of oil (1.5 US pt., 1.2 Imp. pt.), however, during oil changes or replenishments, refill according to the oil level gauge. The crankcase should be filled with oil up to the upper level mark on the gauge. Proper oil checking procedure is not to screw the cap into the crankcase.

#### OIL

Oil of poor quality may adversely affect the engine performance as well as its life. (Fig. 1-3, 4)

The grade 10W30 may be used in all seasons regardless of temperature.

### 2. Parts which require lubricating with oil

- Hanger crank axle
- Crank pedal
- Drive chain
- Chain tensioner
- Free wheel sprocket (Fig. 1-5, 6)

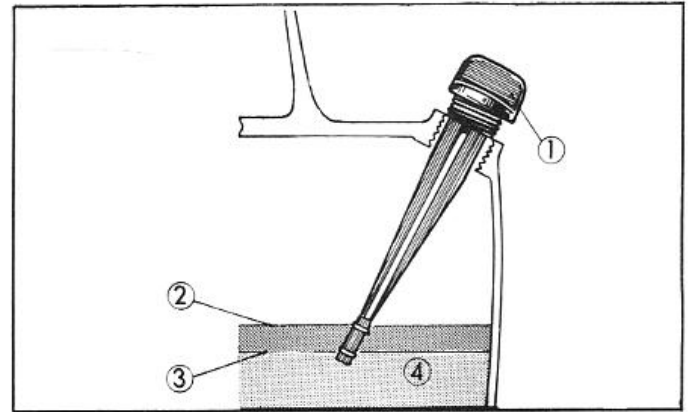


Fig. 1-3 ① Oil level gauge ② Maximum oil level ③ Minimum oil level ④ Oil

Outside temp.		SAE Groups
°C	°F	SAE 30
+15	+60	
0	+32	SAE 20 or SAE 20W
		SAE 10W

Fig. 1-4

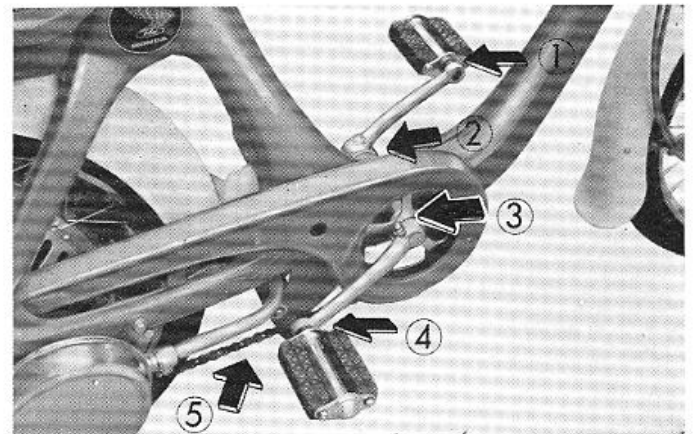


Fig. 1-5 ① L. crank pedal ② Hanger crank axle left side ③ Hanger crank axle right side ④ R. crank pedal ⑤ Drive chain

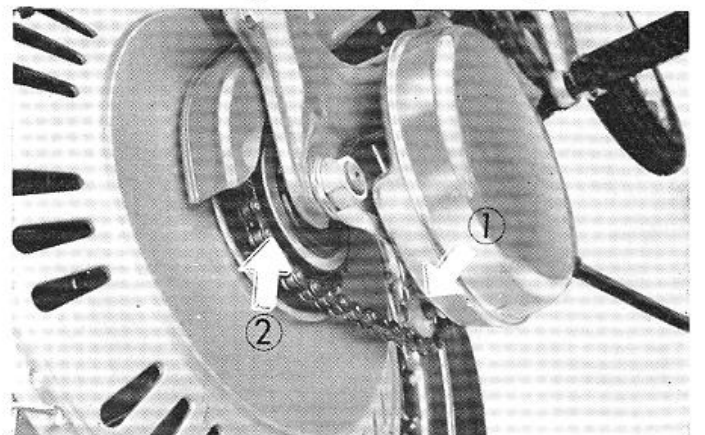


Fig. 1-6 ① Chain tensioner ② Free wheel sprocket

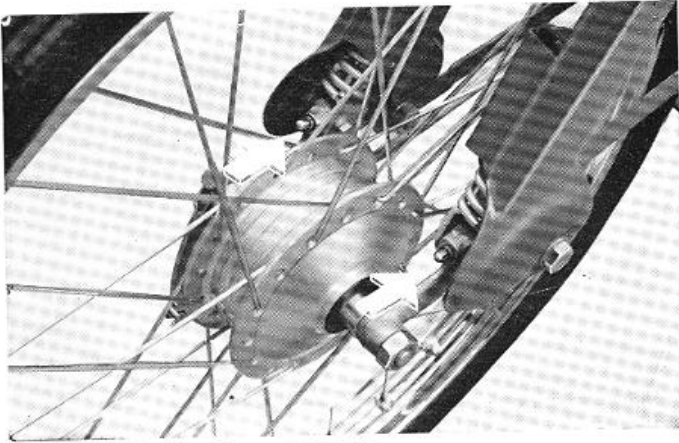


Fig. 1-7 Applying grease

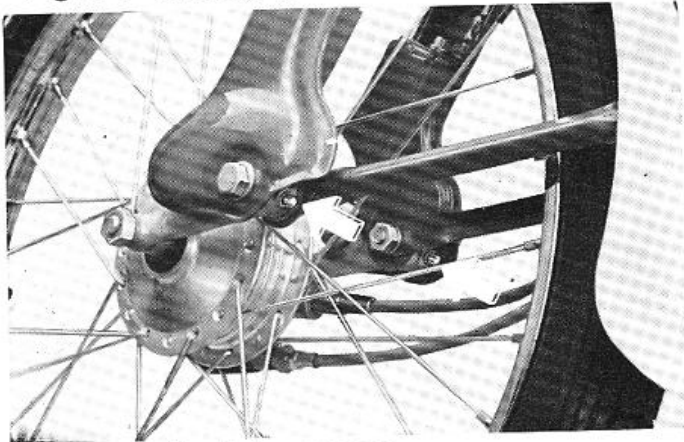


Fig. 1-8 Applying grease

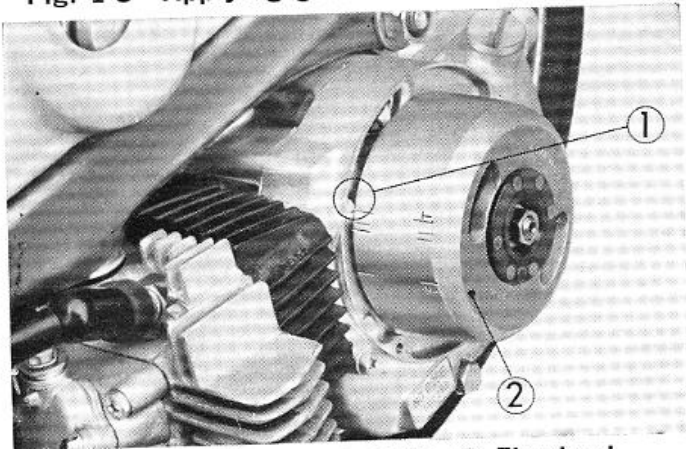


Fig. 1-9 ① Alignment mark ② Flywheel

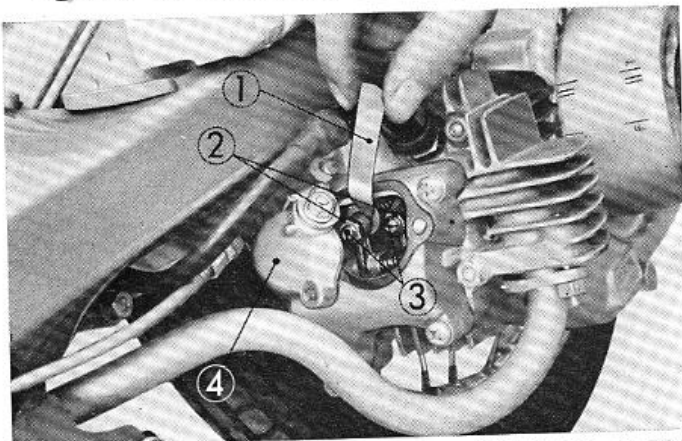


Fig. 1-10 ① Thickness gauge (0.05 mm : 0.002 in) ② Nut ③ Screw ④ Tappet adjusting cap

### 3. Greasing

#### Parts which require lubricating with grease.

Apply grease to grease nipples with grease gun. (Fig. 1-7, 8)

#### Parts not requiring periodic oil change or lubrication.

There are some parts which do not require regular lubrication, they are only lubricated whenever the parts are disassembled for repair or replacement, or when overhauled. These parts are:

- Throttle grip
- Bottom ball race
- Top ball race
- Main stand
- Front and rear wheel bearings

## B. Engine

### 1. Tappet Clearance Adjustment

The tappet clearance will have a great deal of effect on the valve timing. Further, if the clearance is too small, it may prevent the valve from fully closing and result in pressure leak at the valve. On the other hand, an excessive tappet clearance will produce tappet noise, causing noisy engine operation. The tappet clearance will also have a varying degree of effect on the engine power output and engine operation.

- (1) Remove the dynamo cover and align the timing mark "T" on the flywheel with the timing index mark on the crankcase. (Fig. 1-9)
- (2) Remove the tappet adjusting cap on the cylinder head and check the clearance between the adjusting screw and the valve. If the valve is actuated by the screw, rotate the flywheel one complete revolution and realign the timing marks to set the piston at top-dead-center of the compression stroke. Check the tappet clearance with a thickness gauge to see if it is of standard clearance of 0.05 mm (0.002 in). If adjustment is necessary, loosen the adjusting screw lock nut and make the adjustment with the adjusting screw. Both the inlet and exhaust valves should be set to the same clearance. Lock the adjusting screw after the adjustment has been completed. (Fig. 1-10)

#### - NOTE -

1. The adjustment must be made with a cold engine.
2. When tightening the adjusting screw lock nut, hold the screw to prevent its turning.

## 2. Ignition Timing Adjustment

An improper ignition timing, regardless of the accuracy of the valve timing or the proper compression pressure, will not produce a satisfactory engine performance. Ignition timing out of adjustment will seriously affect engine power output as well as resulting in engine overheating and causing backfires.

Check the ignition timing in the following manner.

- (1) Remove the dynamo cover and align the "F" mark on the flywheel with the timing index mark on the crankcase. In this position, check to make sure that the contact points are just about to open. (Fig. 1-11)

Valve Timing [at 0.55 mm (0.022 in) lift]		
<b>IN</b>	Open	(BTDC) 5°
	Close	(ABDC) 10°
<b>EX</b>	Open	(BBDC) 10°
	Close	(ATDC) 5°

This check can be performed by connecting one of the timing tester leads to the black lead from the engine and the other lead to the engine ground. With this hook-up, rotate the flywheel and adjust the breaker assembly so that the tester lamp will light up when the "F" mark on the flywheel is aligned to the timing index mark on the crankcase. (Fig. 1-12)

Adjust the breaker points by loosening the breaker plate lock screw and moving the breaker plate with a screwdriver. (Fig. 1-13)

- (2) Normal breaker point gap should be 0.3~0.4 mm (0.012~0.016 in)

- NOTE -

1. Inspect the breaker point contact surface. Burnt or pitted contact point surfaces will cause poor ignition. If necessary, dress the surfaces with an oilstone so that the points are making good contact.
2. If the point surfaces are stained with oil :
  - a. The surfaces will darken and result in excessive wear.
  - b. Oil traces, if left unremoved for a long time, will harden and form insulation coating over the point surfaces, causing ignition failure.
3. The contact breaker point gap may change slightly when the screw is tightened, therefore, recheck after making the adjustment to assure that the gap setting has not been disturbed.

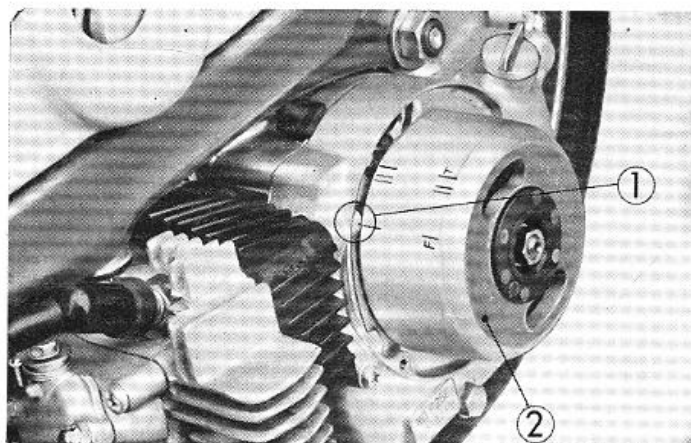


Fig. 1-11 ① Alignment mark ② Flywheel

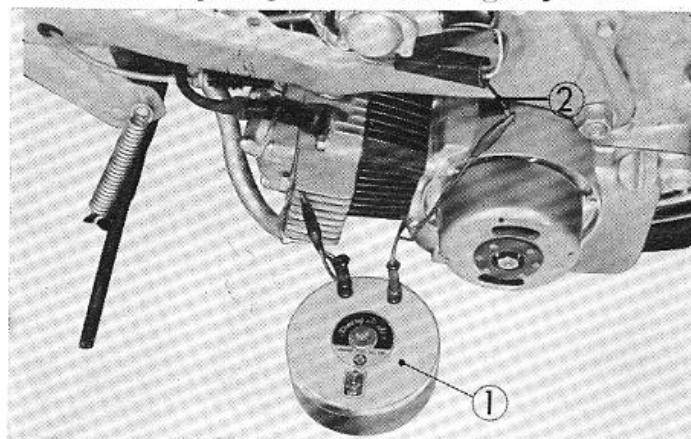


Fig. 1-12 ① Black lead ② Timing tester

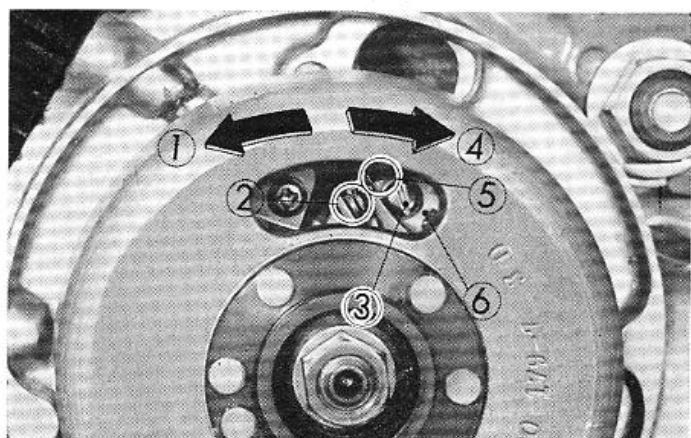


Fig. 1-13 ① To advance ② Breaker point ③ Lock screw ④ To retard ⑤ Screw driver adjusting slot ⑥ Breaker plate

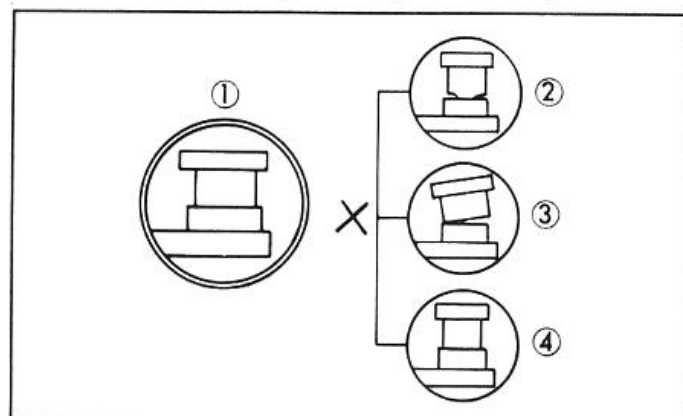


Fig. 1-14 ① Normal ② Worn contact points ③ Side contacting ④ Dirty contact points





Fig. 1-15 ① Spark plug

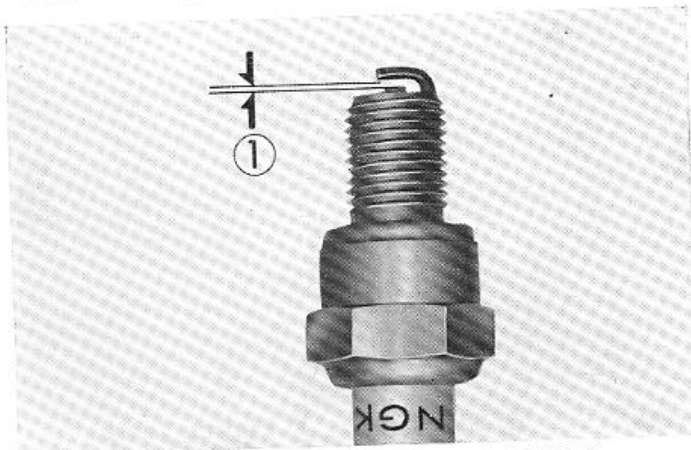


Fig. 1-16 0.6~0.7mm (0.024~0.028 in)

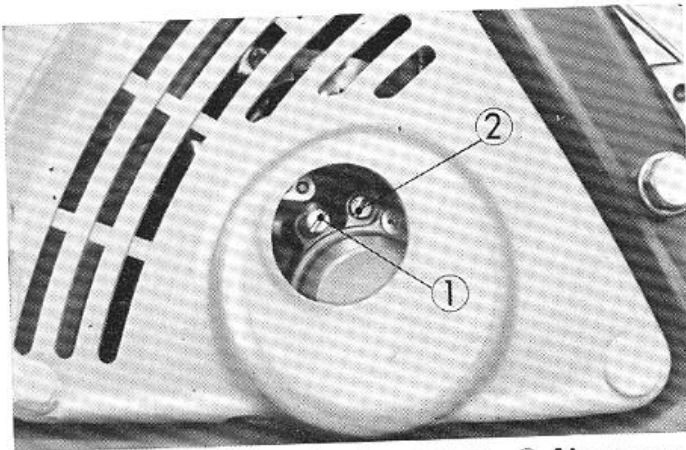


Fig. 1-17 ① Throttle stop screw ② Air screw

### 3. Spark Plug Inspection

The condition of a spark plug is an indicator of engine performance. A dirty or damaged spark plug, or plug electrode which is eroded, will not produce a good strong spark, therefore, the spark plug should be inspected periodically for cleaning and adjustments.

Spark plugs with sooty, wet electrodes or electrodes covered with deposits will permit the high tension voltage to bridge over the gap without sparking, therefore, spark plugs should be cleaned to be free of foreign objects.

- (1) The use of a spark plug cleaner is the recommended method of cleaning the plugs, however, a satisfactory cleaning can be performed by using a needle or a stiff wire to remove the deposits and then wash in gasoline followed by drying with a rag.
- (2) Adjust the spark gap after cleaning.  
The correct spark gap 0.6~0.7 mm (0.024~0.028 in)  
The standard spark plug C-6HB

#### - NOTE -

1. Do not remove the deposits by burning.
2. When installing the spark plug, install finger tight before torquing with a plug wrench.
3. The spark plug electrodes will wear as a result of long use, causing a wide spark gap and will result in lowering the sparking performance. Therefore, periodic inspections should be made.

### 4. Carburetor Adjustments

A dirty carburetor or carburetor out of adjustment will cause poor engine performance. As an example, a carburetor set to a lean air-fuel mixture will cause the engine to overheat, while a rich mixture will cause the engine to run sluggish. An overflowing of fuel from the carburetor is a possible fire hazard. Carburetor should be cleaned and adjust periodically.

- (1) Set the throttle stop screw gradually to the lowest idling speed.
- (2) Next, adjust the air screw by turning slowly in both directions to obtain the highest engine speed.
- (3) Reduce the engine speed which has gone up in (2) to the lowest idling speed by regulating the throttle stop screw.
- (4) At this throttle stop screw setting, recheck the carburetor adjustment by manipulating the air screw. The idling speed should be adjusted to permit the engine to idle smoothly with the rear wheel stationary. (Fig. 1-17)

## - NOTE -

1. All adjustment should be made after the engine has attained operating temperature.
2. Poor engine performance may occasionally be caused by troubles in the ignition or valve system. Therefore, when trying to locate an engine trouble, attention should be given to not only carburetor adjustment but also to the other systems.
3. Lead tetrachloride or other foreign substance contained in fuel will collect in the float chamber and if not cleaned periodically, will result in restriction to the fuel flow, causing poor engine performance. It is recommended that the carburetor be cleaned monthly.

**Carburetor Fuel Level Adjustment**

It is difficult to directly measure the fuel level, therefore, the fuel level is determined indirectly by measuring the height (H) of the float.

1. Place the carburetor in inverted position.
2. In this position, measure H (Old type 3.5mm: New type 5.0mm) with a gauge. The tolerance of the float position is  $\pm 0.1\text{mm}$  (0.0040 in). If the float height is beyond the specified tolerance, make the adjustment by bending the float arm.

## - NOTE -

1. When making the measurement with the gauge, care should be exercised not to deform the float or float arm since the float valve is not spring loaded.
2. The float arm is of hook type, therefore, too large or too small a clearance will effect the valve movement.

**NEW TYPE CARBURETOR**

The new type carburetor is used on Frame No. P50-A148607 and subsequent.

The valve seat is driven into the float chamber cover, therefore, the valve will be removed together with the chamber cover. This will simplify the valve cleaning operation since the valve does not have to be disassembled. The fuel level in the float chamber is measured from the cover flange as shown (Fig. 1-19-1~2)

The main jet can be disassembled by merely removing the float chamber cover to get access to the valve. The oil cover has been deleted as being no longer required. In addition, the air jet has been made an integral part of the bore.

