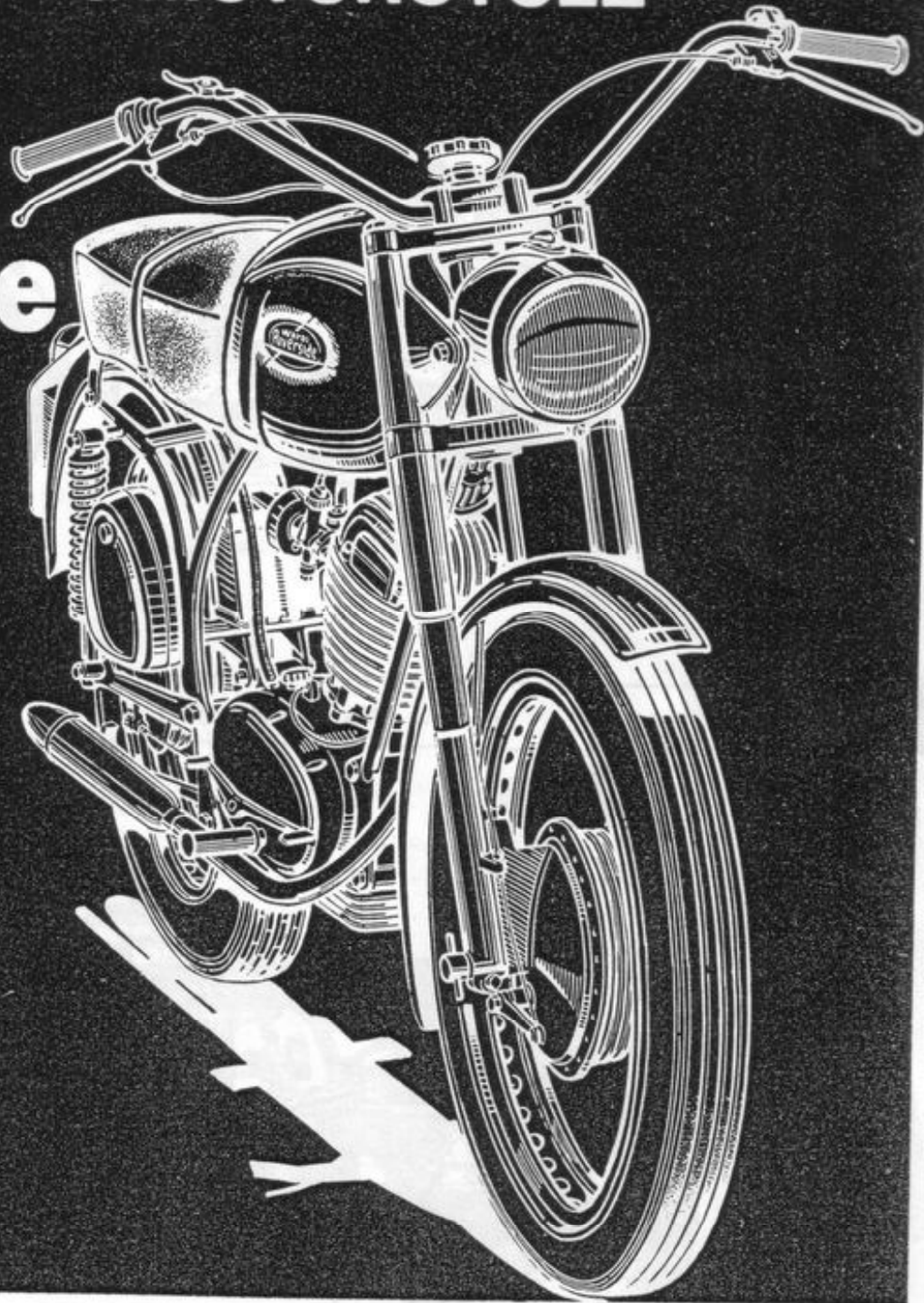


**OWNER'S GUIDE**

**MODEL NUMBER FFA - 14017**

**250 cc. TOURING MOTORCYCLE**

**WARDS**  
**Riverside**



**Riverside** — SOLD EXCLUSIVELY BY MONTGOMERY WARD

# RIVERSIDE 250 cc. TOURING MOTORCYCLE

MODEL NUMBER FFA - 14017

MONTGOMERY WARD welcomes you to the rapidly growing numbers of discerning owners who have selected the precision-crafted Riverside.

The Riverside is a superb quality machine and was assembled to exacting standards by "Old World" craftsmen.

Regular attention to simple maintenance procedures will keep your Riverside in prime condition to perform as the "thoroughbred" it is.

Careful carrying out of the assembly, adjustment, lubrication and maintenance instructions in this Owner's Guide will also assure that you will not intentionally abuse or neglect your machine and void the warranty.

## IMPORTANT

To derive maximum satisfaction from your Riverside Touring Motorcycle, read and carry out the instructions under the following headings:

- A. Assembly and Adjustment
- B. Lubrication
- C. Operation
- D. Break-In
- E. Lubrication
- F. Maintenance



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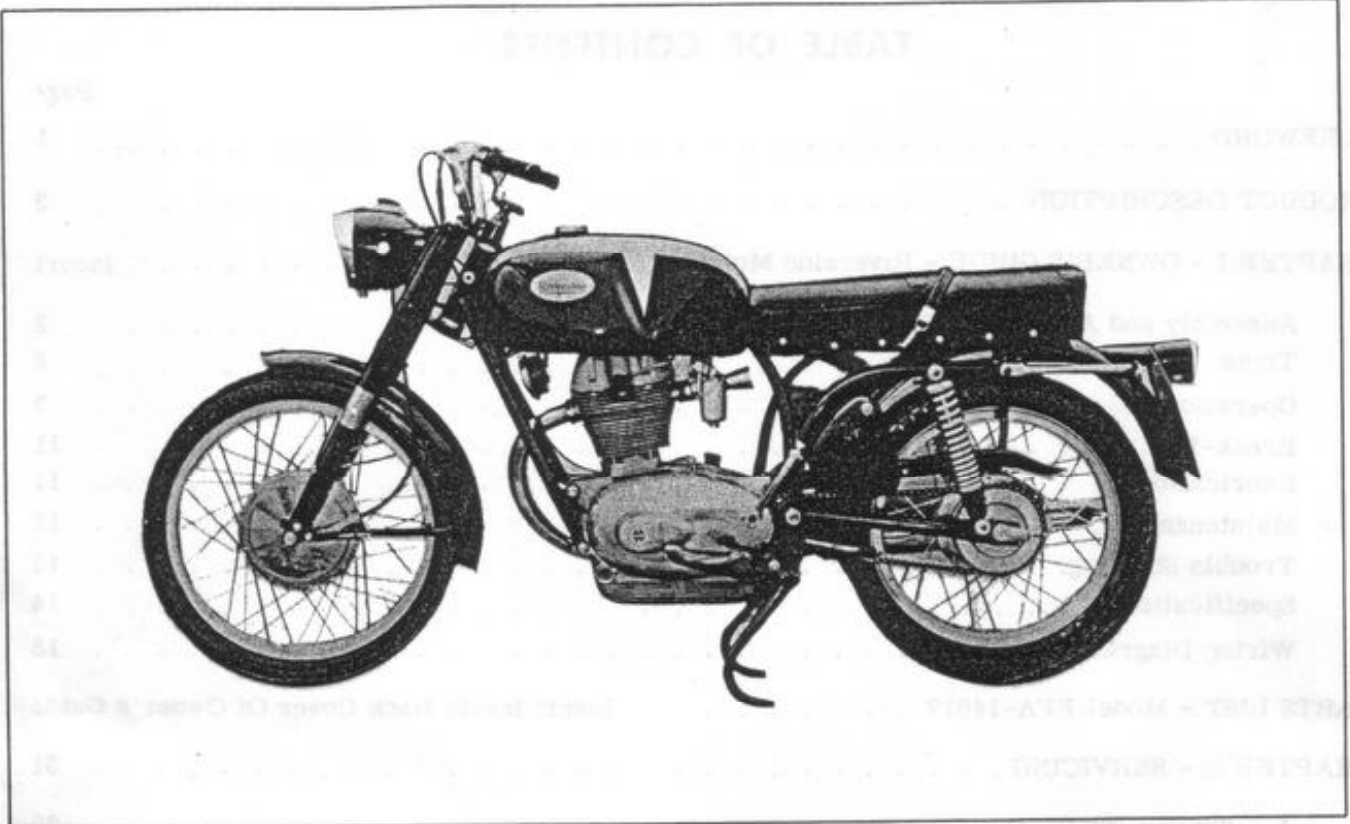