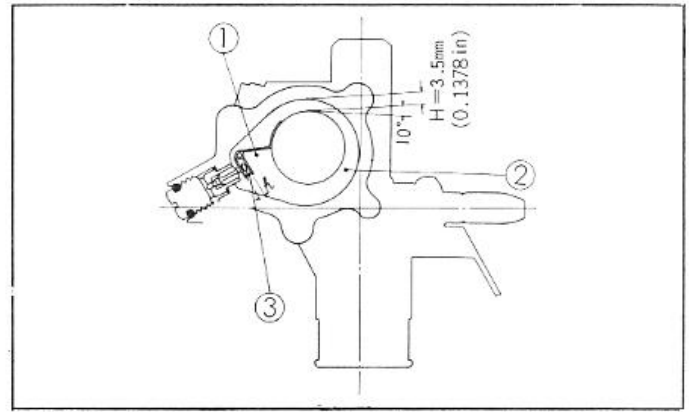


Fig. 1-18-1 ① Float arm ② Float ③ Float valve

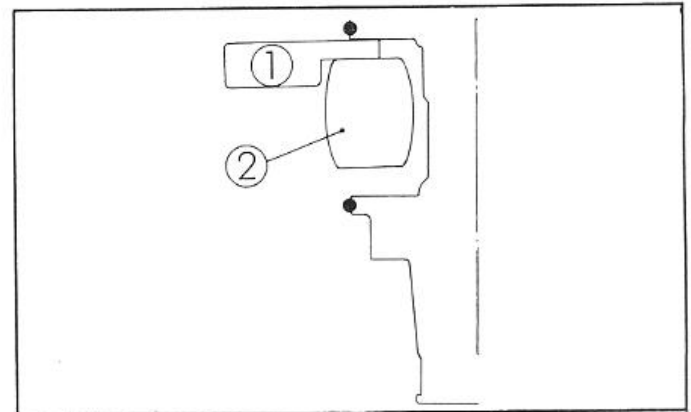


Fig. 1-18-2 ① Gauge ② Float

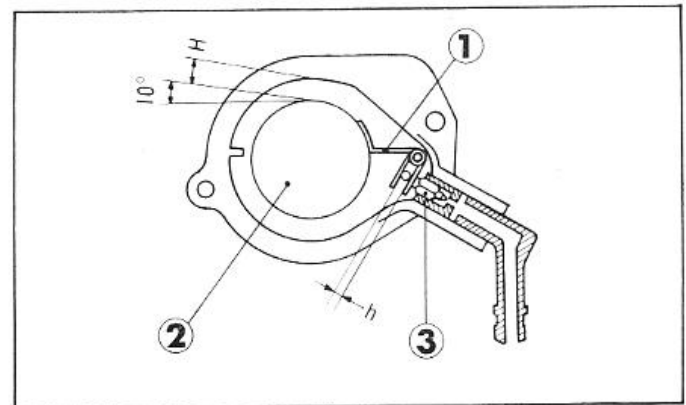


Fig. 1-19-1 ① Float arm ② Float ③ Float valve

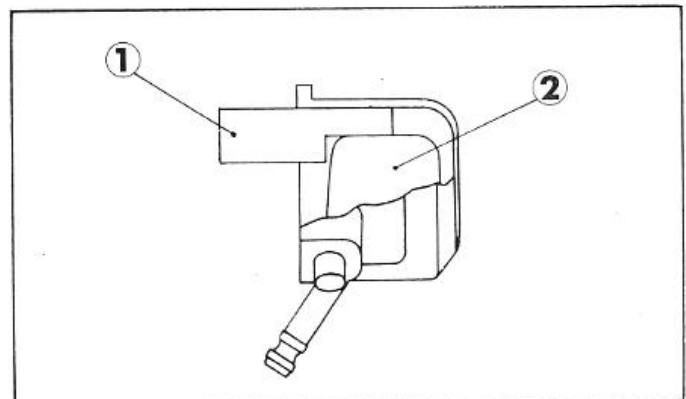


Fig. 1-19-2 ① Gauge ② Float

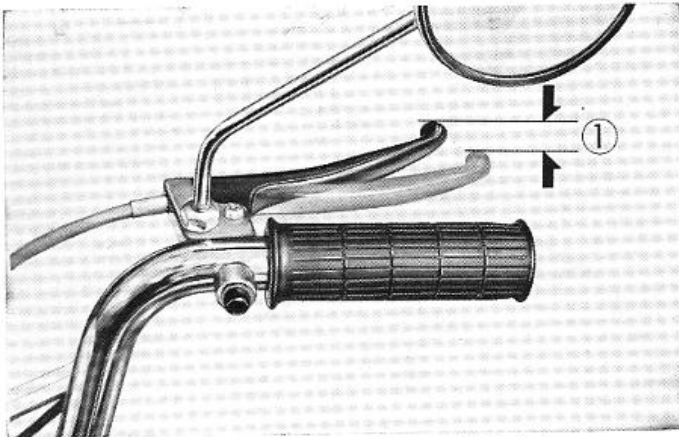


Fig. 1-20 ① 10~15 mm (3/8~5/8 in)

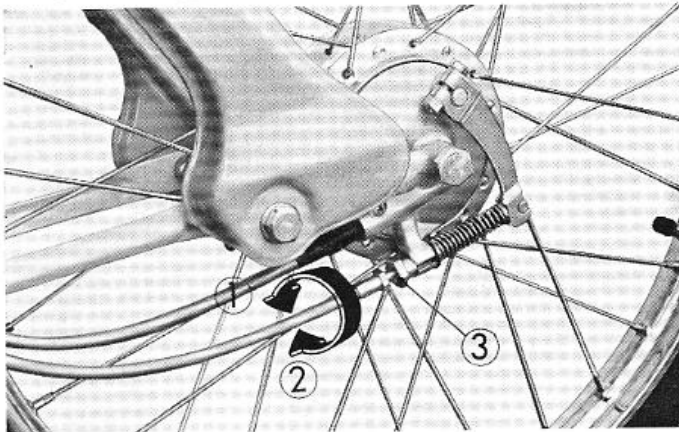


Fig. 1-21 ① To increase ② To decrease  
③ Adjusting nut

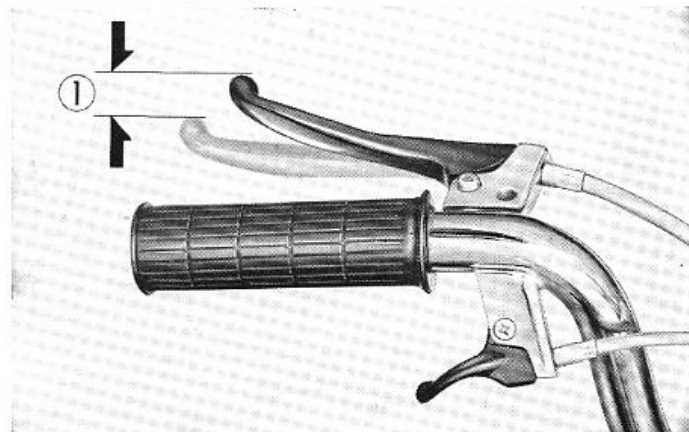


Fig. 1-22 ① 10~15 mm (3/8~5/8 in)

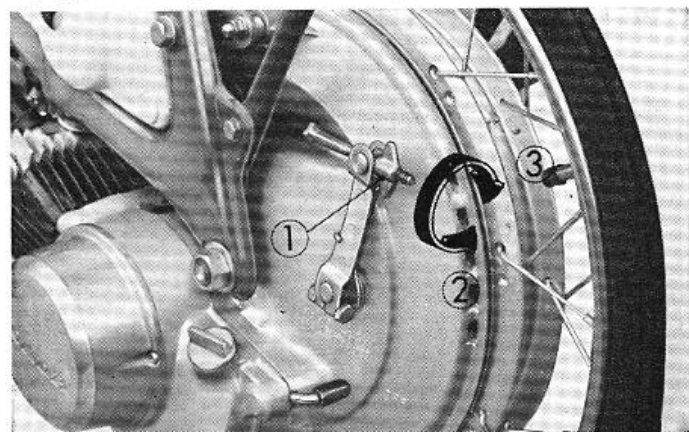


Fig. 1-23 ① Adjusting nut ② To increase  
③ To decrease

## C. Frame

### 1. Brake Adjustment

Brakes are the life-line of the rider, therefore, do not neglect to perform the periodic inspection, daily inspection and pre-riding inspection.

#### Front Brake Adjustment

The free play of the brake lever, that is, the distance between the normal attitude and the point where the brake starts to take hold should be 10~15 mm (3/8~5/8 in). (Fig. 1-20)

Adjustment is made with the adjusting nut. (Fig. 1-21)

#### Rear Brake Adjustment

The free play of the brake lever, that is, the distance between the normal attitude and the point where the brake starts to take hold should be 10~15 mm (3/8~5/8 in). (Fig. 1-22)

Adjustment is made with the adjusting nut. (Fig. 1-23)

### 2. Security of Component Parts

Bolts, nuts and other threaded fasteners will become loose due to vibration, fatigue of the fastened parts, etc. as a result of long use. To prevent the attaching fasteners from loosening, they should be retightened periodically. (Fig. 1-24, 25)

- (1) Handle set bolts
- (2) Front arm pivot bolts
- (3) Front cushion lower bolts
- (4) Front wheel axle nut
- (5) Bolts and nuts fixing both ends of rear torque arm
- (6) Rear axle nut
- (7) Steering stem nut
- (8) Crank arm set pin
- (9) Front and rear wheel spokes

When crank arm set pin becomes loose, move both left and right crank arms inward so that no looseness exists in the direction parallel to the shaft. In this condition, install the pin into the arm and tighten with the nut.

Riding with loose spokes will place an ununiform loading on the rim as well as on the remaining spokes and will cause the rim to develop runout and the spokes subject to damage. The spokes should be inspected frequently and retorqued when they become loose.

Raise the wheel off the ground and check each spoke for tightness using a spoke wrench. Any spoke which is noticeably loose should be torqued to the same value as the remaining spokes so that the spokes are all of uniform torque. Use the spoke nipple tool and torque wrench.

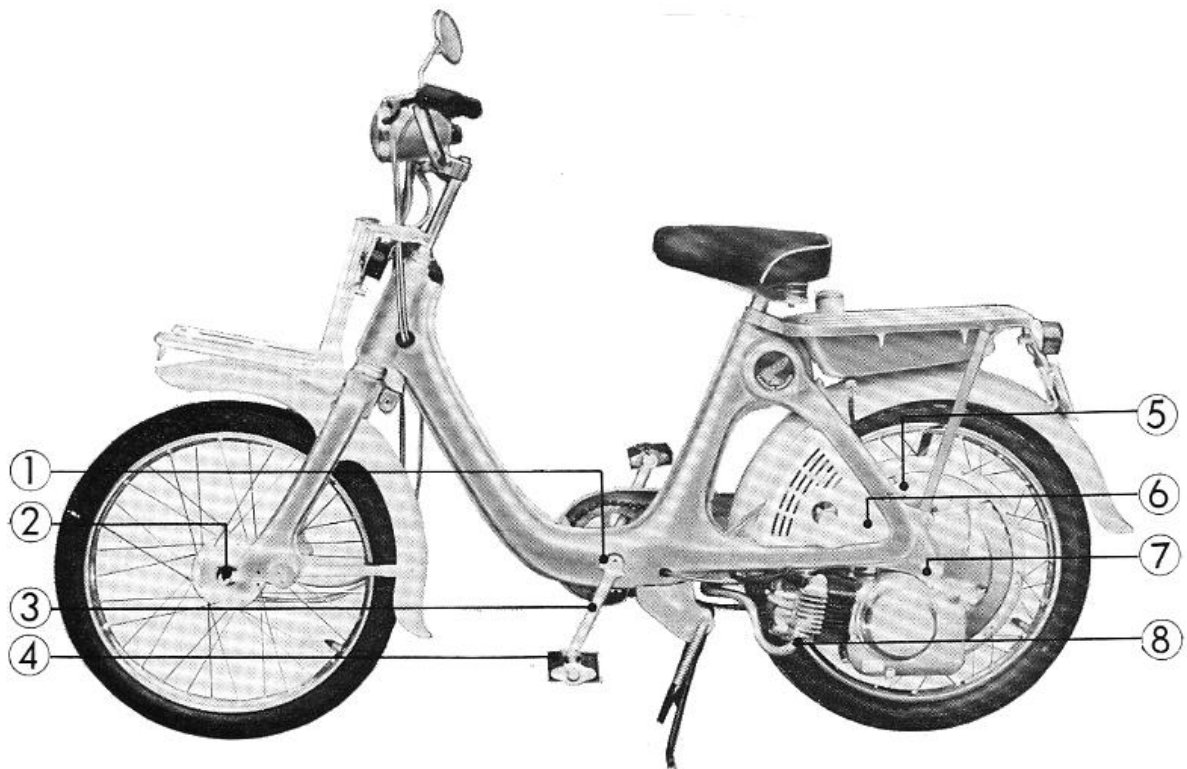


Fig. 1-24 ① Crank arm set pin ② Front wheel axle nut  
 ③ Crank arm ④ Crank pedal ⑤ Rear torque arm  
 ⑥ Carburetor cover ⑦ Rear axle nut ⑧ Exhaust pipe



Fig. 1-25 ① 6×14 bolt ② Spoke ③ Rear axle nut  
 ④ Muffler band ⑤ 6×14 screw (2 ea) ⑥ Spoke

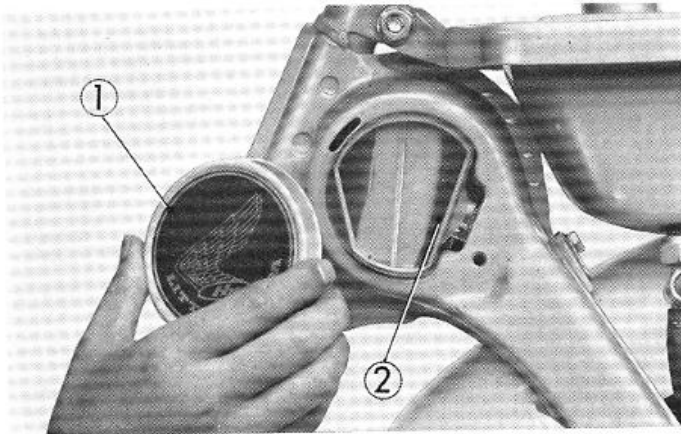


Fig. 1-26 ① Air cleaner cover  
② Air cleaner cap

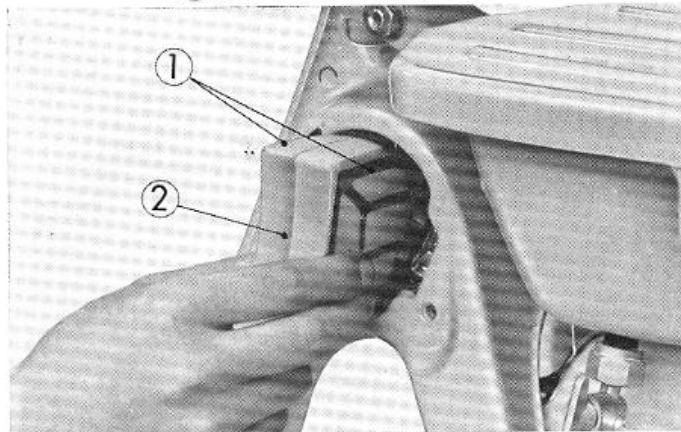


Fig. 1-27 ① Element set plate  
② Air cleaner element

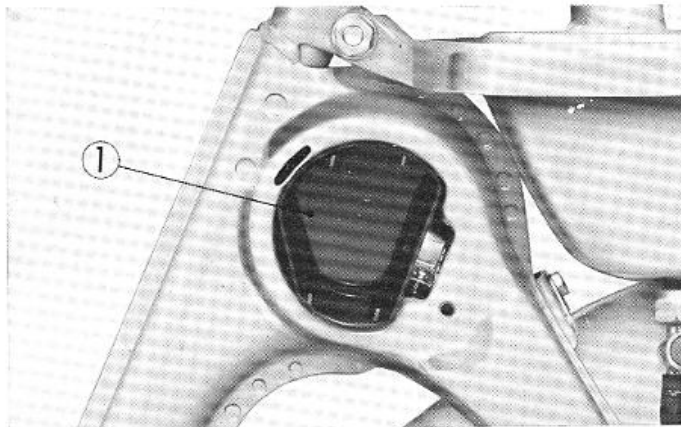


Fig. 1-28 ① Air cleaner case

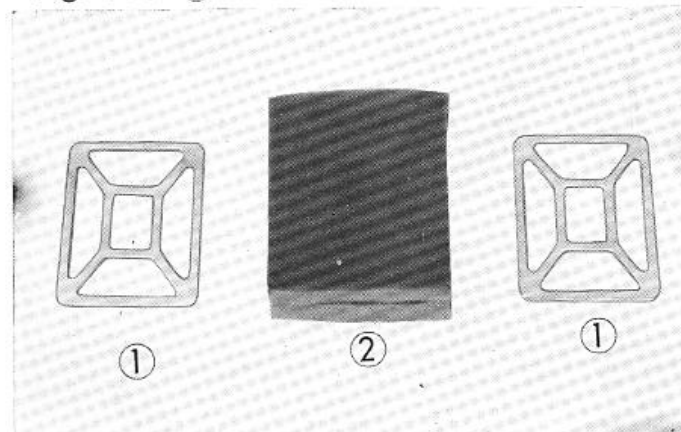


Fig. 1-29 ① Element set plate  
② Air cleaner element

### 3. Air Cleaner Servicing

An air cleaner clogged with dust restricts the free passage of inlet air and results in power loss or drop in acceleration, therefore, periodic servicing of the air cleaner should be performed.

- (1) Remove the air cleaner cover.
- (2) Remove the air cleaner case cap. (Fig. 1-26)
- (3) Remove the air cleaner element together with the element set plate.
- (4) Tap the air cleaner element lightly to remove the dust or wash in water. (Fig. 1-27)
- (5) Remove the dust from the inside of air cleaner case. (Fig. 1-28)

#### - NOTE -

1. Caution not to allow oil to get on the air cleaner element. After washing, reinstall the air cleaner element after it is completely dried.
2. After installing the air cleaner case cover, check to make sure that the cap is in close fit with the air cleaner element.
3. Check to make sure that there is no place for air to leak in.

### 3. Other Inspections and Adjustments

#### (1) Adjustments of Throttle Grip and Throttle Cable

- ① When excessive play exists in the direction parallel to the shaft, turn up the grip rubber and check the screw for looseness. (Fig. 1-30)
- ② When excessive play exists in the rotating direction, adjust the throttle cable. Make the adjustment with the adjusting bolt. After the adjustment, reinstall the cap securely. (Fig. 1-31)

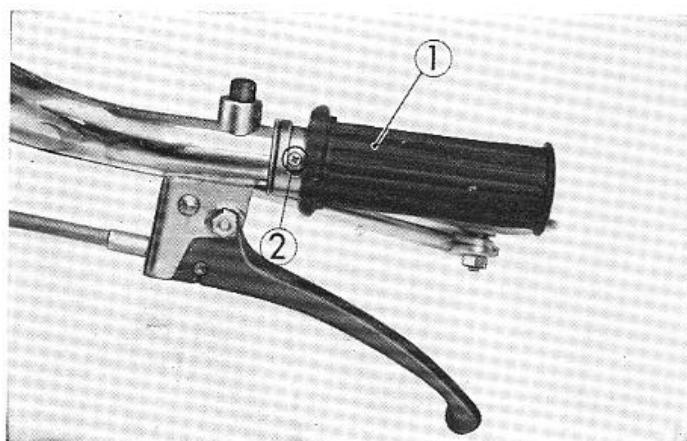


Fig. 1-30 ① Grip rubber ② Screw

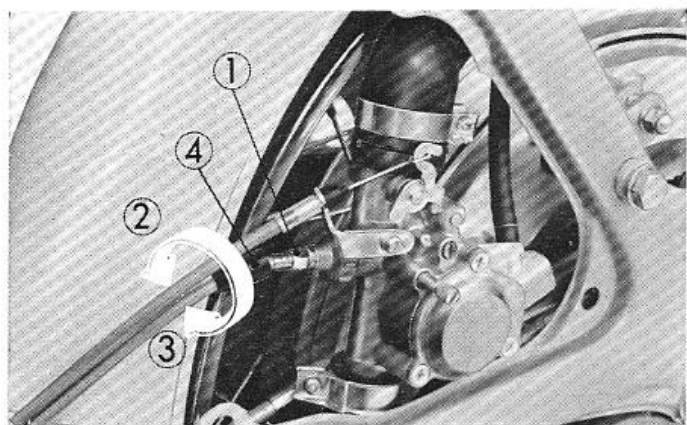


Fig. 1-31 ① Adjusting bolt ② To decrease  
③ To increase ④ Cap

#### (2) Engine Decompression Lever Adjustment

The lever play should be 0.1~0.4 cm (0.04~0.16 in). (Fig. 1-32)

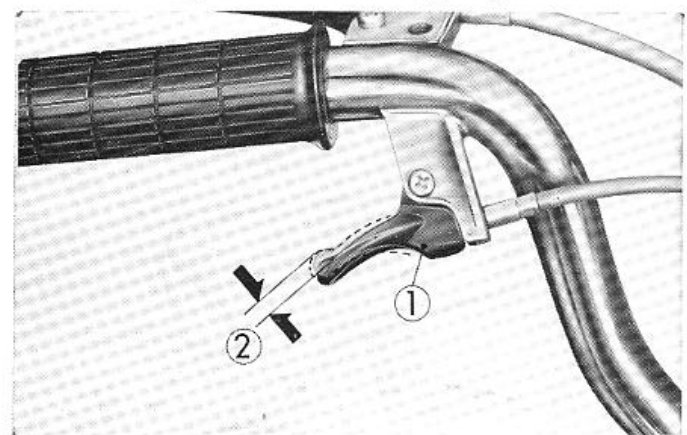


Fig. 1-32 ① Engine lever  
② 0.1~0.4 cm (0.04~0.16 in)

The adjustment shall be made by loosening the nut A and turning the nut B. (Fig. 1-33)

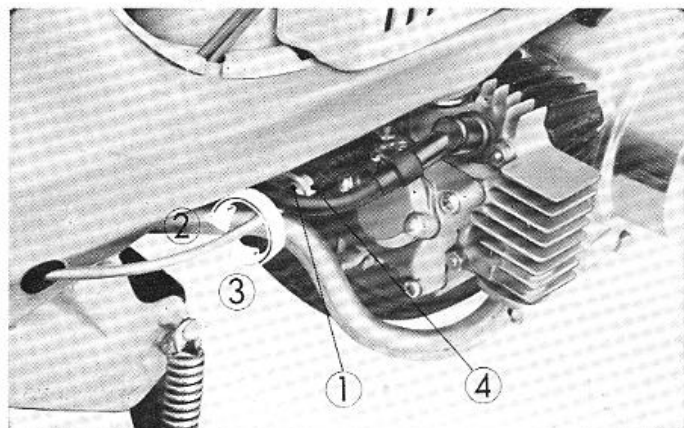


Fig. 1-33 ① Nut B ② To increase  
③ To decrease ④ Nut A

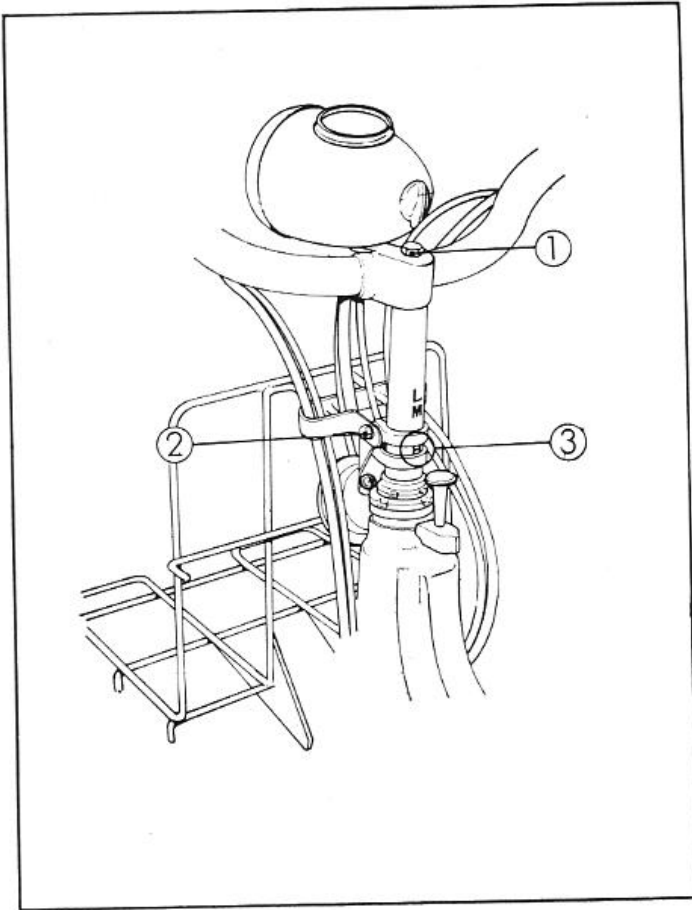


Fig. 1-34 ① Handle set bolt ② 6×40 bolt  
③ Adjusting position

### (3) Handle and Saddle Height Adjustments

Adjust the handle and the saddle to the heights most normally used.

#### Handle Adjustment

- ① Loosen the 6×40 bolt.
- ② Loosen the handle set bolt and tap lightly.
- ③ Adjust the handle to a suitable height between H and L marked on the stem and fix in place with the handle set bolt and the 6×40 bolt.

H - Upper limit

M - Middle

L - Lower limit (Fig. 1-34)

#### Saddle Adjustment

- ① Loosen the 8×42 bolt.
- ② Adjust the saddle to a suitable height with the mark located within the frame, and fix the saddle in place with the 8×42 bolt. (Fig. 1-35)

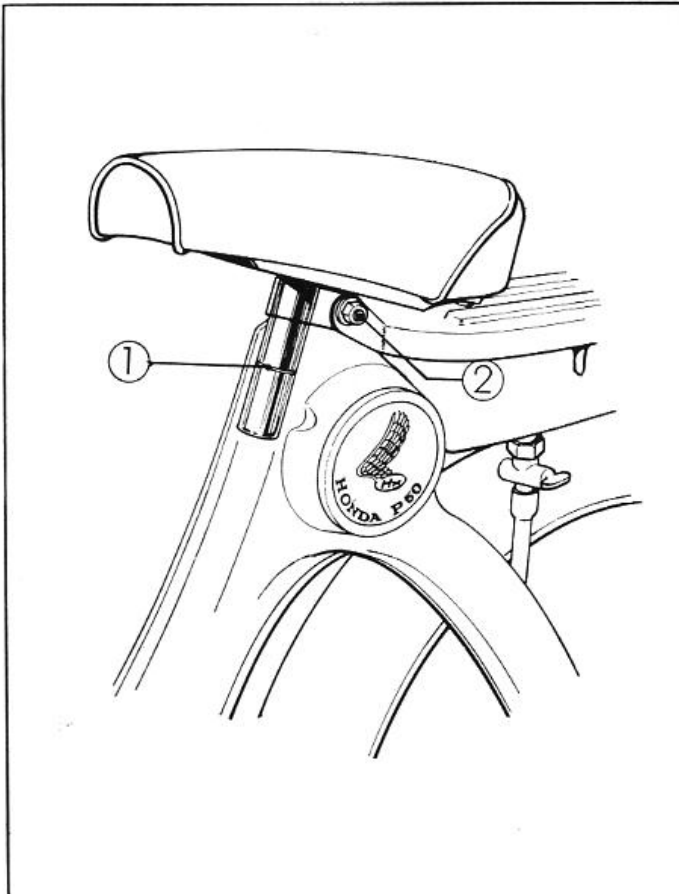


Fig. 1-35 ① Mark ② 8×42 bolt

#### (4) Head Light Adjustment

##### Beam Adjustment

The head light case mount, with exception of those for export to the U. S. A., is of ball and socket type. With the nut loosened it can be adjustable in any directions. (Fig. 1-36)

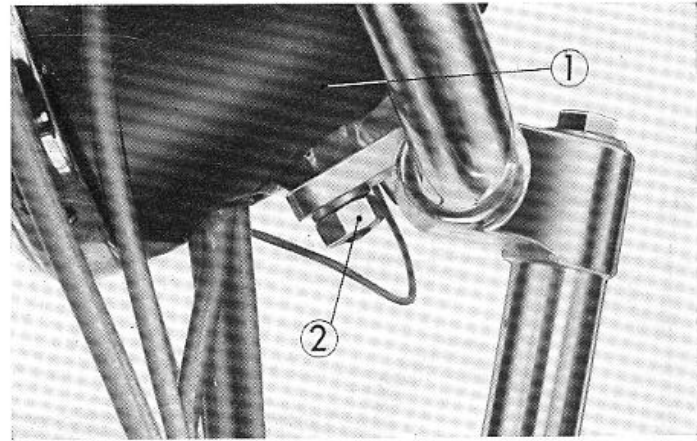


Fig. 1-36 ① Head light case ② Nut

##### Focus Adjustment

There are two types of bulb.

Type A bulb shall be installed by fitting to the groove A in the socket and type B bulb to the groove B. This applies to standard model as well as export models for Netherlands and the United kingdom. (Fig.1-37)

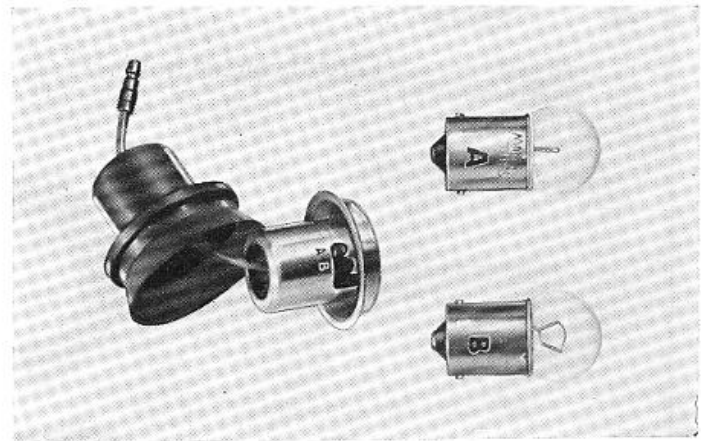
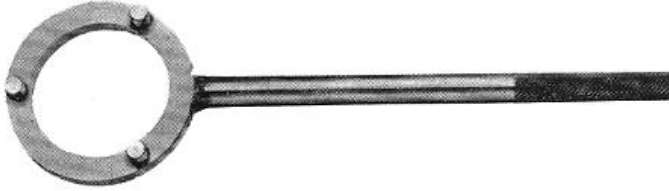


Fig. 1-37 Headlight bulb



2. ENGINE

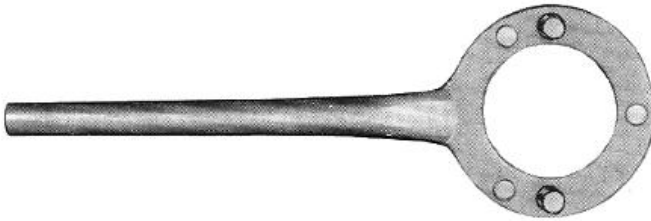
A. SPECIAL TOOLS



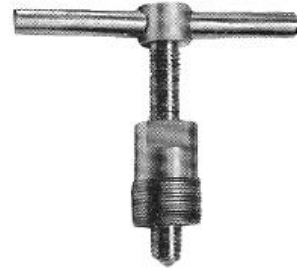
Clutch outer holder



Top cone spanner



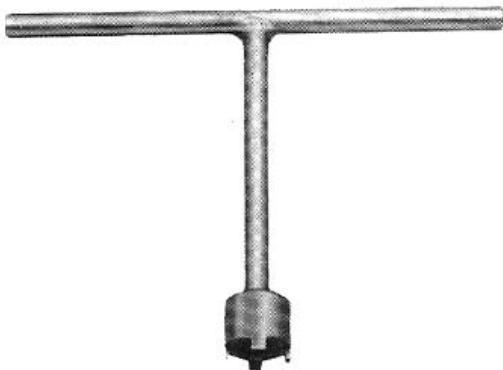
Flywheel holder



Flywheel puller



Pedal remover

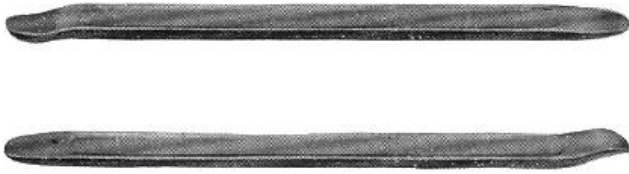


14 mm lock nut wrench



Stem nut spanner

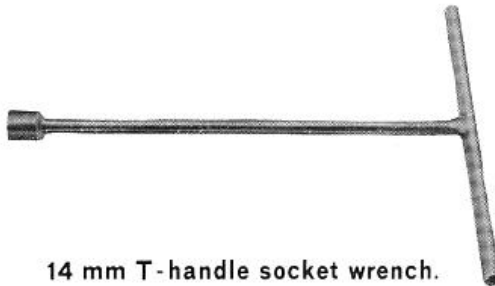
**B. STANDARD TOOLS**



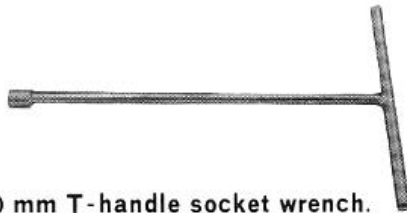
Tire tool set



21 mm T-handle socket wrench.



14 mm T-handle socket wrench.



10 mm T-handle socket wrench.



9 mm T-handle socket wrench.



#3 cross point T-handle screwdriver



#2 cross point T-handle screwdriver



10 x 14 mm double open end wrench



Electrician screwdriver



Common wood handle screwdriver



External snap ring plier



Internal snap ring closing plier



Long nose plier



Slip joint plier



Half pound ball peen hammer



Plastic faced hammer

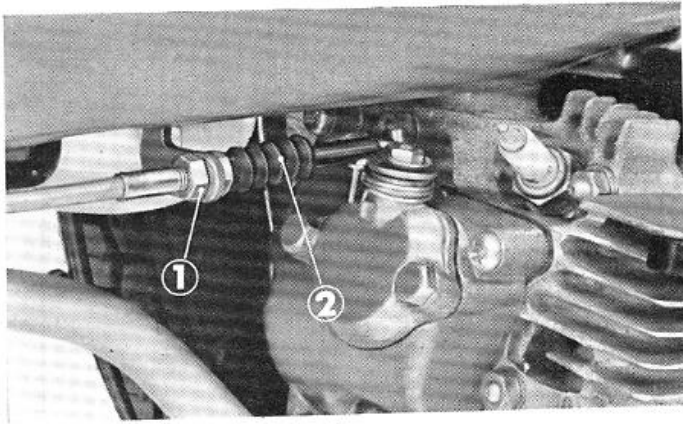


Fig. 2-1 ① Nut ② Decompression cable

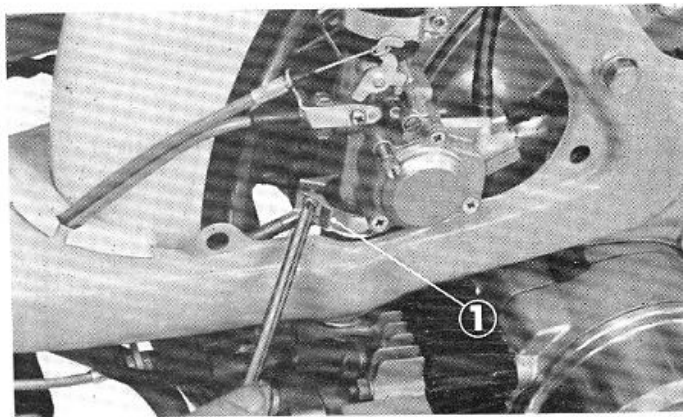


Fig. 2-2 ① Air cleaner connecting clamp

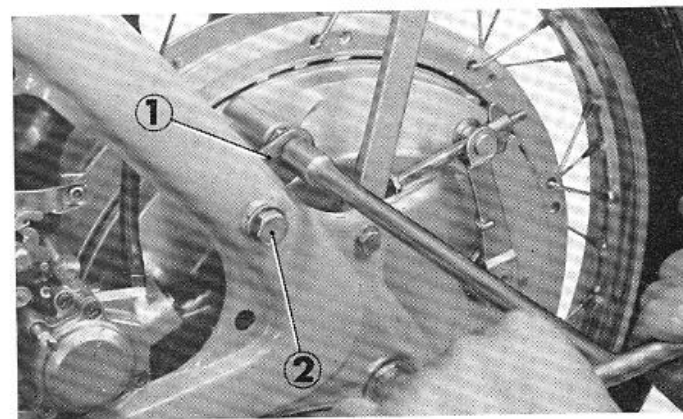


Fig. 2-3 ① Rear torque arm ② 8 mm bolt

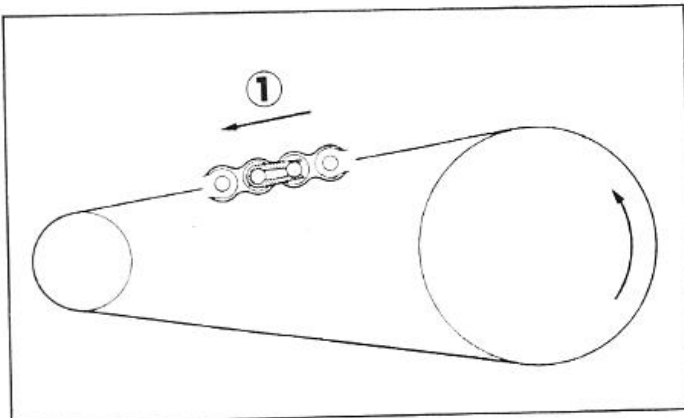


Fig. 2-4 ① Normal direction of chain

## 2.1 Engine Removal and Installation

### A. Engine Removal

1. Remove the carburetor cover.
2. Remove the high tension terminal.
3. Disconnect the decompression cable at the engine. (Fig. 2-1)
4. Disconnect the choke cable from the carburetor.
5. Loosen the air cleaner connecting lower clamp, disconnect the fuel tube and then remove the carburetor. (Fig. 2-2)
6. Detach the rear brake cable from the right crankcase.
7. Disconnect the engine electrical leads.
8. Unscrew the rear torque arm attaching cap nut and 8 mm bolt. (Fig. 2-3)
9. Separate the exhaust pipe and muffler.
10. Loosen the rear axle nut and raise the frame to clear the engine and wheel as a complete unit.

#### (Note)

1. During the engine removal, the oil will flow out if the tappet cap has been removed.
2. If the rear wheel and engine is raised, the oil will flow out and also seep into the brake housing.

### B. Engine Installation

Install the engine in the reverse order of removal.

#### (Note)

- a. When installing the drive chain, make sure that the opening of the clip is facing in the opposite direction as chain movement. (Fig. 2-4)
- b. Make sure that the tensioner is properly positioned before tightened.
- c. Make sure that no oil is leaking from the rear axle collar.
- d. Check for the installation of the O ring.

## 2.2 Cylinder head, cylinder, piston, piston ring

Trouble	Probable Cause	Corrective Action
Low compression pressure or no pressure	<ol style="list-style-type: none"> <li>1. No slack in the decompression lever cable</li> <li>2. Insufficient tappet clearance</li> <li>3. Gas leak from the cylinder head gasket</li> <li>4. Excessive piston or ring wear</li> <li>5. Valve not properly seating or carbon particle caught between valve and seat</li> <li>6. Valve timing off</li> <li>7. Burnt valve or seizure</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide 5~10 mm (0.20~0.40 in) play at the end of the lever</li> <li>2. Adjust to 0.05 mm (0.002 in)</li> <li>3. Torque all cylinder head bolts to the proper value, refer to torque table</li> <li>4. Replace</li> <li>5. Lap valve seat and remove carbon</li> <li>6. Retime</li> <li>7. Replace</li> </ol>
Excessive smoke when throttle opened	<ol style="list-style-type: none"> <li>1. Excessive wear or damage to piston, cylinder, piston ring</li> <li>2. Excessive wear to valve guide</li> <li>3. Loose exhaust valve guide</li> </ol>	Replace
Engine overheat	<ol style="list-style-type: none"> <li>1. Low engine oil level, poor quality oil.</li> <li>2. Damaged spark plug, wrong heat range plug</li> <li>3. Point gap requires adjustment, cleaning</li> <li>4. Ignition timing retarded</li> <li>5. Dragging brakes</li> <li>6. Lean air-fuel mixture</li> <li>7. Carbon deposit in combustion chamber</li> <li>8. Worn piston and rings</li> </ol>	<ol style="list-style-type: none"> <li>1. Add oil to the proper level marked on gauge (0.7 lit) (1.48 U.S.pt./1.23 Imp. pt)</li> <li>2. Clean or replace</li> <li>4. Adjust</li> <li>5. Adjust to 1.5~2.0 mm (0.06~0.08 in)</li> <li>6. Adjust carburetor</li> <li>7. Remove carbon</li> <li>8. Replace</li> </ol>
Decompression lever inoperative	<ol style="list-style-type: none"> <li>1. Excessive slack in lever cable</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust or replace</li> </ol>

### A. Removal of Cylinder head, Camshaft, Valve.

1. Remove cylinder head cover (Fig. 2-5)

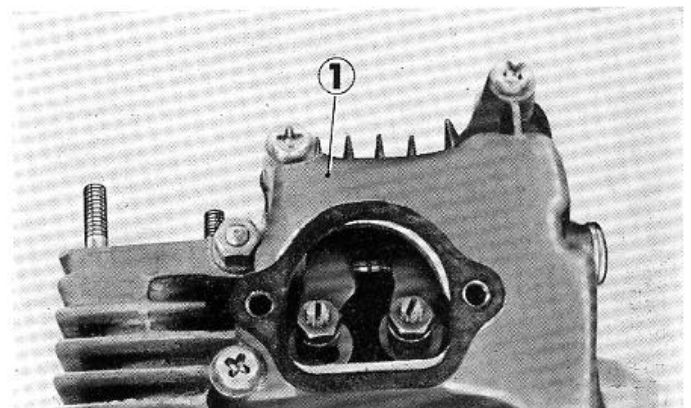


Fig. 2-5 ① Cylinder head cover

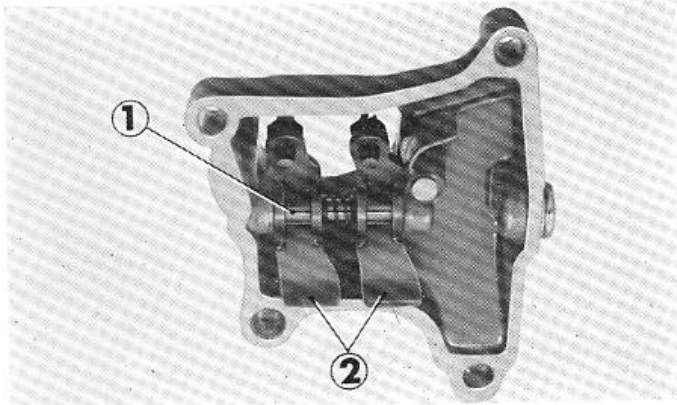


Fig. 2-6 ① Valve rocker arm shaft  
② Valve rocker arm

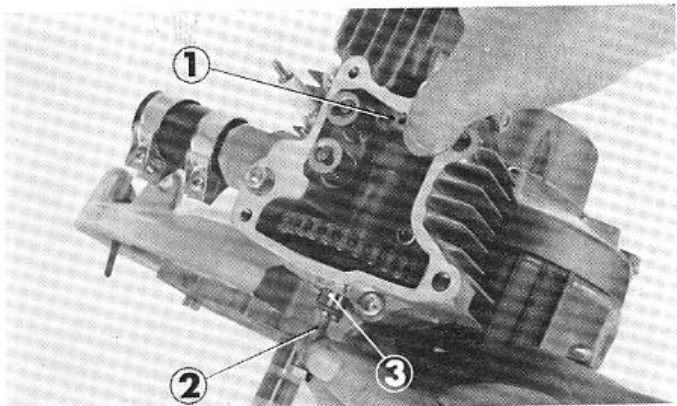


Fig. 2-7 ① 3×12 dowel pin ② Bolt  
③ Camshaft center pin

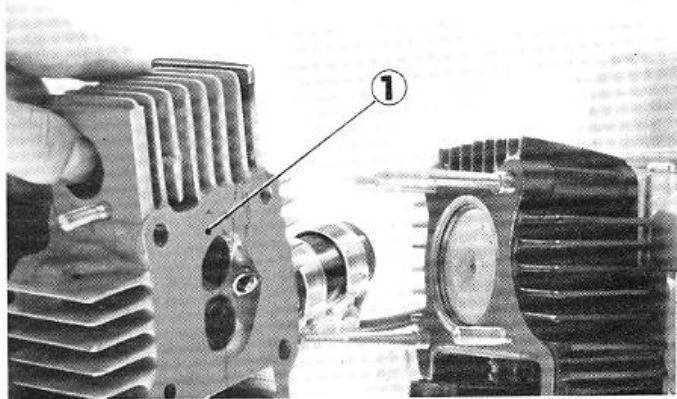


Fig. 2-8 ① Cylinder head

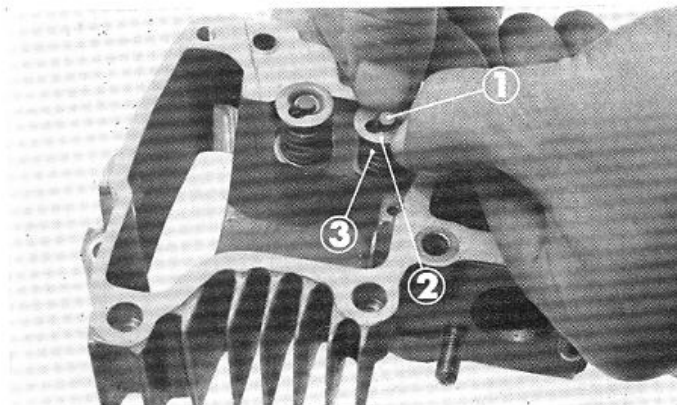


Fig. 2-9 ① Valve ② Valve spring retainer  
③ Valve spring

2. Extract the rocker arm shaft and remove the rocker arms. (Fig. 2-6)

3. Extract the 3×12 camshaft locking dowel pin and then pull out the camshaft center pin.

**(NOTE)**

**Camshaft center pin can be easily removed by screwing in a bolt (Fig. 2-7)**

4. Disengage the camshaft from the cam chain.

5. Unscrew four 6 mm nut, a 6 mm screw and then separate the cylinder head from the cylinder. (Fig. 2-8)

**B. Disassembly of the valve**

1. The valve can be removed by pressing down on the valve retainer and matching the recess in the retainer to the end of the valve. (Fig. 2-9)

### C. Inspection and Repair

1. If the cylinder head is not properly torqued, the head will warp or distort due to the high temperature and pressure to which it is exposed. This will result in improper sealing of the cylinder head and cause troubles due to gas leak, air suction and low compression. (Fig. 2-10)
2. The warping of the cylinder head does not develop suddenly and, therefore, it is very difficult to detect. Since the head warpage is chiefly due to improper head torquing, adequate attention should be given. To check for cylinder head warpage, apply a thin coating of red lead or bluing on a surface plate and then work the head mating surface on the coated surface plate. The red lead or bluing will be transferred to the head surface indicating high and low spots. (Fig. 2-11)

Warped cylinder head may be repaired by sanding the cylinder head on the surface plate using a #200 grade emery paper and then finishing with a #400 grade emery paper followed by checking as stated above. (Fig. 2-12)

#### Combustion Chamber

Item	Standard value	Serviceable limit
Height	5.5 mm (0.22 in)	_____
Volume	5 CC	_____

Use a carbon scraper or brush to remove the carbon from the head and exercise care not to damage.