Figure 1. 250 cc. Motorcycle - Model FFA-14017

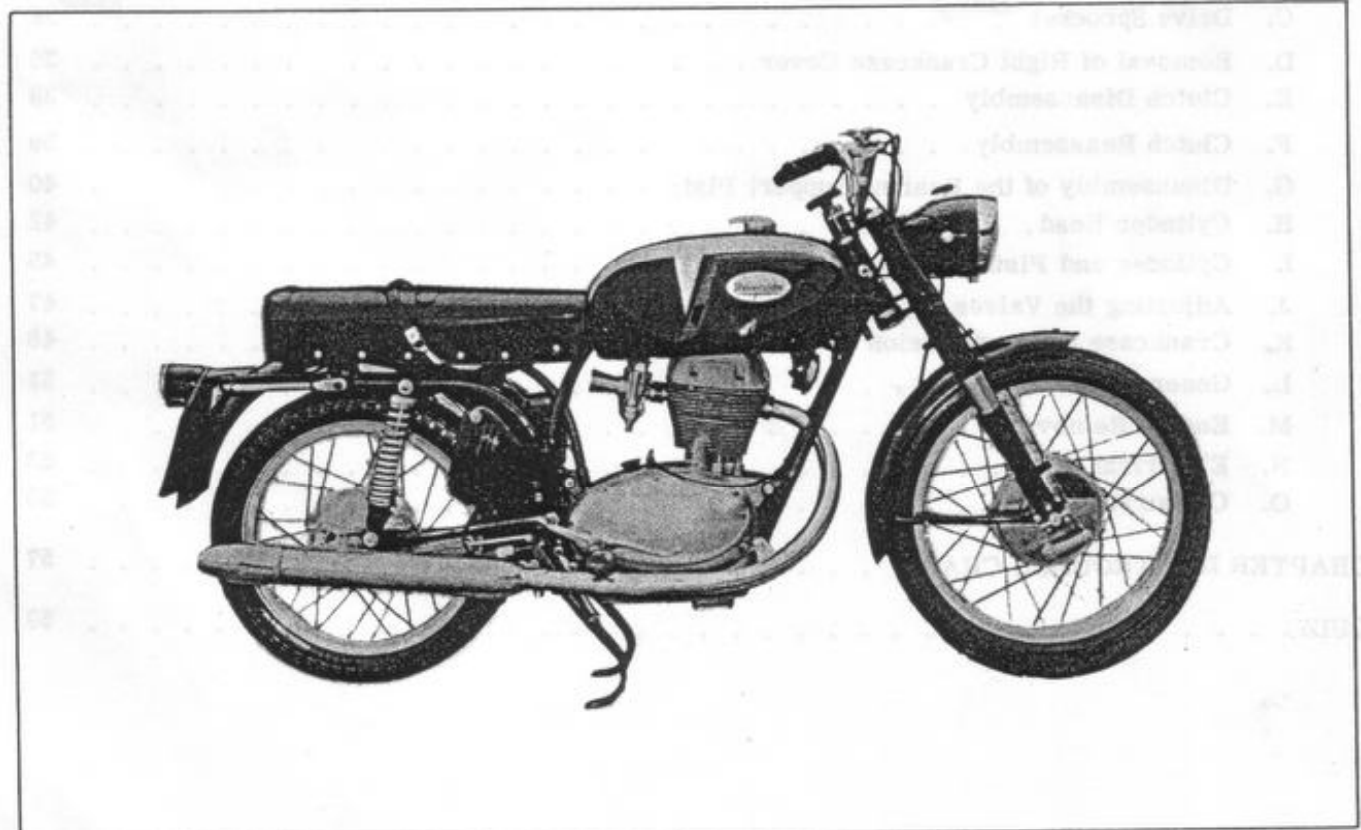


Figure 2. 250 cc. Motorcycle - Model FFA-14017



MONTGOMERY WARD welcomes you to the world of motorcycles. We are proud to offer you the finest quality motorcycles available. The Riverside is a superb quality machine and we warrant its performance. Regular attention to maintenance is essential. All parts are guaranteed to be of the highest quality. We will supply you with the necessary information and instructions to help you get the most out of your motorcycle.