3. Inspect the valve seat by assembling the valves as shown in Fig 2-13 and pour oil into the combustion chamber to cover the valves. Apply a blast of compressed air into each ports; if bubbles are produced, it is an indication that the valves are not properly sealing and repair is necessary. (Fig. 2-13)

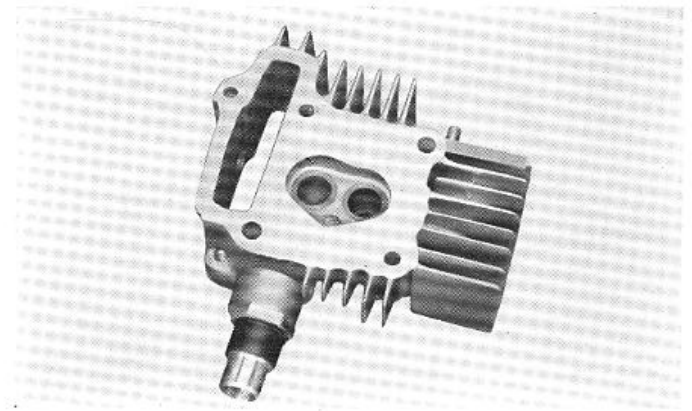


Fig. 2-10 Cylinder head

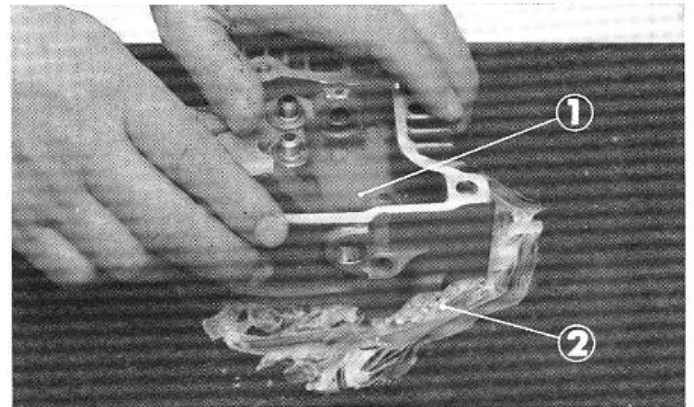


Fig. 2-11 ① Cylinder head  
② Red lead or bluing

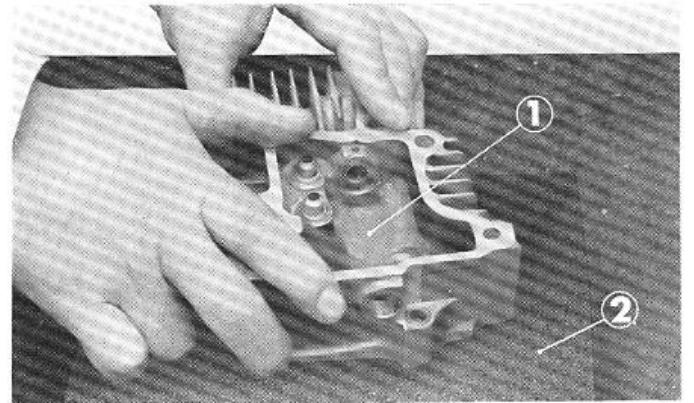


Fig. 2-12 ① Cylinder head  
② #400 emery paper

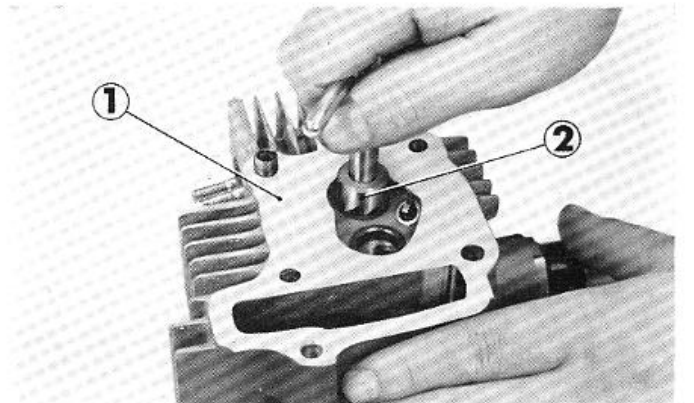


Fig. 2-13 ① Cylinder head  
② Valve seat cutter

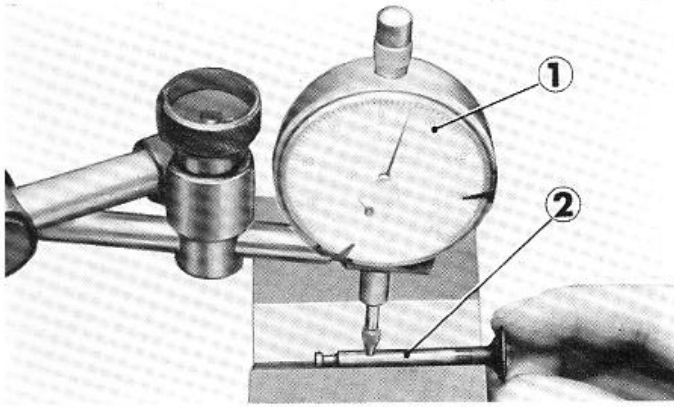


Fig. 2-14 ① Dial gauge ② Valve

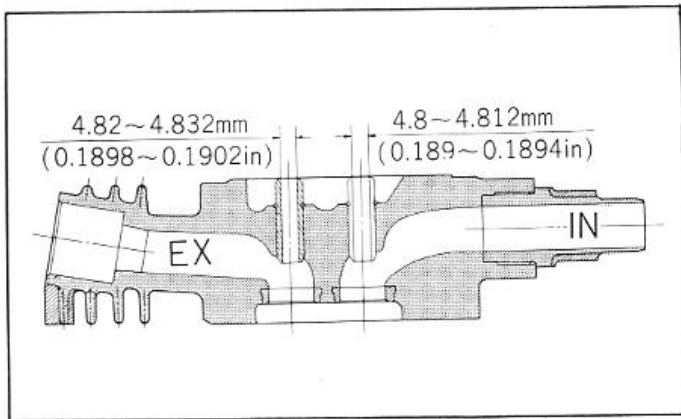


Fig. 2-15 Valve guide dimensions

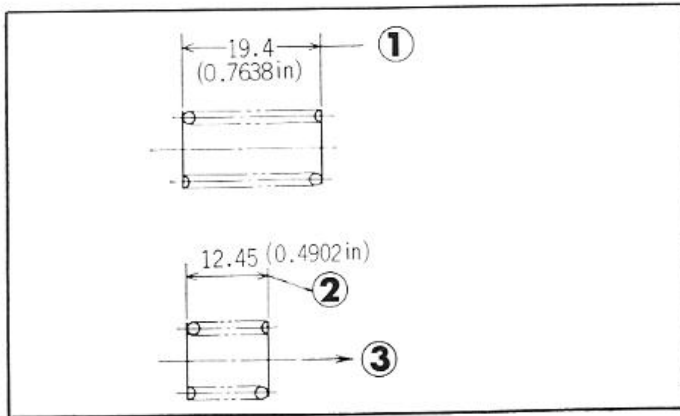


Fig. 2-16 ① Free length ② Installed length ③ Load

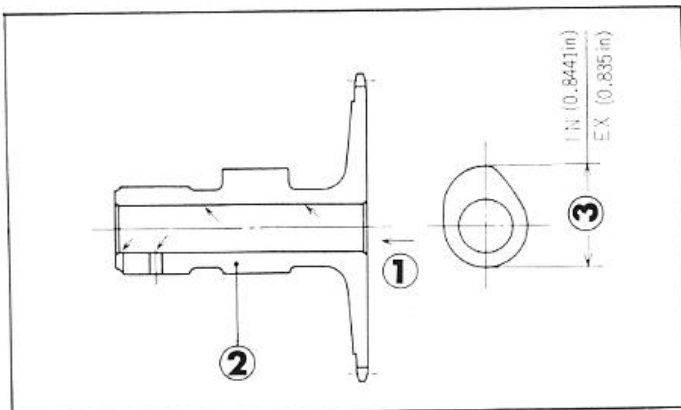


Fig. 2-17 ① Oil ② Camshaft ③ Cam total height

Check the seating width of the valve by applying a thin even coat of red lead or bluing on the valve face and rotating the valve slowly in the seat while applying slight pressure. The valve contact width will be indicated by the transfer of the red lead or bluing.

**Standard Value : 0.7~1 mm (0.028~0.039 in)**

The valve seat is reworked by three types of cutter; 30°, 45° and 60°. The 45° cutter is used for truing the seat while the 30° and 60° cutter are used to cut the top and bottom of the valve seat to produce the proper seat width and also to position the seat. (Fig. 2-13)

4. Valve (Fig. 2-14)

Item	Standard value	Serviceable limit
Diameter	4.790~4.780 (0.189~0.188 in)	4.74 (0.187 in) min.
Overall length	49.5 (1.945 in)	48.6 (1.913 in) min.
Head thickness	0.4~0.6 (0.016~0.024 in)	0.2 (0.008 in) min.

(Note)

**Valve marked "IN" must be used as inlet valve, however, valve without any marking may be used for either inlet or exhaust.**

The diameters of the valve guides are different for the inlet and exhaust valves, therefore, when reaming the guides, use particular caution to ream the guides to their respective diameters by the use of the proper reamers. (Fig. 2-15)

Inlet valve guide reamer : tool No. 07007-04401

Exhaust valve guide reamer : tool No. 07007-04411

5. Valve spring (Fig. 2-16)

Item	Standard value	Serviceable limit
Free length	19.4 (0.764 in)	18 (0.708 in) min.
Tension	5.7~6.3 kg/12.45 mm (5.7~6.3 kg/0.489 in)	
Trueness	1°30'	2° max.

6. Camshaft (Fig. 2-17)

Item	Standard value	Serviceable limit
Cam height	IN 21.44 (0.844 in)	17.8 (0.701 in) min.
Cam height	EX 21.12 (0.834 in)	at base circle.

7. Replace cam sprocket if gear teeth are damaged or excessively worn.

8. Cam sprocket root diameter. (Fig. 2-18)

Standard value: 57.45 (2.261 in)

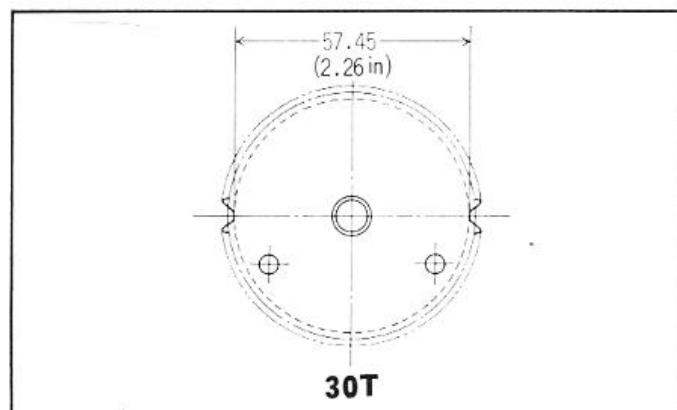


Fig. 2-18 Cam sprocket

#### D. Reassembly

1. Reassemble the valve assembly.
2. Assemble the cylinder head, exercise care not to damage the cam chain and oil guide.

**(Note)**

**When installing the head, do not forget the head gasket and the two hollow dowel pins.**

(Fig. 2-19)

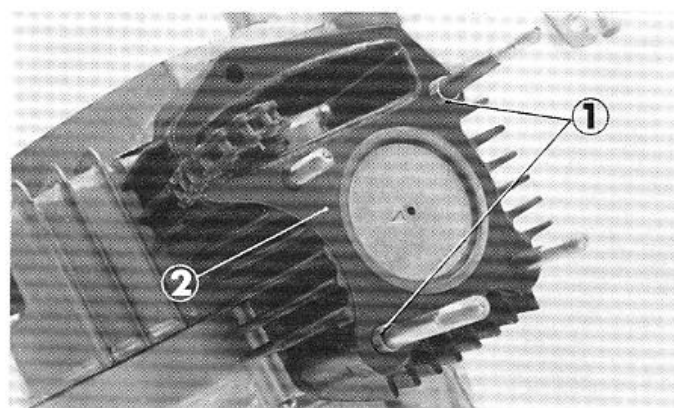


Fig. 2-19 ① Hollow dowel pin  
② Cylinder head gasket

3. Install the four 6 mm nuts and a 6 mm screw.  
Torque the cylinder head nuts to 90~120 kg·cm (6.5~8.7 ft. lbs)

**(Note)**

**Torque the nuts diagonally and with a uniform force. (Fig. 2-20)**

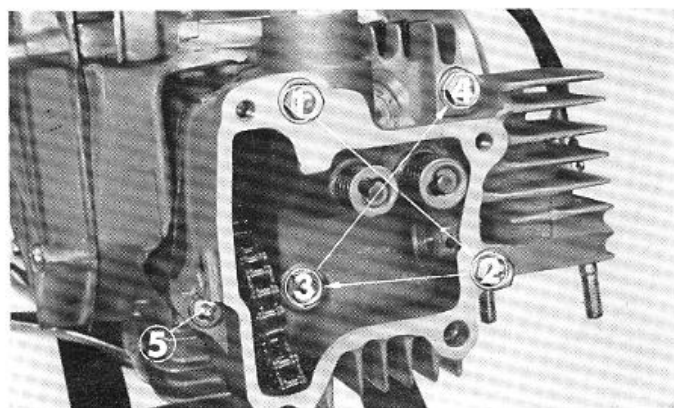


Fig. 2-20 Torquing sequence of cylinder head

4. Align the flywheel top-dead-center mark "T" to the left crankcase index timing mark. (Fig. 2-21)

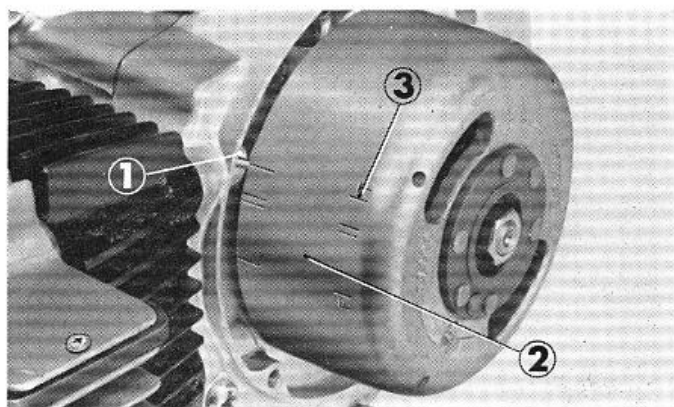


Fig. 2-21 ① Left crankcase index mark  
② Flywheel magnet  
③ "T" timing mark



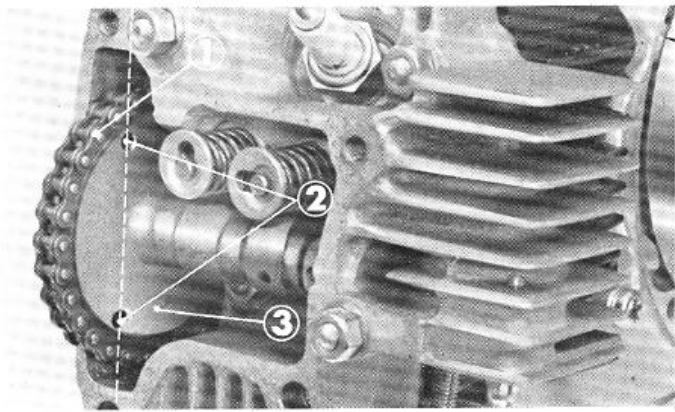


Fig. 2-22 ① Cam chain ② Holes parallel to gasket surface ③ Cam sprocket

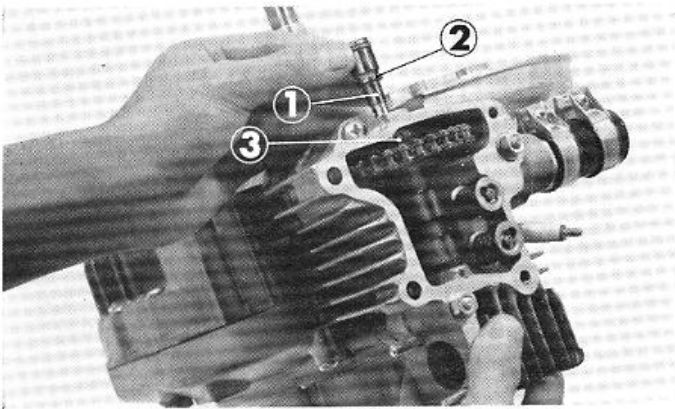


Fig. 2-23 ① Center pin ② 8.1×1.0 O ring ③ Oil guide

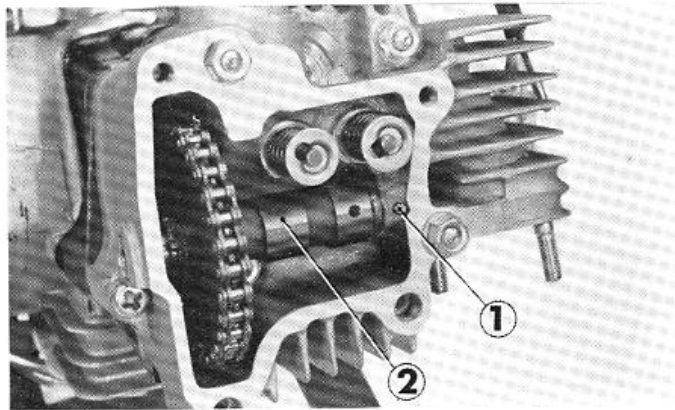


Fig. 2-24 ① 3×12 on dowel pin ② Cam Shaft

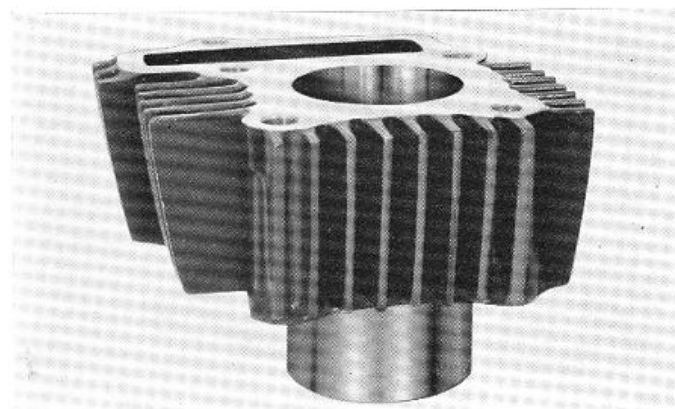


Fig. 2-25 Cylinder

5. Align the two holes in the cam sprocket so that they are parallel to the gasketing surface (top-dead-center) and install the cam chain. (Fig. 2-22)

6. Align the holes in the oil guide and center pin and tap the center pin in with light stroke. (Fig. 2-23)

(Note)

- a. Insert the center pin so that the O ring on the center pin is below the cylinder head center pin hole. While installing, exercise care not to damage the O ring.
- b. Check to make sure that the 10 mm washer is not missing.

7. Align the camshaft lock pin hole with the pin hole in the cylinder head by using a screwdriver for turning and then drive in the 3×12 dowel pin.

(Fig. 2-24)

(Note)

- a. After assembly, rotate the flywheel several times to check for smooth operation and also check the valve timing.
- b. During the dowel pin installation, exercise care not to damage the gasket.

8. Assemble the cylinder head cover.

#### E. Disassembly of Cylinder, Piston, Piston ring

1. Remove cylinder head, refer to section 2.2. A.
2. Remove cylinder (Fig. 2-25)

3. Extract piston pin clip and remove piston pin  
(Fig. 2-26)

(Note)

**Caution not to drop clip into the case.**

4. Remove piston ring.

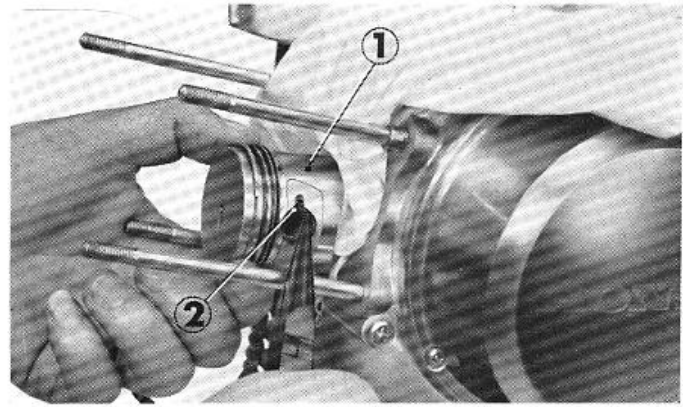


Fig. 2-26 ① Piston ② Clip

## F. Inspection, Repair

1. Check cylinder diameter

Item	Standard value	Serviceable limit
Diameter	42.0~42.01 (1.654~1.655 in)	42.1 (1.658 in)max.

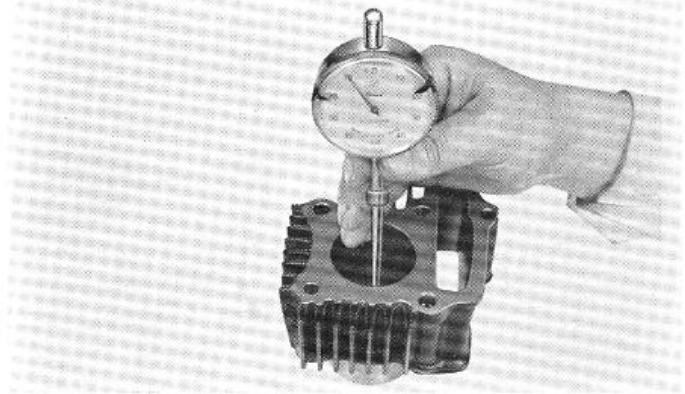


Fig. 2-27 Measuring inner diameter

2. Remove carbon deposit from piston head and ring groove, exercising care not to damage the piston.

(Note)

**Do not use emery paper.**

3. Check piston diameter (Fig. 2-28)

Item	Standard value	Serviceable limit
Diameter	41.08~42.0 (1.646~1.654 in)	41.9 (1.650 in)min.

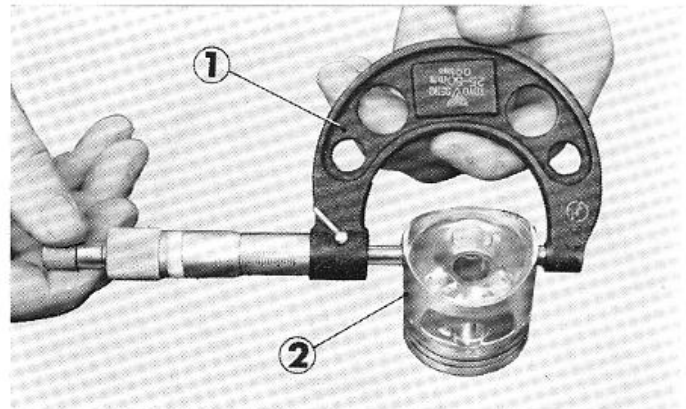


Fig. 2-28 ① Micrometer ② Piston

4. Piston ring side clearance  
Check the clearance with a new ring (Fig. 2-29)
5. Piston pin bore

Item	Standard value	Serviceable limit
Diameter	13.002~13.008 (0.5119~0.5121 in)	13.05 (0.514 in) max.

6. Piston pin diameter

Item	Standard value	Serviceable limit
Diameter	12.994~13.000 (0.5116~0.5118 in)	12.98 (0.510 in) min.

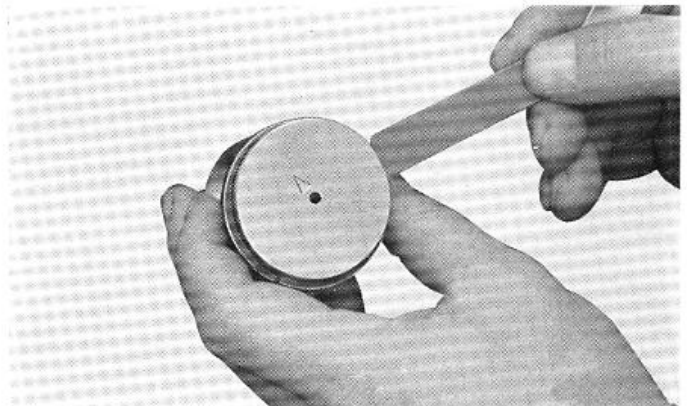


Fig. 2-29 Checking the clearance

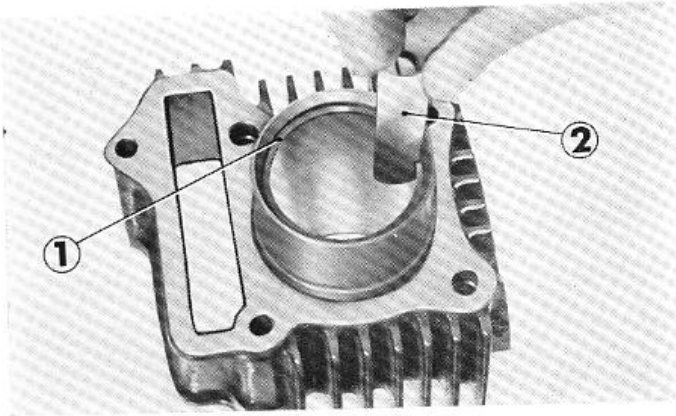


Fig. 2-30 ① Piston ring ② Thickness gauge

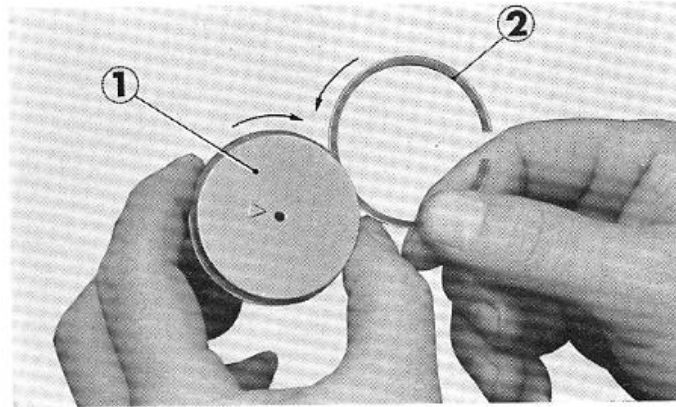


Fig. 2-31 ① Piston ② Piston ring

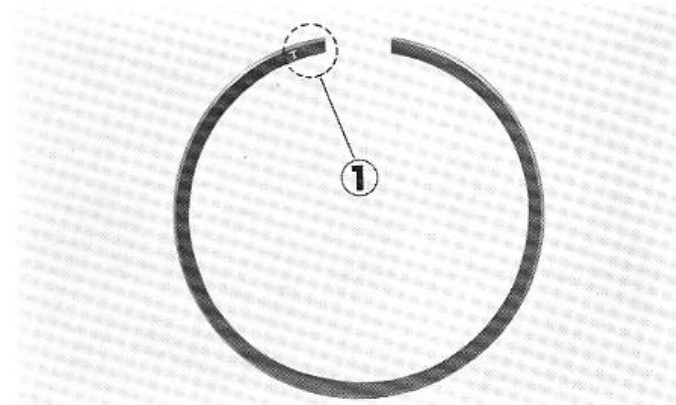


Fig. 2-32 ① Manufacturers mark

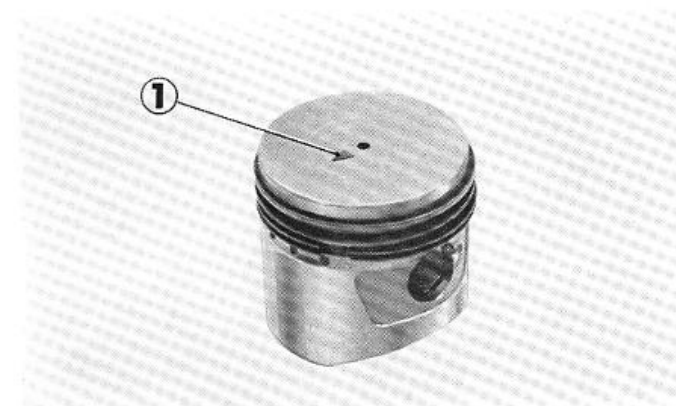


Fig. 2-33 ① Arrow marking

#### 7. Piston ring end gap

Fit the ring into the cylinder squarely and measure the end gap with a thickness gauge. (Fig. 2-30)

Item	Standard value	Serviceable limit
End gap	0.1~0.3 (0.004~0.012 in)	0.6 (0.024 in)max.

#### 8. Ring tension

Item	Standard value	Serviceable limit
Top ring	0.35~0.65 kg (0.77~1.43 lbs)	0.2 kg (0.44 lbs) min.
2nd ring	0.35~0.65 kg (0.77~1.43 lbs)	0.2 kg (0.44 lbs) min.
Oil ring	0.58~0.93 kg (1.28~2.05 lbs)	0.45 kg (0.99 lbs) min.

#### 9. Ring width and thickness

		Standard value	Serviceable limit
Thickness	All rings	1.90~2.10 (0.0748~0.0827in)	
	Top ring	1.195~1.180 (0.0470~0.0465in)	1.14 mm min. (0.0449 in)
Width	2nd ring	1.195~1.180 (0.0470~0.0465in)	1.14 mm min. (0.0449 in)
	Oil ring	2.480~2.495 (0.0976~0.0982in)	2.44 mm min. (0.0960 in)

### G. Reassembly

1. Assemble the piston ring to the piston

(Note)

- a. When assembling new rings, roll the rings in their respective piston grooves to check the fit. (Fig. 2-31)
- b. The ring must have the maker's mark on the ring toward the top. (Fig. 2-32)

2. Install the piston

(Note)

**Make sure that the arrow on the piston head is pointing downward.**

3. Install the pin clips at both ends of the piston pin.

(Note)

- a. The clip opening should not be aligned to the cut out.
- b. Distorted or clips which have lost its tension should be replaced with a new part.

4. Before installing the cylinder, make sure that the cylinder gasket and the two hollow dowel pins are in place. (Fig. 2-34)
5. Space the ring gaps evenly apart for all rings.
6. Trim the crankcase gasket with a sharp knife if it extends above the cylinder mating surface.

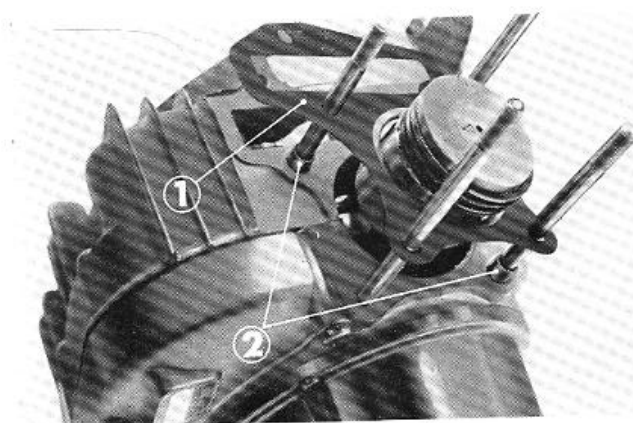


Fig. 2-34 ① Cylinder gasket  
② Hollow dowel pin

### 2.3 Reduction, Cam chain tensioner, Oil guide, Crankshaft

Trouble	Probable Cause	Corrective Action
Engine will not start	<ol style="list-style-type: none"> <li>1. Drive plates and friction plates are not making uniform contact</li> <li>2. Excessively worn friction plate disc</li> <li>3. Excessively worn ball rolling surface</li> <li>4. Weak clutch spring</li> <li>5. The clutch weight is not pressing against the friction plate due to excessive wear of the clutch weight spring hook</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace or repair, refer to section 3-A</li> <li>2. Replace friction plate</li> <li>3. Replace clutch outer, friction plate and/or ball retainer</li> <li>4. Replace weight</li> </ol>
Engine speed with clutch disengaged is too fast or slow	<ol style="list-style-type: none"> <li>1. Loss of clutch spring tension</li> <li>2. Excessively worn or burnt clutch weight shoe</li> <li>3. Excessively worn clutch outer friction surface</li> <li>4. Excessively worn clutch weight hook</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace, refer to section 2.3 A</li> <li>2. Replace</li> <li>3. Replace</li> <li>4. Replace, refer to section 2.3 A</li> </ol>
Clutch suddenly engages during idling and cause engine to stop	<ol style="list-style-type: none"> <li>1. Too high an idling speed</li> <li>2. Weak clutch spring</li> <li>3. Clutch defective or out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust to 1500 RPM</li> <li>2. Replace</li> <li>3. Replace or adjust</li> </ol>
Cycling lever inoperative, will not engage with engine in ON position	<ol style="list-style-type: none"> <li>1. Defective free pawl</li> <li>2. Worn groove in secondary driven sprocket</li> <li>3. Free pawl guide disengaged from free pawl</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Replace secondary driven sprocket</li> <li>3. Repair</li> <li>4. Replace, refer to section 2.3 A</li> </ol>
Cycling lever inoperative, will not disengage from engine in OFF position	<ol style="list-style-type: none"> <li>1. Excessively worn or defective cycling lever</li> <li>2. Free pawl spring bent over</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Replace</li> </ol>
Engine oil changes to emulsion	<ol style="list-style-type: none"> <li>1. Water mixed in oil</li> <li>2. Blogged breather pipe</li> </ol>	Oil even though clean in appearance may be decomposed when used for a long period, thins out and loses lubricating quality

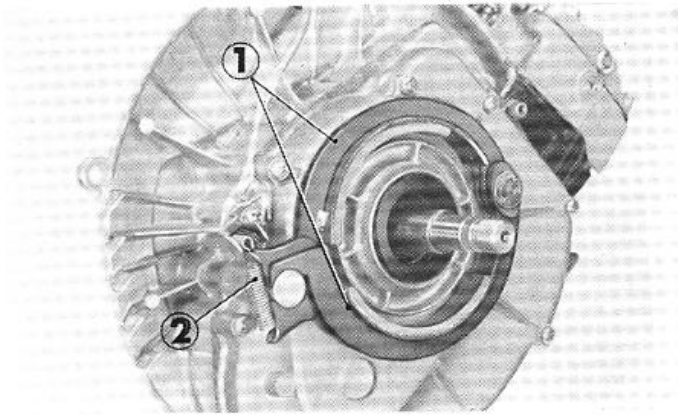


Fig. 2-35 ① Rear brake shoe  
② Rear brake shoe spring

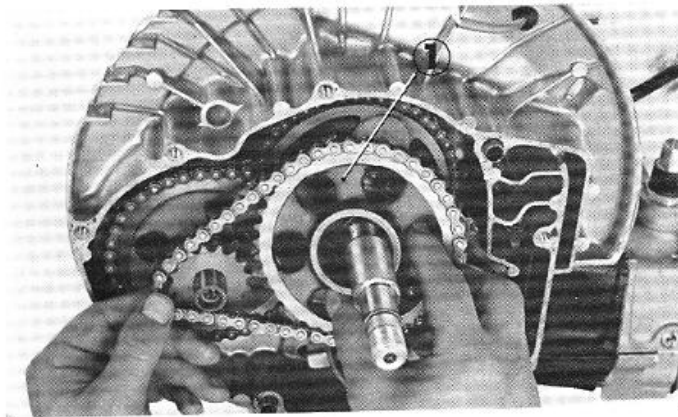


Fig. 2-36 ① Final driven sprocket

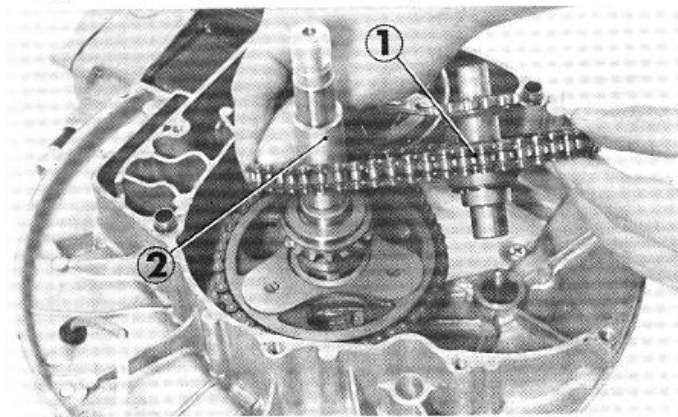


Fig. 2-37 ① Secondary driven sprocket  
② Rear wheel axle

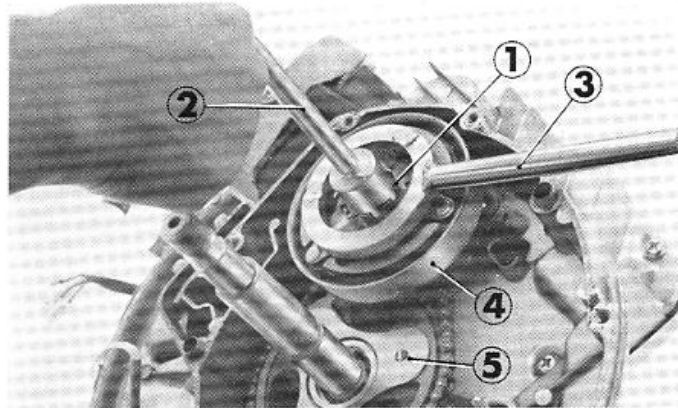


Fig. 2-38 ① 14 mm lock nut ② Clutch outer spanner ③ Clutch outer holder  
④ Primary drive sprocket  
⑤ Primary driven sprocket

### A. Disassembly of Reduction Gear

1. Remove engine, refer to section 2.1 A
2. Remove rear brake shoes (Fig. 2-35)
3. Disconnect rear brake arm and remove rear brake cam.
4. Remove right crankcase cover.

5. Remove final driven sprocket. (Fig. 2-36)

6. Remove secondary driven and drive sprockets together with the chain. (Fig. 2-37)

7. Unlock the tongued washer and unscrew the 14 mm lock nut, the primary driven and drive sprockets. (Fig. 2-38)

#### (Note)

The 14 mm lock nut may be removed before the removal of the sprockets.

## B. Inspection and Repair

1. Check clutch spring tension.
2. Inspect for damage and wear of the # 10 steel ball.  
(Fig. 2-39)
3. Inspect drive plate friction surface for wear.
4. Inspect secondary drive sprocket for damage.  
(Fig. 2-40)
5. Inspect sprocket teeth for wear and damage.
6. Inspect rear brake shoe for lining warp and thickness.

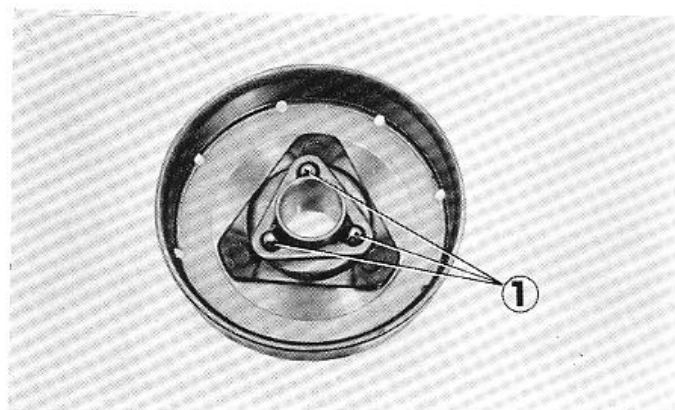


Fig. 2-39 ① # 10 steel balls

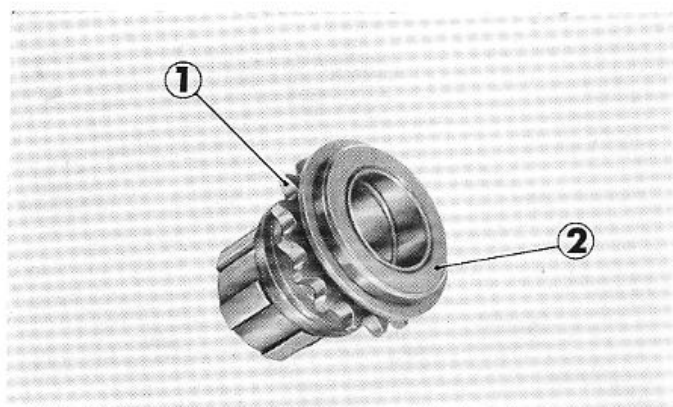


Fig. 2-40 ① Sprocket  
② Final driven sprocket flange

## C. Reassembly

1. Loop the chain on the primary drive and driven sprockets and assemble.

(Note)

**Check to make sure that the primary drive sprocket is operating smoothly and lightly.**

2. Loop the chain on the secondary drive and driven sprockets and assemble.
3. Loop the chain on the final driven sprocket and assemble. (Fig. 2-41)

(Note)

**Check to make sure that the final driven sprocket is fitted to the secondary drive sprocket flange.**

4. Install the right crankcase cover.

(Note)

**Check for any damage to the right crankcase cover, upset of the screw holes, breather pipe restriction.**

5. Assemble the rear brake cam, rear brake shoe, stop switch spring and the stop switch assembly. Check for proper operation after assembly.

(Fig. 2-42)

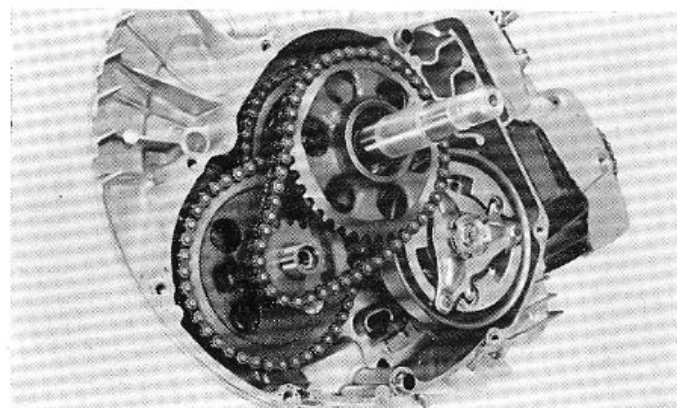


Fig. 2-41 Assembling the reduction sprockets

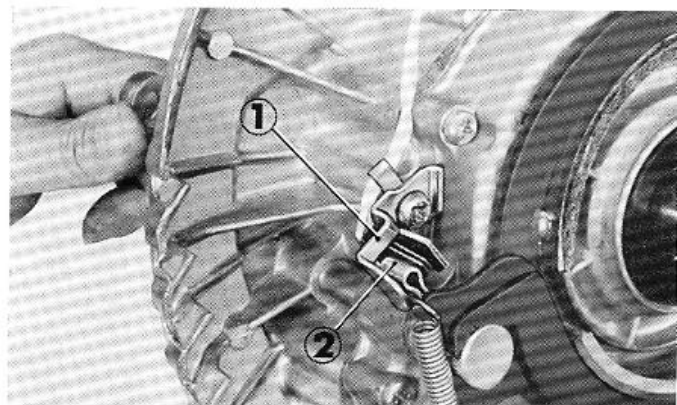


Fig. 2-42 ① Stop switch assembly  
② Stop switch spring

6. Reinstall engine, refer to section 2.1 B.

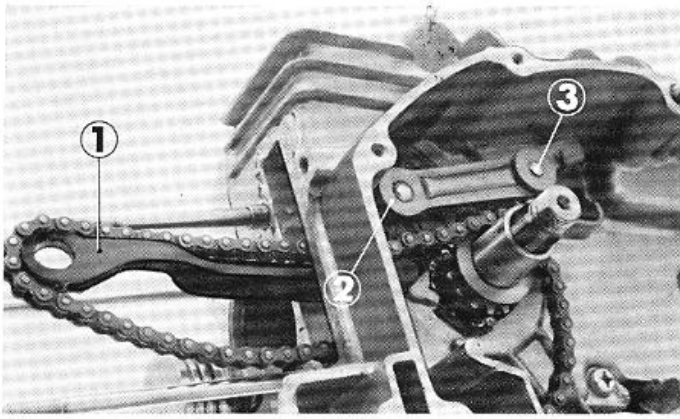


Fig. 2-43 ① Oil guide ② Headed rivet  
③ Tensioner arm

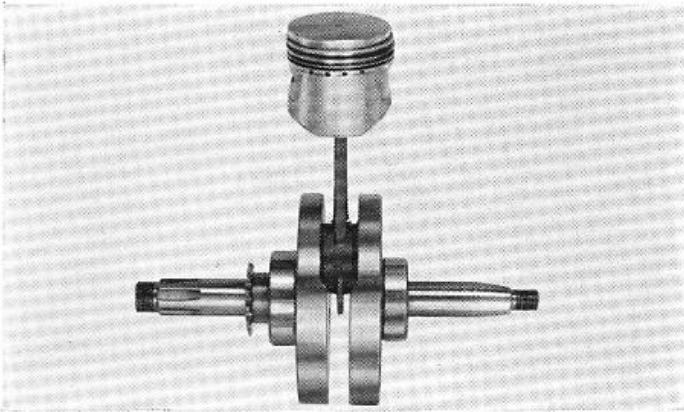


Fig. 2-44 Crankshaft assembly

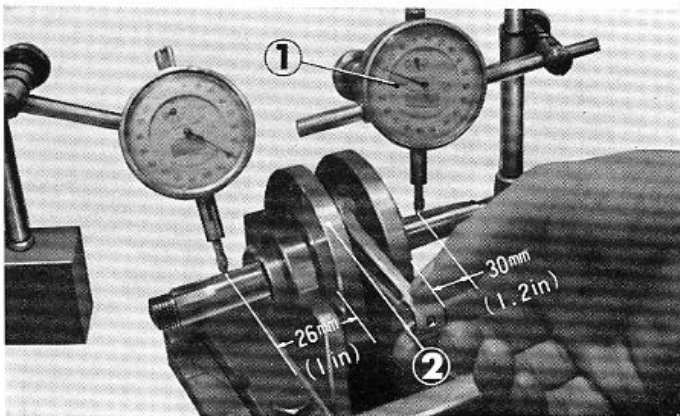


Fig. 2-45 ① Dial gauge ② Crankshaft

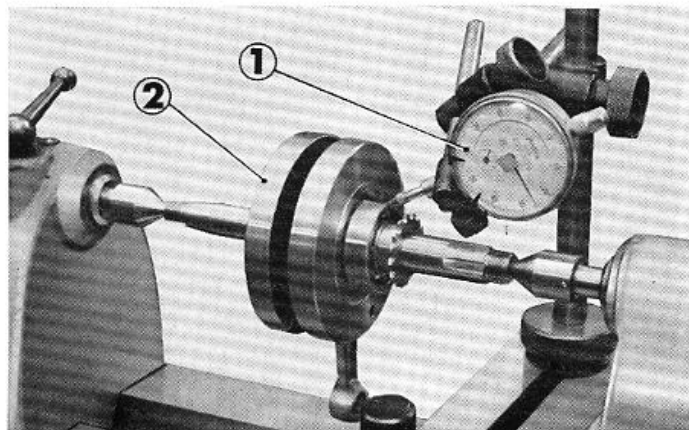


Fig. 2-46 ① Dial gauge ② Crankshaft

#### D. Disassembly of cam chain tensioner, oil guide

1. Remove cylinder, refer to section 2.2 E.
2. Remove reduction unit, refer to section 2.3 A.
3. Tensioner arm may be removed by filing off the headed rivet. (Fig. 2-43)
4. Remove the oil guide.

#### E. Reassembly

1. When assembling the tensioner arm, use a new rivet and peen over the end.
2. Check the movement of the tensioner arm after installing the chain tensioner spring.
3. Check the tension of the cam chain.