## Warranty

For a period of ninety days from date of purchase or 3000 miles, whichever ever occurs sooner, Montgomery Ward will replace for the original purchaser, free of charge, any part, or parts, found upon examination by any Wards Repair Service Representative to be defective in material and/or workmanship.

All transportation charges on parts submitted for replacement under this warranty or pick-up and delivery charges for a complete machine being returned for repair under this warranty must be borne by the purchaser.

There is no other warranty expressed or implied. Wards shall in no event be liable for consequential damage.

This warranty becomes null and void if:

1. Breakage of parts or damage to parts is due to abuse or failure to follow operating and maintenance instructions outlined in this Owner's Guide.
2. Any modifications are made to the frame or engine.
3. The machine is used in sporting competition.
4. The machine is used for rental.

Claims can be made thru any Wards Retail Store or Catalog House and must include evidence of purchase date, model number and serial number of frame and engine.

FIRST IN  
SERVICE

Nationwide

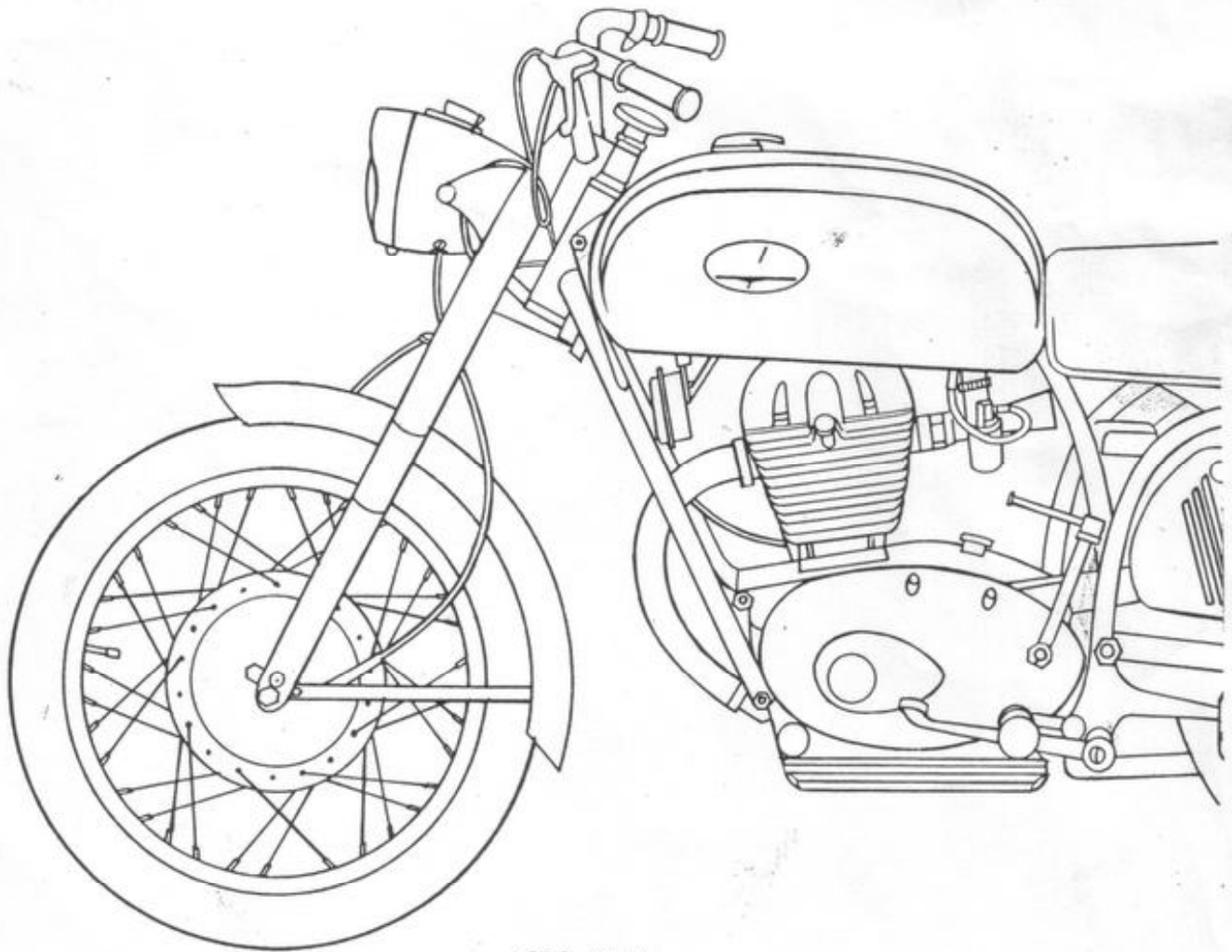


# *Service Manual*

## **Riverside MOTORCYCLES**

MODELS FFA-14017, 14020 AND 14023

DEPARTMENT 61



CRS-6154

ISSUED BY THE CUSTOMER SERVICE DEPARTMENT, CHICAGO

\$1.95

# SERVICE MANUAL

## Riverside

### MOTORCYCLES

MODELS FFA-14017, 14020 AND 14023

#### FOREWORD

This Manual provides the necessary information and procedures for disassembly, reassembly, repair and adjustment of the basic components of Riverside Motorcycles, Models 14017, 14020 and 14023.