#### F. Disassembly of the crankshaft

1. Remove cylinder, refer to section 2.2 E.
2. Remove the reduction unit, refer to section 2.2 A.
3. Remove dynamo cover.
4. Remove flywheel magnet.
5. Separate the left crankcase.
6. Remove the free pawl slider.
7. Separate the crankshaft from the right crankcase.

(Fig. 2-44)

#### G. Inspection and Repair

1. Support the crankshaft on v-blocks at the bearings and inspect for run-out. (Fig. 2-45)

Item	Standard value	Serviceable limit
Left crankshaft at 30 mm (1.2 in)	TIR 0.015 mm (0.0006 in)	0.05 max. (0.002 in)
Right crankshaft at 26 mm (1.0 in)	TIR 0.015 mm (0.0006 in)	0.05 max. (0.002 in)

2. Support the crankshaft on centers and inspect the bearing for wear in both the parallel and normal direction of crankshaft. (Fig. 2-46)

Item	Standard value	Serviceable limit
Parallel direction	0.07~0.22 mm (0.003~0.009 in)	0.1 max. (0.004 in)
Normal direction	0.007~0.022 mm (0.0003~0.0009 in)	0.05 max. (0.002 in)

## 3. Crank pin

Item	Standard value	Serviceable limit
Diameter	18.60~18.61 (0.7328~0.7332 in)	18.55 (0.7309 in) min.
Interference fit	0.06~0.09 (0.0024~0.0035 in)	

## 4. Timing sprocket root diameter. (Fig. 2-47)

Standard value: 27.00~27.08 (1.063~1.0670 in)

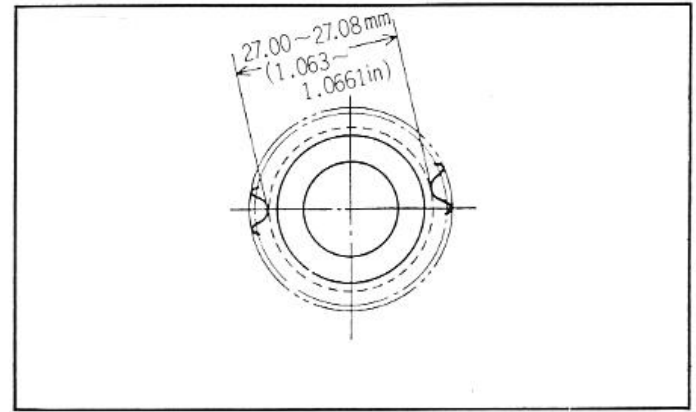


Fig. 2-47 No. of teeth: 15

## 5. Connecting rod small end. (Fig. 2-48)

Item	Standard value	Serviceable limit
Inner dia	13.016~13.034 mm (0.5130~0.5134 in)	13.08 max. (0.5154 in)

## 6. Clearance between connecting rod small end to piston pin.

Item	Standard value	Serviceable limit
Clearance	0.02~0.04 (0.0008~0.0016 in)	0.08 (0.0032 in) max.

## 7. Connecting rod small end run-out.

Item	Standard value	Serviceable limit
Run-out	0.15~0.35 (0.0059~0.0138 in)	1.50 (0.0591 in) max.

## 8. Clearance at connecting rod large end.

Item	Standard value	Serviceable limit
Clearance	0.00~0.01 (0.000~0.0004 in)	0.03 (0.0012 in) max.

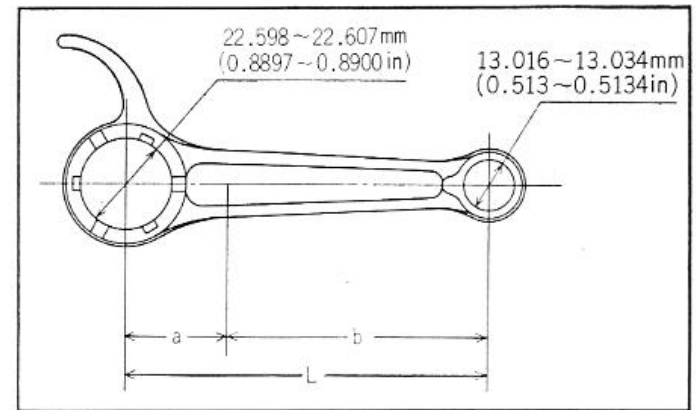


Fig. 2-48 Dimensions of connecting rod

## H. Reassembly

1. Assemble the crankshaft and the free pawl slider. (Fig. 2-49)

2. Assemble left crankcase after making sure that the two hollow dowel pins are installed. (Fig. 2-50)

**(Note)**

**Check to make sure that the crankcase is clean and free from foreign matters and damage to gasketing surface.**

3. Complete the reassembly in the reverse order of disassembly.

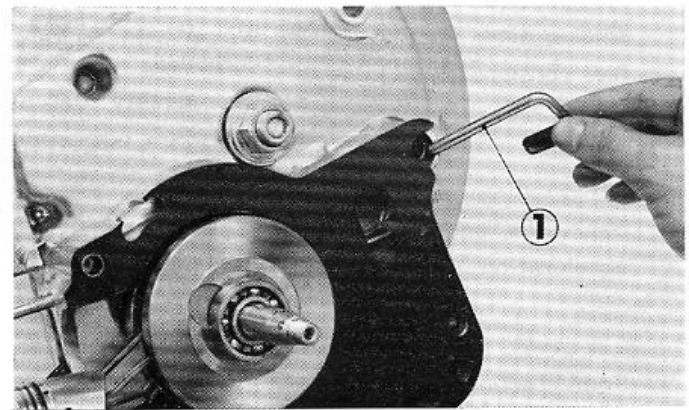


Fig. 2-49 ① Free pawl slider

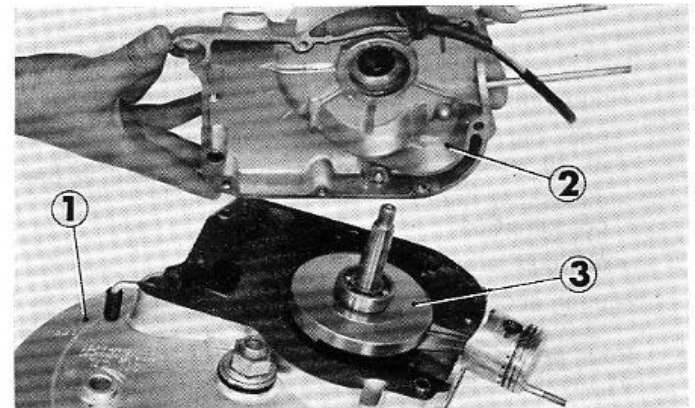


Fig. 2-50 ① Right crankcase ② Left crankcase ③ crankshaft



## 2.4 Carburetor

Trouble	Probable Cause	Corrective Action
Engine will not idle	<ol style="list-style-type: none"> <li>1. Clogged fuel tank cap breather hole</li> <li>2. Air leaking in from connecting tube</li> <li>3. Clogged air cleaner</li> <li>4. Improper fuel level</li> <li>5. Clutch will not disengage</li> <li>6. Tappet clearance out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair</li> <li>2. Repair</li> <li>3. Repair</li> <li>4. Adjust</li> <li>5. Adjust</li> <li>6. Adjust</li> </ol>
Idling out of adjustment <ul style="list-style-type: none"> <li>◦ slow speed</li> <li>◦ erratic idling</li> <li>◦ no response to throttle snap</li> <li>◦ engine dies during braking</li> </ul>	<ol style="list-style-type: none"> <li>1. Air screw out of adjustment</li> <li>2. Throttle stop screw out of adjustment</li> <li>3. Clogged pilot and/or slow jet, or loose jets</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> <li>2. Adjust</li> <li>3. Clean repair</li> </ol>
Engine stops suddenly while running	<ol style="list-style-type: none"> <li>1. No fuel in tank</li> <li>2. Clogged fuel cock</li> <li>3. Dirty spark plug (Carboned or wet)</li> <li>4. Spark plug points being shorted</li> </ol>	<ol style="list-style-type: none"> <li>2. Adjust</li> <li>3. Adjust</li> <li>4. Clean or repair</li> </ol>
Excessive smoking during medium and high speed	<ol style="list-style-type: none"> <li>1. Loose main jet, clogged jet</li> <li>2. Worn jet needle</li> <li>3. Jet needle dropped from holder</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce size of main jet</li> <li>2. Lower jet needle one groove</li> <li>3. Repair</li> </ol>
Excessive exhaust smoke, after fine, high fuel consumption	<ol style="list-style-type: none"> <li>1. Choke not fully opened</li> <li>2. Wrong heat range spark plug used, or plug carboned.</li> <li>3. Poor quality fuel, oil mixed fuel</li> <li>4. Air screw not properly adjusted.</li> <li>5. Worn jet needle.</li> </ol>	<ol style="list-style-type: none"> <li>2. Replace or clean</li> <li>4. Adjust</li> <li>5. Adjust or replace</li> </ol>
Back-fires, poor acceleration	<ol style="list-style-type: none"> <li>1. Improperly adjusted air screw</li> <li>2. Clogged air bleed system</li> <li>3. Loose choke valve</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> <li>2. Clean</li> <li>3. Slightly over-tighten the choke valve</li> </ol>
Poor starting	<ol style="list-style-type: none"> <li>1. Excessive use of choke</li> <li>2. Fuel overflow</li> <li>3. Choke relief valve spring defective</li> </ol>	<ol style="list-style-type: none"> <li>1. Start without choking</li> <li>2. Refer to section 2</li> <li>3. Replace the choke valve</li> </ol>
Fuel overflow <ul style="list-style-type: none"> <li>◦ poor idling</li> <li>◦ poor performance at all speed</li> <li>◦ excessive fuel consumption</li> <li>◦ difficult starting</li> <li>◦ poor acceleration</li> </ul>	<ol style="list-style-type: none"> <li>1. Dirt caught in float valve</li> <li>2. Damaged valve or valve seat</li> <li>3. Punctured float</li> <li>4. Water mixed in fuel</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean</li> <li>2. Replace</li> <li>3. Replace</li> <li>4. Drain and clean tank</li> </ol>
Poor performance at medium speed <ul style="list-style-type: none"> <li>◦ flat spot</li> <li>◦ poor acceleration</li> </ul>	<ol style="list-style-type: none"> <li>1. Improperly adjusted jet needle</li> </ol>	<ol style="list-style-type: none"> <li>1. Set clip to the third groove on the needle with possible one groove difference for winter and summer.</li> </ol>

Trouble	Probable cause	Corrective Action
<ul style="list-style-type: none"> <li>◦ slow speed difficult</li> <li>◦ high fuel consumption</li> <li>◦ erratic operation</li> </ul>	<ul style="list-style-type: none"> <li>2. Clogged slow and/or pilot jet</li> <li>3. Clogged air vent pipe</li> </ul>	<ul style="list-style-type: none"> <li>2. Clean or repair</li> <li>3. Over flow pipe serves as air vent; prevent from blocking</li> </ul>
Poor high speed performance	<ul style="list-style-type: none"> <li>1. Choke partially closed</li> <li>2. Clogged air vent pipe</li> <li>3. Loose main jet, dropped or clogged</li> <li>4. Jet needle dropped</li> </ul>	<ul style="list-style-type: none"> <li>1. Fully open the choke valve</li> <li>2. Refer to part 4 above.</li> <li>3. Clean main jet and tighten securely</li> <li>4. Replace jet needle clip</li> </ul>

### A. Adjustment Procedure

#### 1. Air screw

Screw in fully and then back off  $1\frac{1}{8}$  turn.

#### 2. Throttle stop screw

Loosen the throttle screw fully and then screw in to obtain the proper idle speed of 1500 RPM.

Determine the proper idle speed by running the engine with the rear wheel off the ground, the point of maximum throttle opening with the rear wheel stationary.

#### 3. Slow speed adjustment

Adjust the engine to smooth operation with the air screw and then adjust to the proper idle speed with the throttle stop screw.

#### 4. Medium and high speed adjustment

Adjust with the main jet.

If exhaust gas is dark, replace main jet with one of smaller number and visa versa.

#### (Note)

**Jets are precision parts, therefore, handle with care to prevent damage. Finally, check the fuel level.**

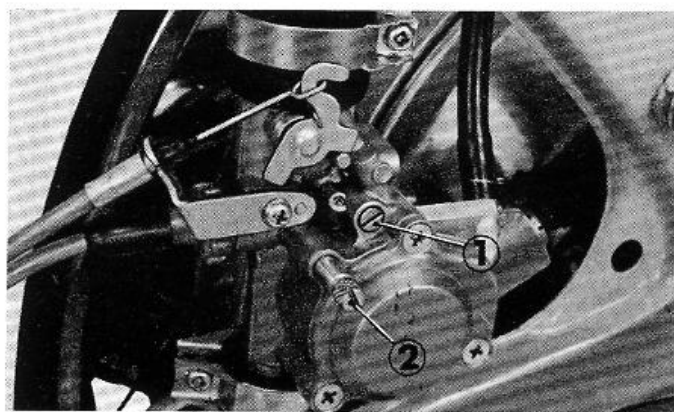


Fig. 2-51 ① Air screw  
② Throttle stop screw

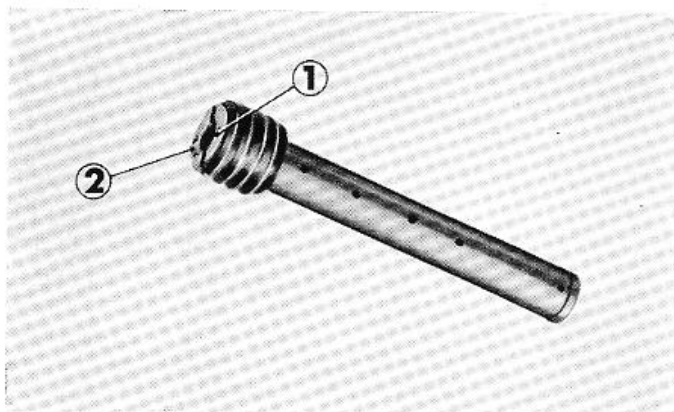
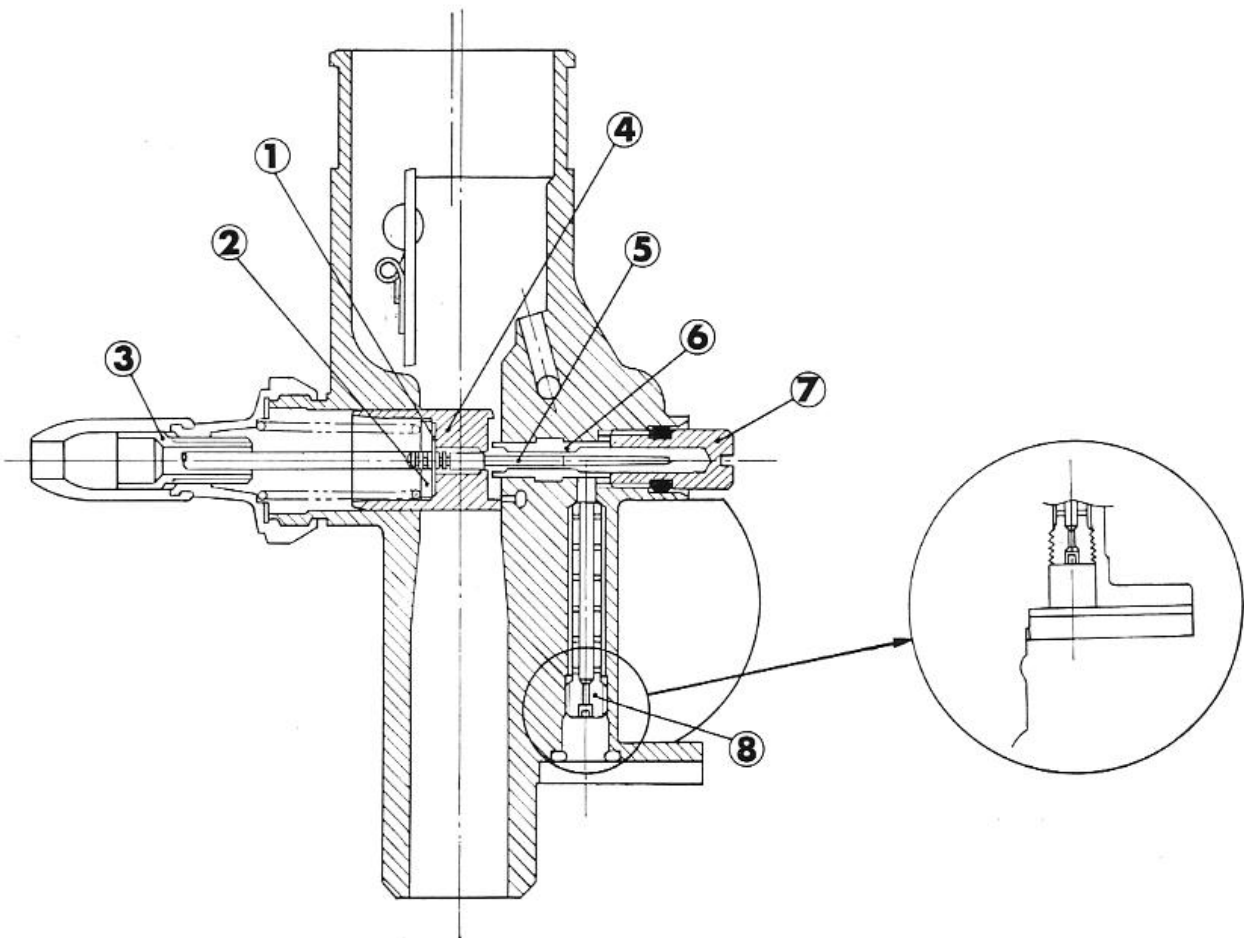


Fig. 2-52 ① Genuine parts mark  
② Main jet No.

**B. Float check procedure**

1. Shake the float and listen for fuel inside.
2. Submerge in hot water (approx. 90° C) for one minute and check for rise of bubble which indicates leak.
3. Clean float chamber before assembly.



**Fig. 2-53** ① Needle clip ② Needle clip plate ③ Cable adjuster ④ Throttle valve  
 ⑤ Jet needle ⑥ Needle jet ⑦ Needle jet holder ⑧ Main jet

## C. Carburetor Setting Table

Item	Setting		
	Old type	Holland export type	New type
Setting mark	50 A	50 A 1	50 B
M. J (main jet)	# 55	# 58 (Pointed mark # 55)	# 58 (Outer diameter 3.4)
A. J (Air jet)	# 70	# 70	# 100
A. B (Air bleed)	AB1 0.4×1 AB2 0.4×1 AB3 0.4×1 AB4 0.4×1 AB5 0.4×1 AB6 0.4×1	AB1 0.4×1 AB2 0.4×1 AB3 0.4×1	AB1 0.4×1 AB2 0.4×1 AB3 0.4×1 AB4 0.4×1 AB5 0.4×1 AB6 0.4×1
N. J (Needle Jet)	2.6×2	2.6×2	2.6×1.55
J. N (Jet needle)	131310-3 stages	011302-3 stages	11401-3 stages
C. A (Throttle valve)	# 2.0 width 2.0 Depth 0.2	# 2.0 width 1.2 Depth 0.2	# 2.0 width 1.2 Depth 0.2
A. S (Air screw)	1.¼±¼	1.¼±¼	1.¼±¼
S. J (Slow jet)	# 35 AB1 0.8×2 AB2 0.8×2 AB3 0.8×2 AB4 0.8×2	# 35 AB1 0.8×2 AB2 0.8×2 AB3 0.8×2 AB4 0.8×2	# 35 AB1 0.8×2 AB2 0.8×2 AB3 0.8×2 AB4 0.8×2
P. O (Pilot outlet)	0.9, Pitch 5.0	0.9, Pitch 5.0	0.8, Pitch 5.0
P. J (Pilot jet)	# 35	# 35	# 35
V. S (Valve seat)	0.8	0.8	0.8
Oil level	3.5	3.5	5.0

### 3. ELECTRICAL SYSTEM

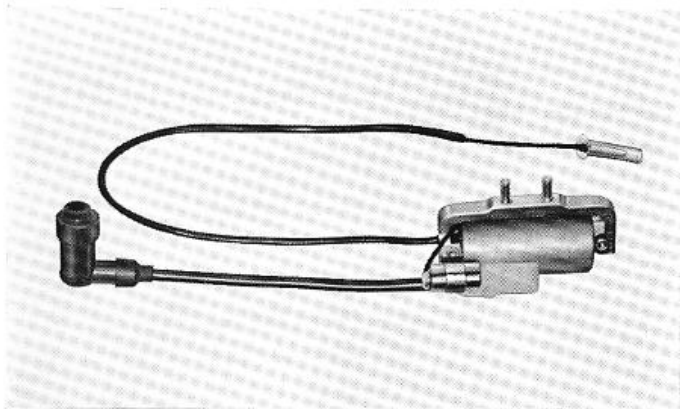


Fig. 3-1 Ignition coil

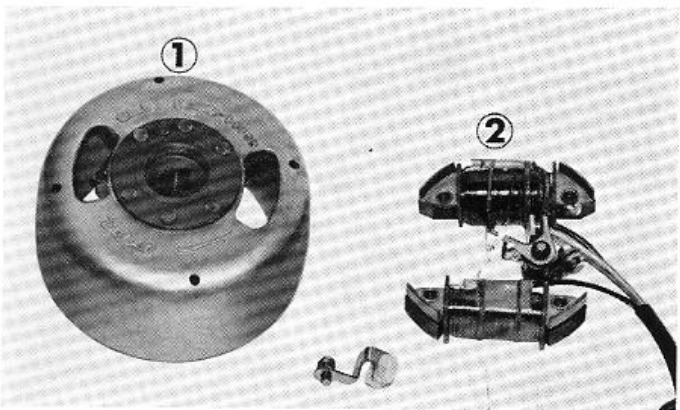


Fig. 3-2 ① Rotor ② Stator

In order for a gasoline engine to operate, fuel mixture must be ignited by one of several methods so that the fuel mixture can be burned to produce useful work.

The P 50 utilizes A. C. ignition system, employing an A. C. generator and ignition coil. In this system, the A. C. current produced by the A. C. generator is interrupted to supply the primary voltage to the primary coil of the externally mounted ignition coil where the high voltage is induced for the ignition. This system differs from the conventional ignition system where the D. C. current is supplied to the ignition coil.

The chart on the following page lists the electrical system troubles and guides to corrective action.

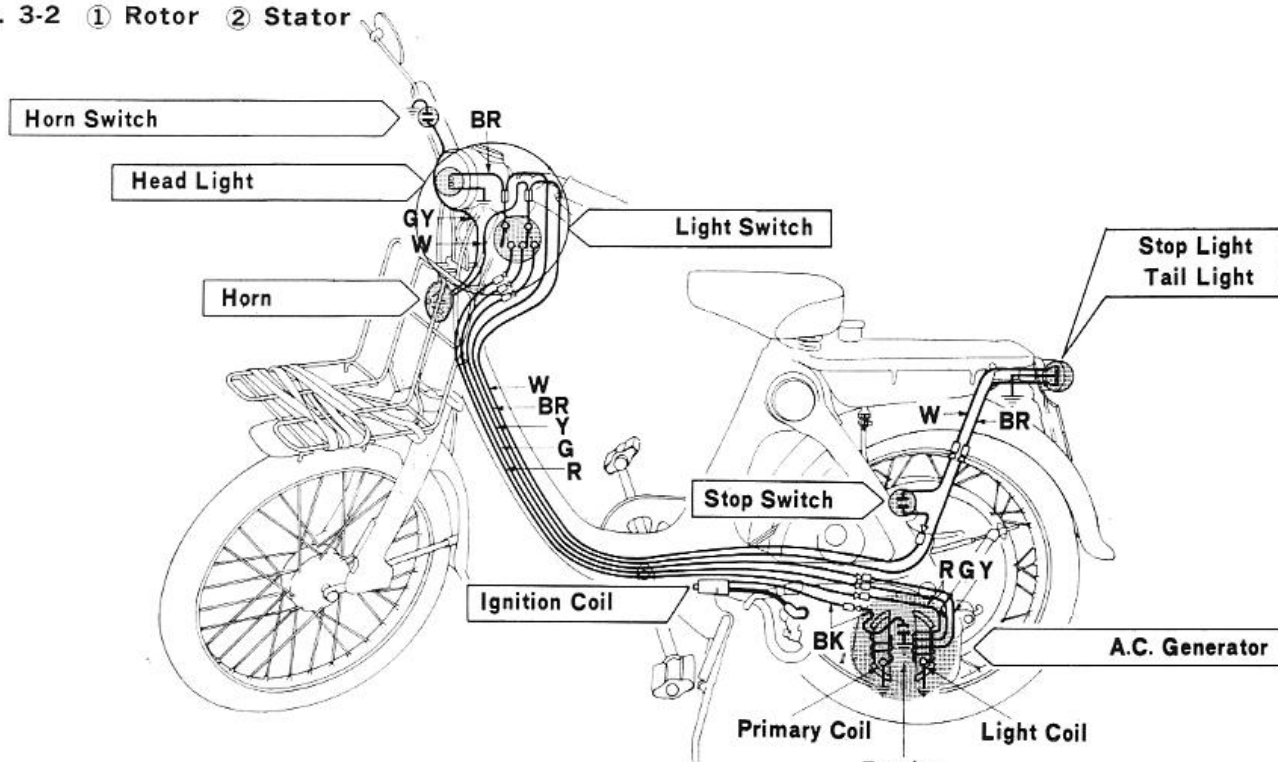


Fig. 3-3 BR : BROWN      GY : GREY      W : WHITE      Y : YELLOW      G : GREEN  
 R : RED      BK : BLACK

## Electrical Trouble Shooting

Trouble	Probable cause	Corrective action
Engine will not start • No spark at the plug • Weak spark	<ol style="list-style-type: none"> <li>1. Spark plug improperly installed</li> <li>2. Plug electrode dirty or eroded</li> <li>3. Plug gap too wide</li> <li>4. Dirty breaker point</li> <li>5. Improper ignition timing</li> <li>6. Defective condenser</li> <li>7. Decrease of magnetic force in the flywheel magneto</li> <li>8. Defective primary coil</li> <li>9. Leaky high tension cord</li> <li>10. Defective ignition coil</li> <li>11. Insulation failure in ignition coil</li> </ol>	<ol style="list-style-type: none"> <li>1. Reinstall</li> <li>2. Clean or replace</li> <li>3. Repair or replace</li> <li>4. Repair or replace</li> <li>5. Adjust</li> <li>6. Replace</li> <li>7. Replace</li> <li>8. Replace</li> <li>9. Replace</li> <li>10. Replace</li> <li>11. Repair</li> </ol>
Engine will not increase in speed	<ol style="list-style-type: none"> <li>1. Improper ignition timing</li> <li>2. Defective plug (wet)</li> <li>3. Defective governor</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> <li>2. Clean or replace</li> <li>3. Repair or replace</li> </ol>
Excessive engine speed	Defective governor	Repair or replace
Fire emitted from muffler	<ol style="list-style-type: none"> <li>1. Too rich a fuel mixture</li> <li>2. Excessive carbon deposit</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust carburetor and clean plug or replace.</li> </ol> <p style="text-align: center;">Refer to section 6 for spark plug check</p>
Breaker points readily burns	<ol style="list-style-type: none"> <li>1. Points covered with oil</li> <li>2. Improper point gap</li> <li>3. Improper ignition timing</li> <li>4. Condenser internally shorted</li> <li>5. Improper capacity condenser</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean</li> <li>2. Adjust</li> <li>3. Adjust</li> <li>4. Replace</li> <li>5. Replace</li> </ol>
Horn inoperative	<ol style="list-style-type: none"> <li>1. Open connection</li> <li>2. Defective horn switch contact</li> <li>3. Defective light switch contact</li> <li>4. Defective horn</li> </ol>	<ol style="list-style-type: none"> <li>2. Repair or replace</li> <li>3. Repair or replace</li> <li>4. Repair or replace</li> </ol>
Stop lamp defective	<ol style="list-style-type: none"> <li>1. Broken bulb filament, connector unplugged</li> <li>2. Defective stop switch contact</li> <li>3. Defective lighting switch contact</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace</li> <li>2. Repair</li> <li>3. Repair or replace</li> </ol>
Head light bulb filament burned	<ol style="list-style-type: none"> <li>1. Open tail light circuit causing excessive voltage</li> </ol>	
Head light defective (also same for tail light)	<ol style="list-style-type: none"> <li>1. Bulb filament broken, connector unplugged</li> <li>2. Poor socket contact, burned contacts</li> <li>3. Defective lighting switch contact</li> <li>4. Loss of magnetism in A. C. generator</li> <li>5. A. C. generator lamp coil defective</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair by raising the contact</li> <li>2. Replace</li> <li>3. Repair or replace</li> <li>4. Remagnetize or replace</li> <li>5. Replace</li> </ol>
Light beam center dark	Improper bulb installation	Adjust focus
Lens and reflector clouded	<ol style="list-style-type: none"> <li>1. Fogged</li> <li>2. Dust</li> </ol>	Clean the lens and reflector surface (after removing socket)

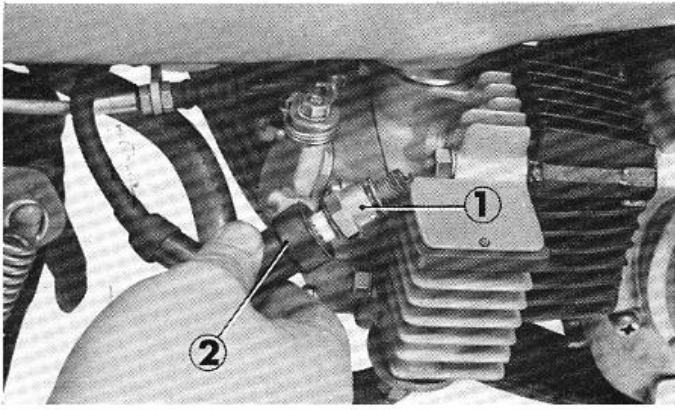


Fig. 3-4 ① Spark plug  
② Noise suppressor cap

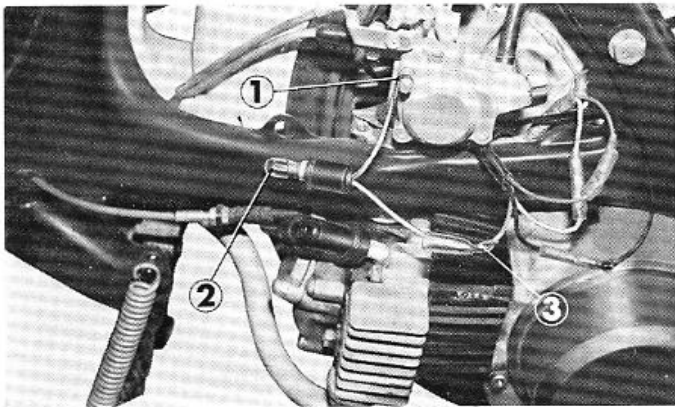


Fig. 3-5 ① Attach the cord to frame  
② Test lamp  
③ Black lead from the generator

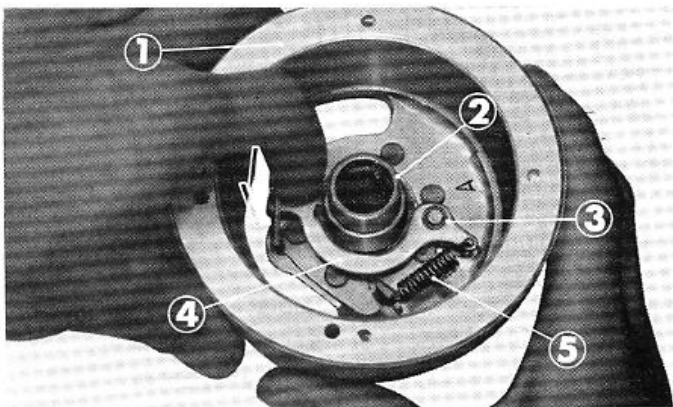


Fig. 3-6 ① Rotor ② Cam ③ Snap washer  
④ Governor weight  
⑤ Governor spring

## A. Inspection of Spark Characteristic

The use of the A.C. ignition system makes it imperative that the inspection of the ignition coil be made by using the A.C. generator.

1. First, check to see that the high voltage is being delivered to the spark plug. Ground the spark plug on the engine as shown in Fig. 3-4 and perform the starting process. If bluish white spark is seen jumping across the plug points, it is an indication that the spark plug, ignition coil, flywheel, A.C. generator are in good condition.

If there are no sparks; one or more of the components are defective.

2. The primary coil may be checked for condition by the use of a lamp.

Connect a 6V-3W bulb across the black lead from the generator and the ground and start the engine. If the bulb does not light up, there is an opening in the black lead or else the coil is defective. However, if the the bulb continues to stay lit, the ignition coil or the breaker point is defective. (Fig. 3-5)

### Specification and Performance

Type: A.C. ignition system

Ignition characteristics: Coupled with the Denso A.C. generator No. 0-38000-074-0

Engine RPM	Spark length/ 3 point spark gap tester
1,000	5 mm (0.1968 in) min.
3,000	8 mm (0.3150 in) min.

## B. Inspection of Governor

The cam should move smoothly when governor weight is forced in the direction of the arrow (Fig. 3-6) and should also return smoothly when released. If the operation is not smooth, remove the snap washer and clean the inside of the cam, and check to see that the cam inside surface is not scratched or coated with metallic dust.

When assembling, apply a coating of grease to the inside of the cam.

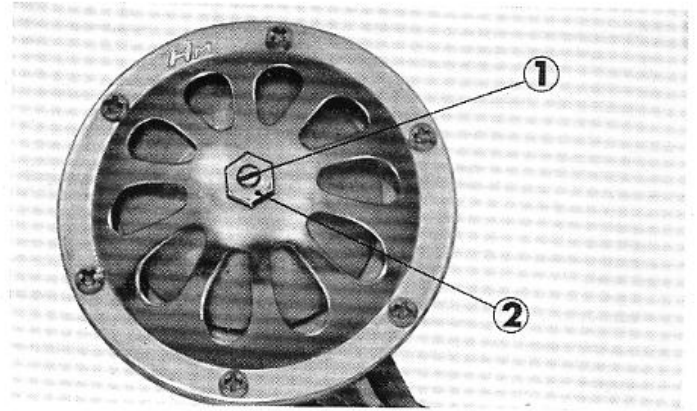
### C. Inspection of Horn

The horn trouble are either no sound, poor tone or insufficient loudness.

1. If there is no sound: check for poor electrical connections, horn switch (grounding).
2. Insufficient loudness: adjust the current control screw on back of the horn. (Fig. 3-7)

Turn to the right to decrease loudness and to the left to increase loudness.

3. Check point and coil: disconnect the leads at the horn terminal and measure the resistance across the terminals. It should register about 1 ohm resistance.



**Fig. 3-7** ① Screw ② Nut



## 4. FRAME

### Front fork, Front wheel, Front cushion, Rear wheel

Trouble	Probable cause	Corrective action
Steering stability is very poor	<ol style="list-style-type: none"> <li>1. Improper tire pressure</li> <li>2. Loose handle mounting bolt</li> <li>3. Loose front axle</li> <li>4. Loose ball race</li> <li>5. Rear axle not properly tightened (both sides)</li> <li>6. Loose front suspension pivot bolt</li> <li>7. Loose spoke</li> <li>8. Distorted rim</li> <li>9. Worn front wheel bearing</li> </ol>	<ol style="list-style-type: none"> <li>1. Front tire 1.3 kg/cm<sup>2</sup> ( 18.5 lb/in<sup>2</sup>) Rear tire 1.7 kg/cm<sup>2</sup> ( 24.2 lb/in<sup>2</sup>)</li> <li>2. Retorque, refer to chart on page</li> <li>3. Retorque</li> <li>4. Retorque</li> <li>5. Properly set into the frame groove</li> <li>6. Retorque</li> <li>7. Replace, refer to section A.</li> <li>8. Repair or replace</li> <li>9. Retorque</li> </ol>
Noise originating in the cushion	<ol style="list-style-type: none"> <li>1. Lack grease at the pivot and front cushion bottom</li> <li>2. Loose cushion mountings</li> </ol>	<ol style="list-style-type: none"> <li>1. Apply grease</li> <li>2. Retorque</li> </ol>
Front brake inoperative	<ol style="list-style-type: none"> <li>1. Front brake arm out of adjustment</li> <li>2. Lining not fully contacting, worn</li> <li>3. Oil on drum</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust to 1.0~1.5 cm (0.40~0.60 in) free play at end of lever</li> <li>2. Repair or replace</li> <li>3. Clean</li> </ol>
Excessive vibration when rear brake applied	<ol style="list-style-type: none"> <li>1. Loose rear axle shaft nut</li> <li>2. Loose rear axle bolt</li> <li>3. Worn torque arm mounting hole</li> </ol>	<ol style="list-style-type: none"> <li>1. Retorque</li> <li>2. Retorque</li> <li>3. Replace</li> </ol>
Pedal inoperative	<ol style="list-style-type: none"> <li>1. Rear brake dragging</li> <li>2. Disconnected or broken drive chain</li> <li>3. Locked free wheel sprocket               <ul style="list-style-type: none"> <li>~1 Water and dust caused grease to harden</li> <li>~2 Weakened free wheel spring</li> <li>~3 Broken ratchet pawl</li> <li>~4 Broken internal teeth on free wheel sprocket</li> <li>~5 Worn free wheel spring B (scraping sound heard when reverse pedalling)</li> </ul> </li> <li>4. Bent rear axle</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> <li>2. Repair or replace, refer to section 1</li> <li>3.           <ul style="list-style-type: none"> <li>~1 Clean and add new grease</li> <li>~2 Replace, refer to section 1</li> <li>~3 Replace, refer to section 1</li> <li>~4 "</li> <li>~5 "</li> </ul> </li> <li>4. Repair or replace</li> </ol>

Trouble	Probable cause	Corrective action
Pedal being driven by the rear wheel	<ol style="list-style-type: none"> <li>1. Solidified grease</li> <li>2. Broken ratchet pawl</li> <li>3. Worn final driven shaft groove causing ratchet pawl to bind</li> <li>4. Seizure of final driven shaft and free wheel sprocket</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean, apply grease</li> <li>2. Replace, refer to section J.</li> <li>3. //</li> <li>4. //</li> </ol>
Unusual noise (scraping and knocking noise)	<ol style="list-style-type: none"> <li>1. Defective free wheel spring B</li> <li>2. Lack grease in free wheel</li> <li>3. Bent internal teeth of free wheel sprocket</li> <li>4. Worn tensioner</li> <li>5. Chain tensioner roller not centrally aligned</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Apply grease</li> <li>3. Replace free wheel sprocket</li> <li>4. Replace</li> <li>5. Repair</li> </ol>

### A. Disassembly of Front Wheel

1. Disconnect the front brake cable from the brake panel.
2. Unscrew the 4×16 screw and disconnect the speedometer cable. (Fig. 4-1)
3. Remove the 10 mm nut, draw out the front wheel axle and disassemble the front wheel.
4. Remove the brake shoe spring and disassemble the front brake shoes. (Fig. 4-2)

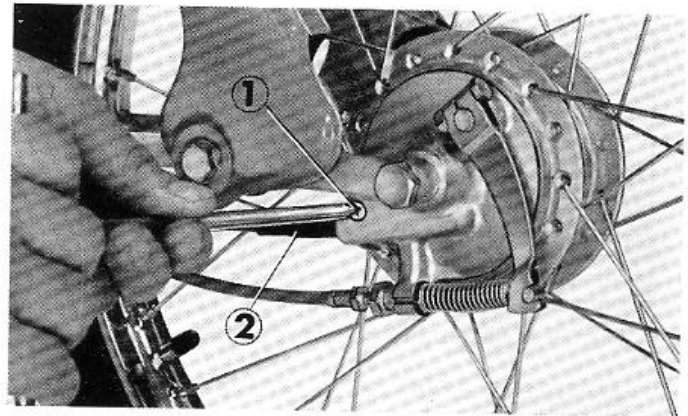


Fig. 4-1 ① 4×16 cross screw  
② Speedometer cable

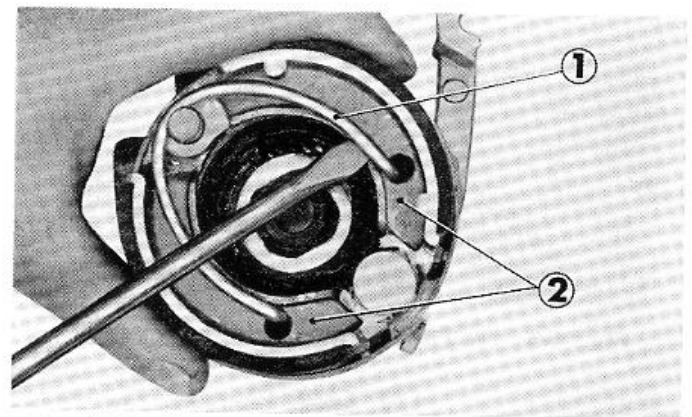


Fig. 4-2 ① Front brake shoe spring  
② Front brake shoe

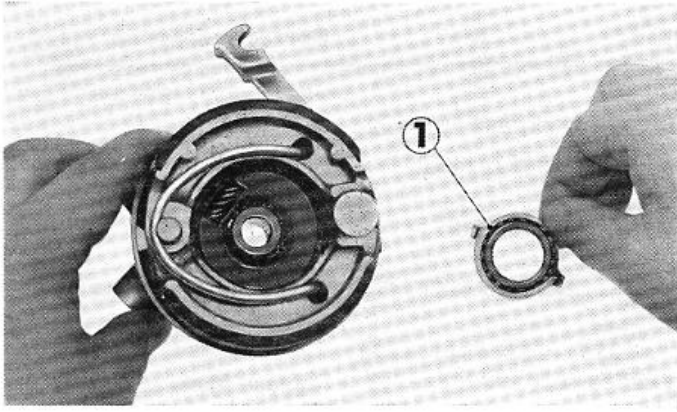


Fig. 4-3 ① Speedometer gear

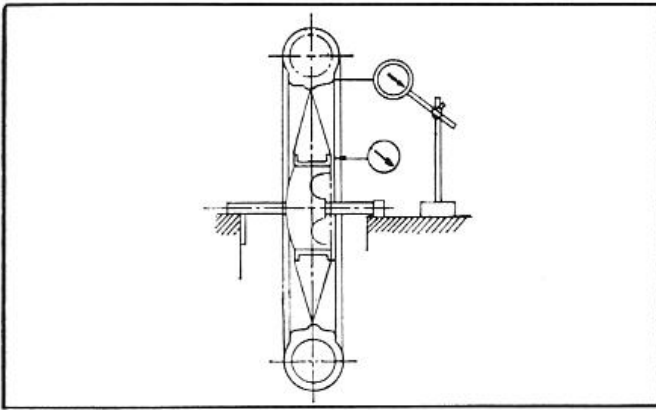


Fig. 4-4 Measuring rim runout

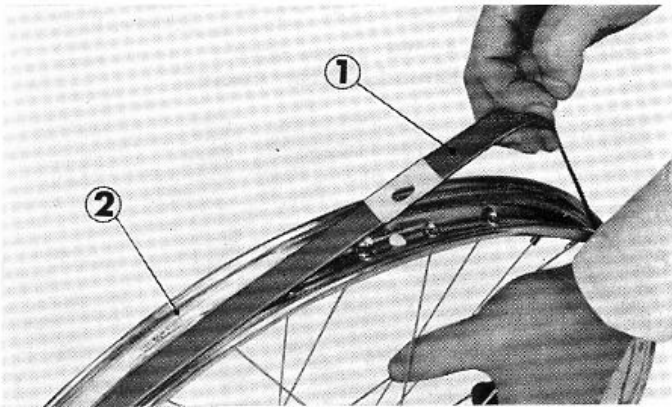


Fig. 4-5 ① Tire ② Rim

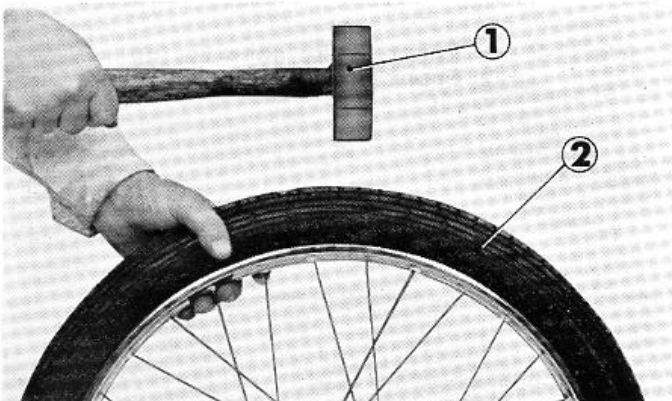


Fig. 4-6 ① Wooden hammer ② Tire

5. Remove the speedometer gear from the front brake panel. (Fig. 4-3)
6. Remove tire and tube from the rim with tire lever

## B. Inspection

1. Measure rim runout. (Fig. 4-4)

Item	Standard value	Serviceable limit
Side runout	0.6 mm (0.024 in)	0.5 mm (0.020 in)
Vertical runout	1.0 mm (0.040 in)	1.0 mm (0.040 in)

2. Measure front axle diameter and bend.

Item	Standard value	Serviceable limit
Diameter	9.994~9.990 (0.3935~ 0.3933 in)	
Bend	0.2 mm (0.008 in)	0.5mm (0.020 in) max

3. Remove any deep grooves and scratches from the drum contact surface and lining.

## C. Reassembly

1. Assemble the speedometer gear.
2. Set brake shoe on the brake panel.
3. Assemble the tire flap over the spoke nipple. (Fig. 4-5)
4. Assemble tube and tire.

### (Note)

- a. After assembling the tire and tube, fill tire with approximately  $0.5\text{kg}/\text{cm}^2$  ( $7.1\text{ lb}/\text{in}^2$ ) of air and tap all around with a wooden hammer to prevent tube from being pinched. (Fig. 4-6)

- b. The valve stem should be pointed toward the axle or else air will leak from the base of the stem. (Fig. 4-7)

#### Tire pressure

Standard	front: 1.3 k g/cm <sup>2</sup> (18.5 lb/in. <sup>2</sup> )
	rear: 1.7 k g/cm <sup>2</sup> (24.2 lb/in. <sup>2</sup> )

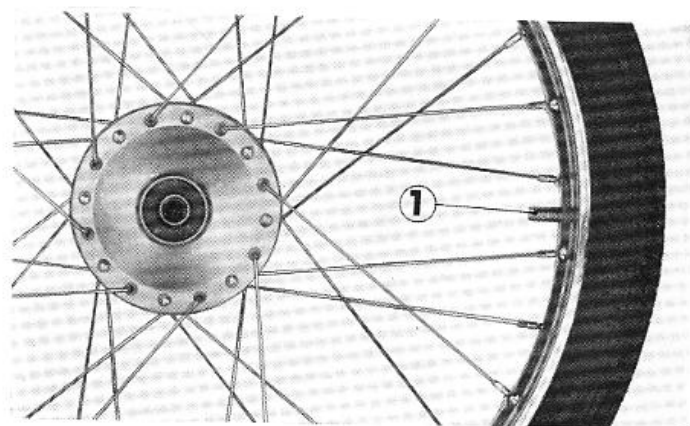


Fig. 4-7 ① Valve stem

- Wash off old grease from the wheel hub and bearing, and pack both bearing and hub with new grease. Assemble the distance collar, 6201 ball bearing and oil seal. (Fig. 4-8)
- Fit the brake panel on the hub.
- Assemble the front wheel on the fork, connect the speedometer cable and brake cable. Check the operation of the speedometer and made adjustment to the brake lever.