Service procedures and techniques were prepared to take full advantage of special tools to make fast service possible.

The following subjects:

1. Assembly and Adjustment
2. Lubrication
3. Operation
4. Break-in
5. Maintenance
6. Specifications
7. Exploded Views with Parts Index
8. General Information

are covered in the Owner's Guide for Model 14017 which has been assembled within the covers of this Manual.

Please note that the Manual is concluded with a Service Quiz that includes instructions for taking the quiz and mailing it to the Regional Service Training Specialist.

MONTGOMERY WARD  
CUSTOMER SERVICE DEPARTMENT  
CHICAGO

## A. ASSEMBLY AND ADJUSTMENT

Your Riverside has been carefully and compactly crated to bring it to you in excellent condition. Careful assembly of your Riverside will give you an excellent opportunity to become familiar with the workings and minor adjustments of the controls. **The tools necessary for assembly and adjustment are packed with your machine.** Follow the steps below for quick and easy assembly.

**NOTE:** Tool kit is placed inside the metal container under the seat (left hand side) — Figs. 2 and 2 A.

### 1. UNPACKING:

- a. After removing the lid of the crate you will observe that packing braces are located at the handle-bars and seat post. Remove the bolts fastening the packing braces to the side of the crate and remove rear brace. (Fig. 1).
- b. Remove nuts fastening the packing braces of the crate.
- c. Remove box containing seat, front wheel and fender and remove front end of paking case. (Fig. 3).
- d. Remove cycle from crate (Fig. 4). Place cycle on kickstand and put an additional support under front fork.
- e. Remove front wheel and fender from carton. (Fig. 5).
- f. Remove seat from carton. (Fig. 6).

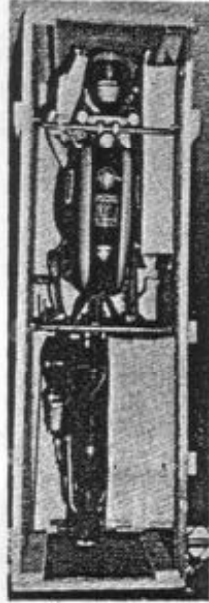


fig. 1

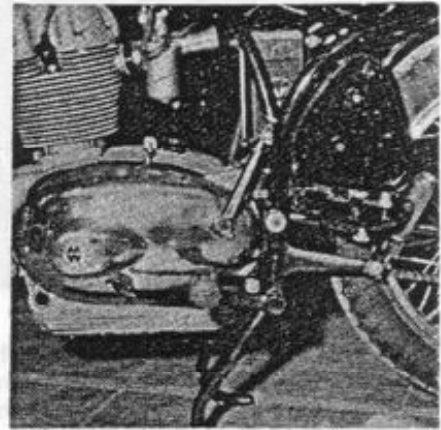


fig. 2 and 2 A

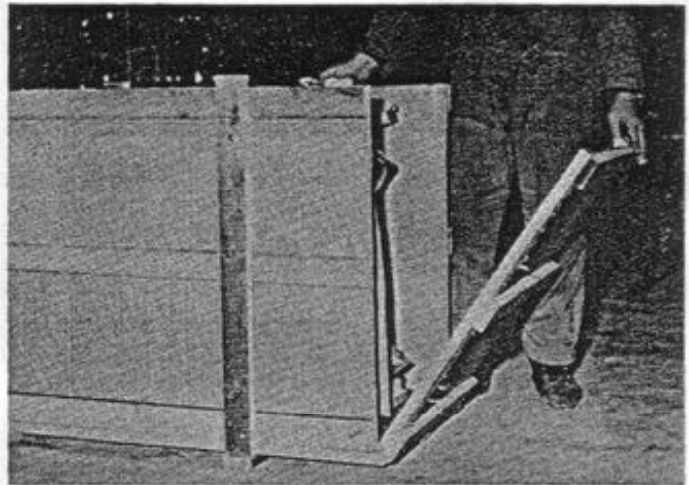


fig. 3

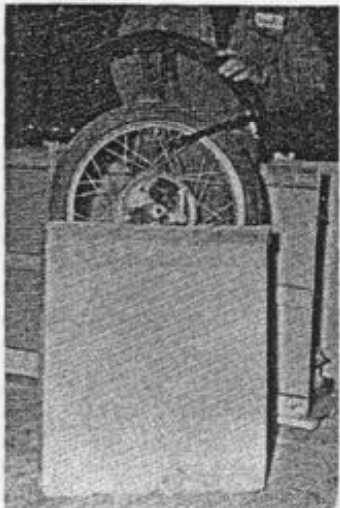


fig. 5



fig. 6

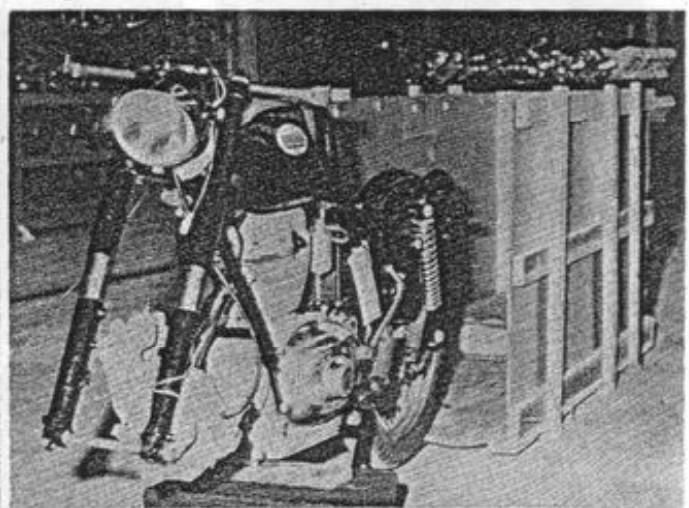


fig. 4





fig. 7

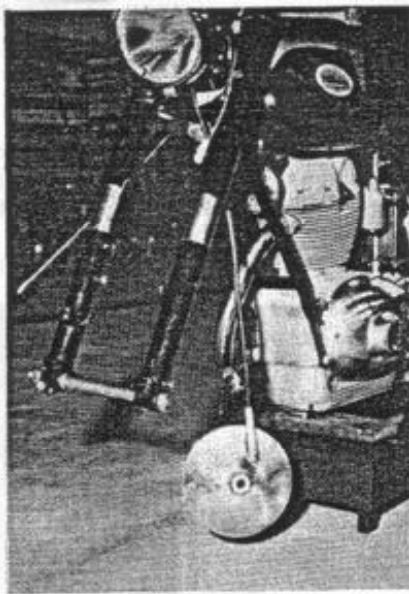


fig. 8

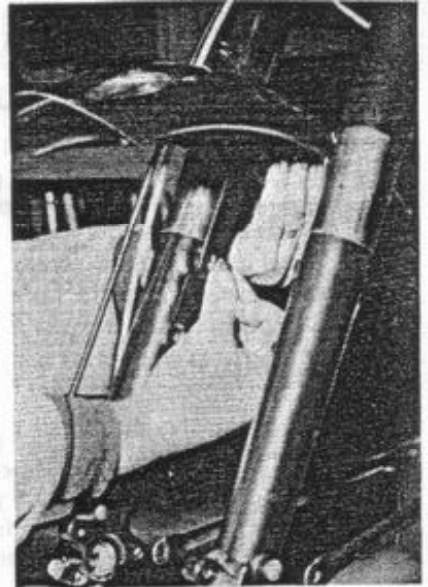
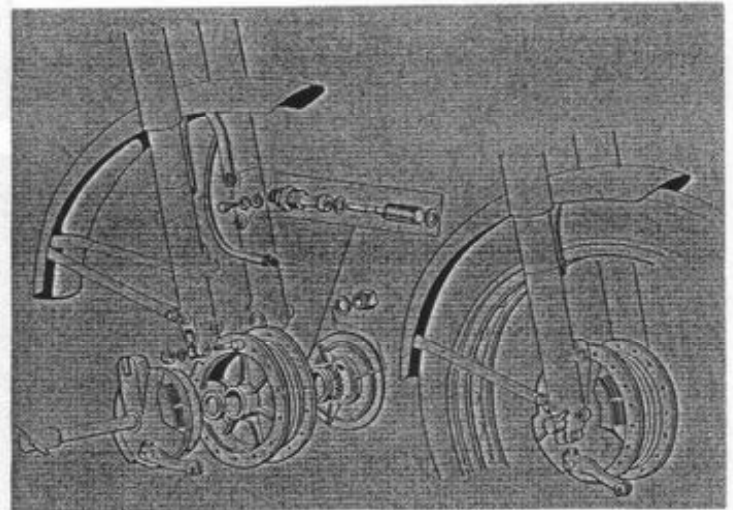


fig. 9

## 2. INSTALLATION OF FRONT WHEEL AND FENDER:

- a. Loosen nut and remove the bolt on the right tube of fork, then remove the axle by striking it lightly with a wooden hammer. (Fig. 7).
- b. Remove speedometer drive plate from envelope. (Fig. 8).
- c. Slip the fender into the fork and tighten bolts (Fig. 9), (and Sketch A).
- d. Make sure that front fender bolts are tightened **after** having tightened the bolts for the front wheel (Fig. 10).
- e. Mount the front wheel in correct position. Slip the speedometer drive plate into the wheel from under the fender. (Figs. 11 and 12). Insert arm on brake drum casting into retaining slot on right fork arm. Slip axle into the hole at the end of the fork by striking it with a wooden hammer (Fig. 13), then tighten nut. Make sure that all elements are mounted in the sequence indicated in Sketch A and Figures 7 thru 13.
- f. Firmly tighten axle nut and then the outer bolt on right arm of fork. (Fig. 14).
- g. Tighten the bolts on front fender. (Fig. 9).
- h. Slip in the speedometer drive as indicated in Sketch A.