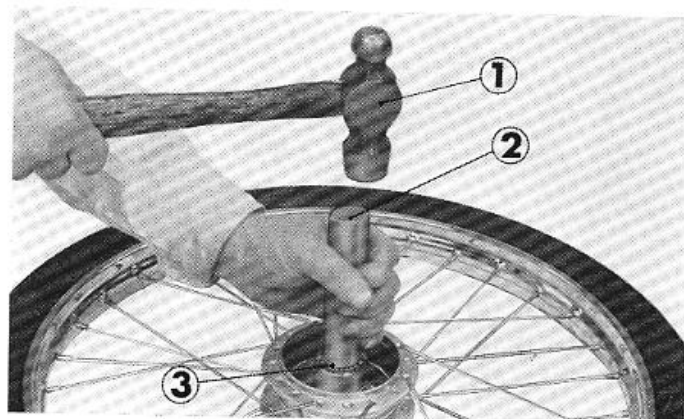


Fig. 4-8 ① Ball peen hammer ② Bearing installer ③ 6201 ball bearing

#### D. Disassembly of Front Cushion

- Disassemble the front wheel, refer to section 4.1.A.
- Remove the 8 mm and 6 mm nuts mounting both the front cushion and fender.
- Disassemble the front cushion assembly and suspension arm from the front fork. (Fig. 4-9)
- Remove the 6mm nut and loosen the front cushion under bolt, and the front cushion; suspension can be disassembled. (Fig. 4-10)

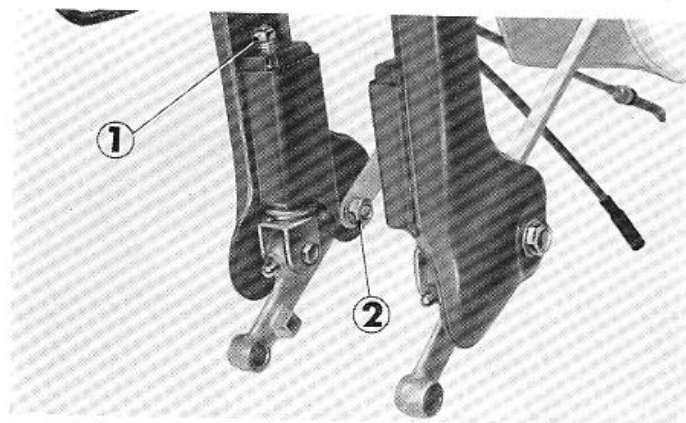


Fig. 4-9 ① 6 mm nut ② 8 mm nut

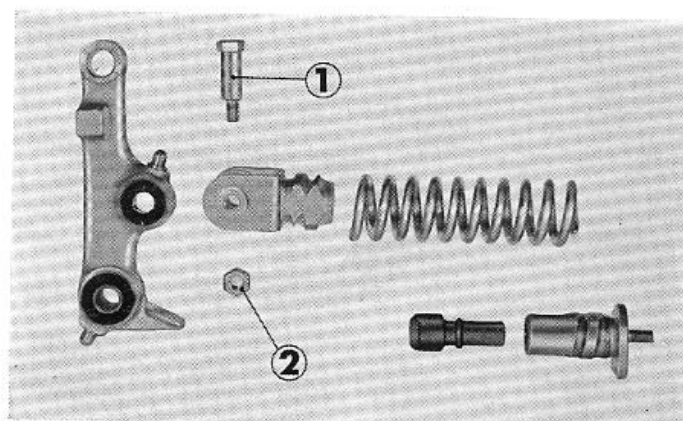


Fig. 4-10 ① Front cushion under bolt ② 6 mm nut

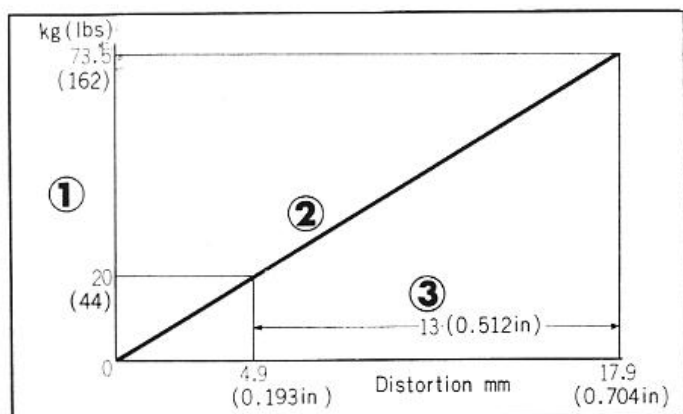


Fig. 4-11 ① Load kg. ② Spring rate  
③ Stroke

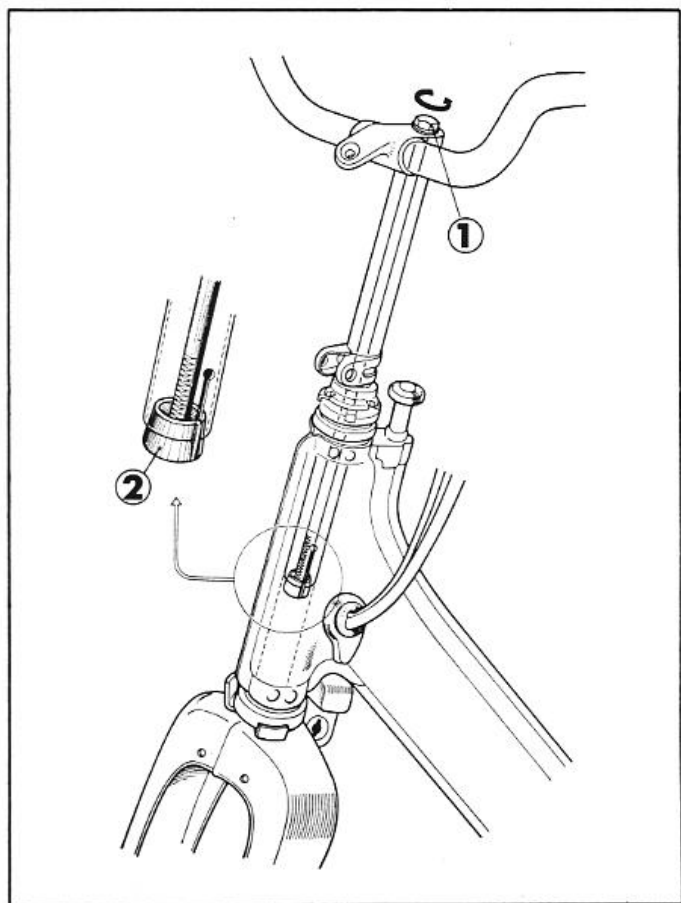


Fig. 4-12 ① Handle set bolt ② Lock nut

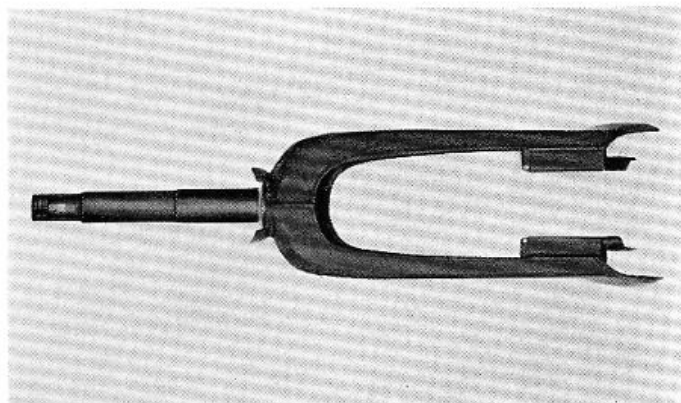


Fig. 4-13 Front fork

5. Front cushion characteristic. (Fig. 4-11)

#### E. Reassembly

1. Assemble in the reverse order of removal.

(Note)

- a. Clean suspension arm and other parts, apply grease before assembly.
- b. Apply grease with the grease gun after assembly.

#### F. Disassembly of Front Fork

1. Remove front wheel, refer to section A.
2. Remove head light and disconnect all leads.
3. Remove horn and front carrier.
4. Loosen handle set bolt and tap lightly to remove the handle. (Fig. 4-12)

\*A tapered plug is fitted on the bottom of the handle pipe stem.

As the handle setting bolt is tightened, the slotted handle pipe expands and locks on the front fork pipe.

5. Loosen the stem nut, remove the top cone race and pull out the front fork. (Fig. 4-13)

(Note)

Watch for the steel balls which will drop out.

### G. Inspection

1. Bend in the handle pipe
2. Twist in the front fork
3. Distorted lock nut
4. Pressure failure of the ball race

### H. Reassembly

1. Assemble 26 and 21 steel balls into the bottom and top cone race respectively with the use of grease. (Fig. 4-14)
2. Slide the front fork into the stem carefully and make sure that the steel balls are not dropped. Tighten the top cone race fully and then back off 1/4 turn.

(Note)

**Front fork should not be loosen nor tighten so that steering is heavy.**

3. Hold the top cone race and then tighten the stem nut using a special tool spanners.
4. Subsequent assembly operation shall be in the reverse order of disassembly procedure. (Fig. 4-15)

### I. Rear Wheel Disassembly

1. Remove engine, refer to section 2. 1. A.
2. Remove the 50mm circlip and disassemble the free wheel sprocket, 50 mm thrust washer A and C. (Fig. 4-16)
3. Remove the 61mm circlip and disassemble the 50 mm thrust washer B, free wheel spring B. (Fig. 4-17)

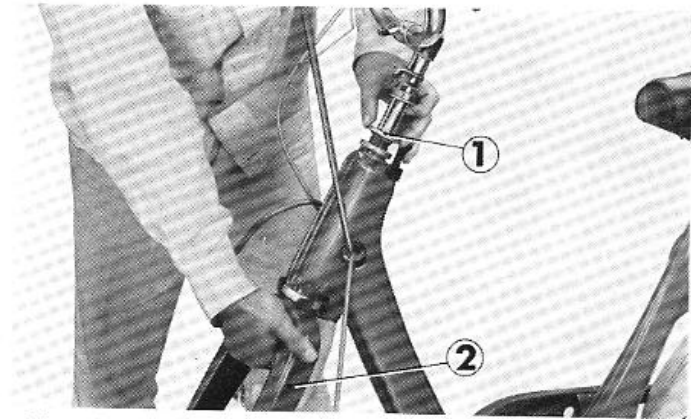


Fig. 4-14 ① Steering top cone race  
② Front fork

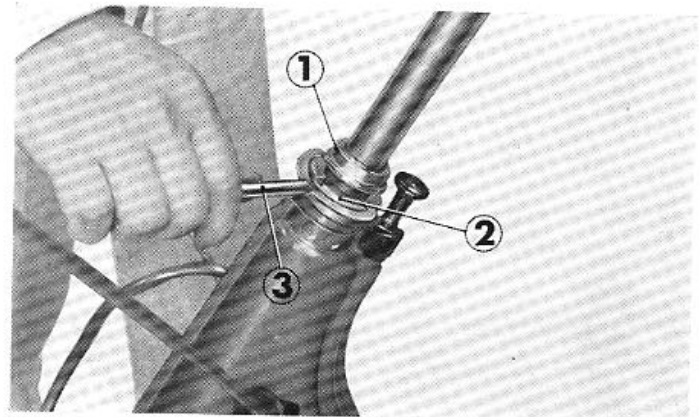


Fig. 4-15 ① Steering stem nut ② Steering top cone race ③ Special tool spanner

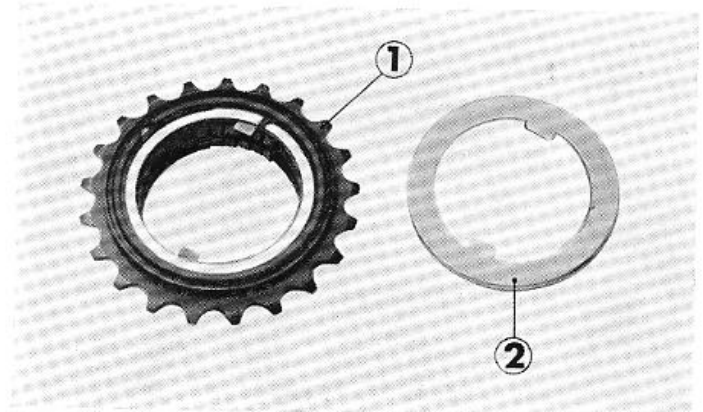


Fig. 4-16 ① Free wheel sprocket  
② 50 mm thrust washer C

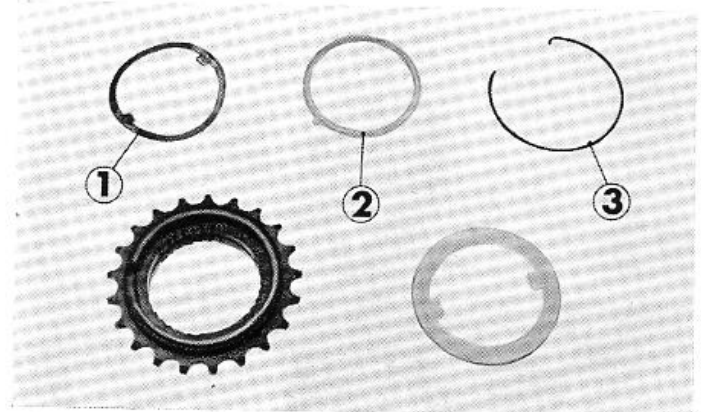


Fig. 4-17 ① Freewheel spring B ② 50 mm thrust washer B ③ 61 mm circlip

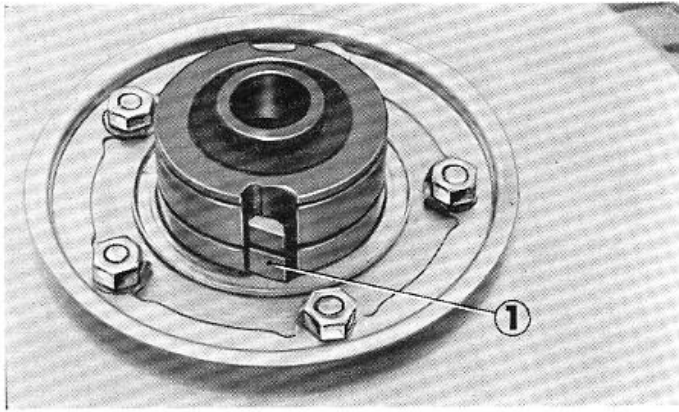


Fig. 4-18 ① Ratchet pawl

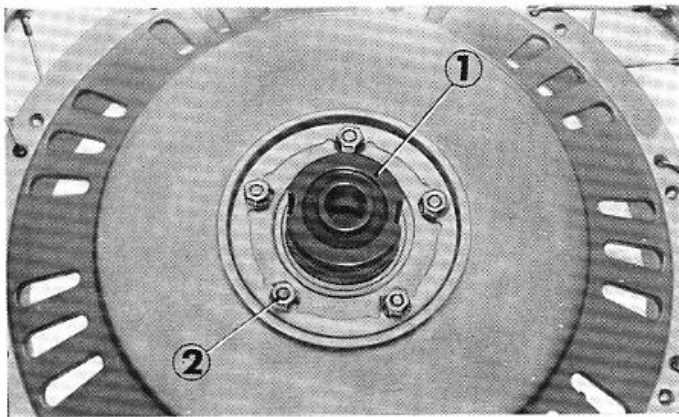


Fig. 4-19 ① Final driven shaft  
② 6 mm hex. nut

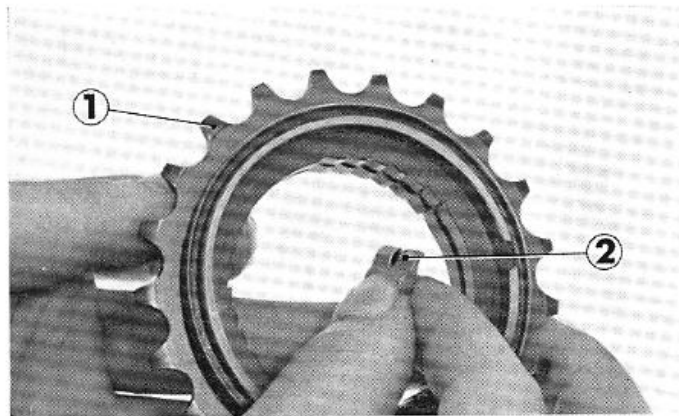


Fig. 4-20 ① Free wheel sprocket  
② Ratchet pawl

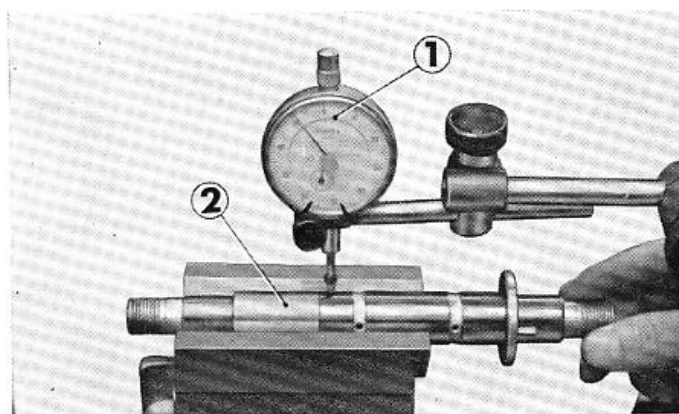


Fig. 4-21 ① Dial gauge  
② Rear wheel axle complete

4. After removing the free wheel spring A, the ratchet pawl can be disassembled. (Fig. 4-18)

5. Remove five 6 mm nuts and the 50 mm thrust washer A, and the final driven shaft can be disassembled together. (Fig. 4-19)

6. Disassemble tire and tube from the rim using tire lever.

**J. Inspection**

1. Check for wear of the internal teeth on the free wheel sprocket. (Fig. 4-20)
2. Check for wear and damage of ratchet pawl.
3. Check free wheel spring for loss of tension.
4. Inspect diameter of final driven shaft.

Item	Standard value	Serviceable limit
Sprocket	49.98~50.11 (1.967~1.973 in)	
Lining cam	97.8~98.0 (3.850~3.858 in)	

5. Rear wheel axle diameter, bend, wear. (Fig. 4-21)

Item	Standard value	Serviceable limit
Diameter	0.2 mm (0.008 in)	0.5 mm (0.020 in) max
Bend		

6. Rim runout.

Item	Standard value	Serviceable limit
Side runout	0.6 mm (0.024 in)	1.0 mm (0.040 in) max
Vertical runout	0.5 mm (0.020 in)	1.0 mm (0.040 in) max

7. Check loss of tension of rear brake shoe spring.
8. Check for bend in the rear brake cam.

## Frame trouble diagnosis

Trouble	Probable cause	Corrective action
Excessive axial play in the throttle grip	1. Grip setting screw loose 2. Throttle grip pipe deformed	1. Tighten 2. Replace
Throttle grip operation heavy	1. Throttle cable binding 2. Lack of grease on the throttle grip pipe 3. Throttle grip pipe deformed	1. Repair or replace 2. Apply grease 3. Replace
Excessive looseness at the hanger crank axle	Crank arm improperly installed	Adjust
Noise produced by the hanger crank axle	Lack of grease on the hanger pipe bushing	Apply grease

## Torquing Table

Item	Torque value	
	kg·cm	ft·lbs
<b>Engine</b>		
Right crankcase	80 ~ 110	5.8 ~ 8.0
Drain plug	320 ~ 270	23.1~19.5
Clutch	380 ~ 450	27.5~ 32
Right crankcase cover	80 ~ 120	5.8 ~ 8.7
8 mm cylinder bolt	70 ~ 100	5.1 ~ 7.2
Cord clamp	60 ~ 90	4.3 ~ 6.5
Dynamo stator	20 ~ 40	1.5 ~ 2.9
Fly wheel	180 ~ 250	13.0~18.1
Dynamo cover	20 ~ 40	1.5 ~ 2.9
Cylinder head	90 ~ 120	4.5 ~ 8.7
Cylinder head cover	80 ~ 110	5.8 ~ 8.0
Spark plug	110 ~ 150	8.0 ~10.8
Tappet adjusting nut	70 ~ 100	5.1 ~ 7.2
Tappet cap	90 ~ 130	6.5 ~ 9.4
Stop switch	80 ~ 110	5.8 ~ 8.0
brake arm	50 ~ 70	3.6 ~ 5.1
<b>Frame</b>		
Front cushion pivot bolt	180 ~ 230	13.0~16.6
Front cushion bolts	80 ~ 110	5.8 ~ 8.0
Torque stopper bolt	200 ~ 250	14.5~18.1
Torque arm nut	40 ~ 70	2.9 ~ 5.1
Crank arm set pin	40 ~ 70	2.9 ~ 5.1
Handle setting bolt	250 ~ 350	18.1~25.3
Steering head stem nut	400 ~ 500	28.9~36.2
Seat bolt	200 ~ 250	14.5~ 18.1
Rear axle nut	400 ~ 600	28.9~43.4



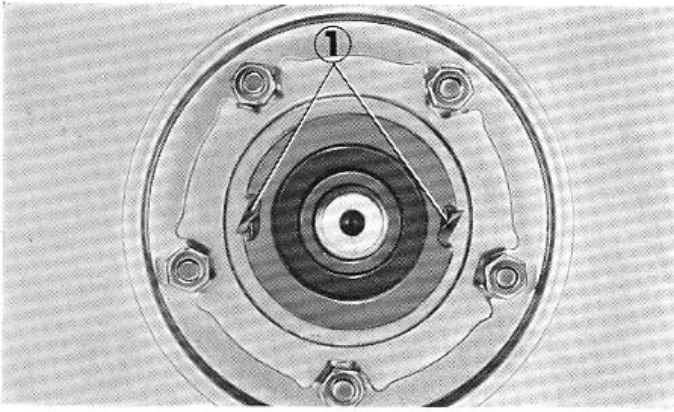


Fig. 4-22 ① Ratchet pawl

## K. Reassembly

1. Assemble the final driven shaft together with the 50 mm thrust washer C to the rear wheel hub.
2. Apply grease on the final driven shaft ratchet groove and assemble the ratchet pawl.
3. Assemble the free wheel sprocket A to the final driven shaft.

### (Note)

**After assembling the free wheel spring A, check the spring tension. If the spring is weak or the operation is not smooth, the ratchet will produce noise, and in some cases, the power will not be transmitted to the rear wheel, therefore, replace the spring.**

4. Apply a coating of grease on the inside of the free wheel sprocket, hold the ratchet pawl and assemble on the final driven shaft.
5. Coat the free wheel spring B with grease and assemble the pawl on the final driven shaft.
6. Set the 50 mm thrust washer B and the 61 mm circlip on the sprocket.
7. Set the 50 mm thrust washer A and the 50 mm circlip on the final driven shaft.

### (Note)

**If grease is not applied, the sprocket will turn heavy, noisy and the operation will not be smooth.**



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