Sketch A

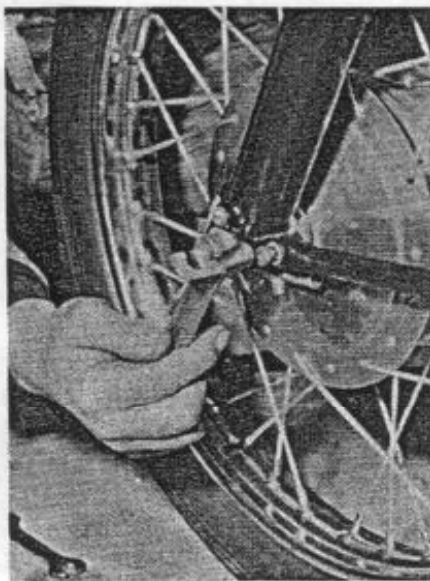


fig. 10

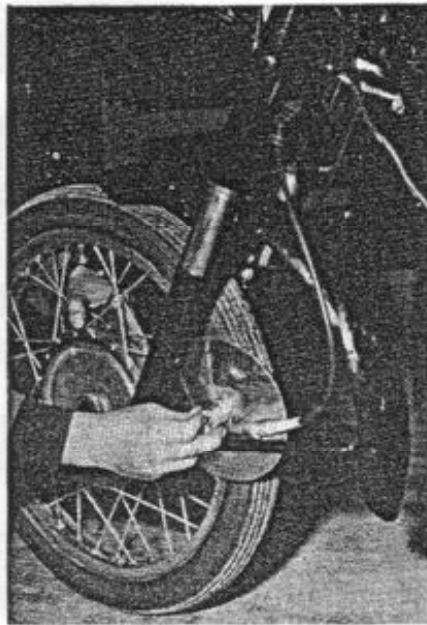


fig. 11



fig. 12

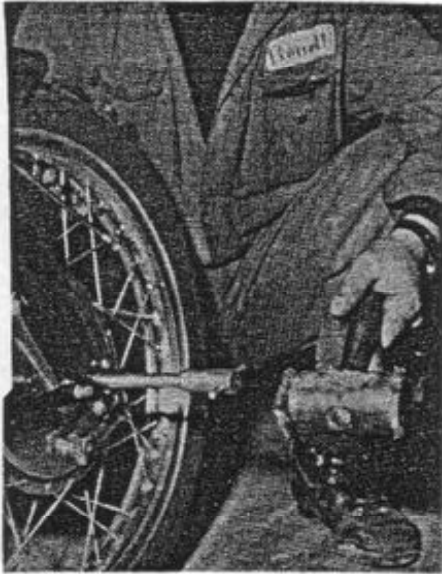


fig. 13

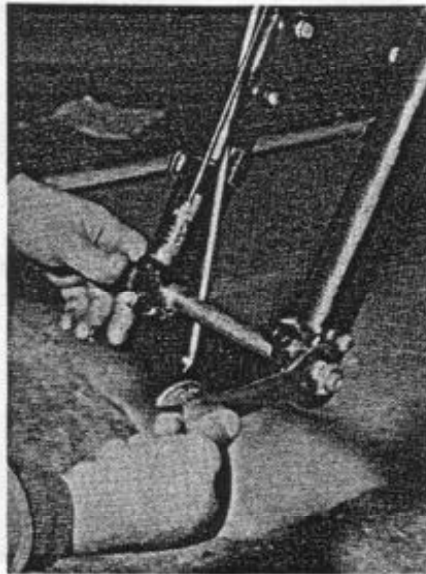


fig. 14

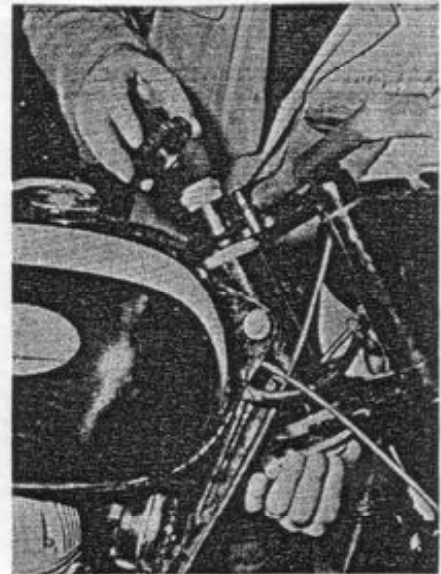


fig. 15

### 3. INSTALLATION OF HANDLE BARS AND CONTROLS:

- a. Remove the cap from the steering mechanism dampener. (Fig. 15), while holding the pivot firmly in position on the bottom.
- b. Remove the handle-bar blocking mechanism by unscrewing the four (4) hollow-headed bolts with an Allen wrench. (Fig. 16).
- c. Place the handle-bar in position. Before tightening Allen bolts, make sure that handle-bars are dead center of motorcycle and at the correct elevation. (Fig. 17).
- d. Screw the cap on the steering mechanism dampener by keeping the pivot firm in position at the other end. (Fig. 18).
- e. Slip the front brake cable thru the ring after having placed the rubber washer as indicated in Sketch B. Next slip cable thru slotted retainer on fork (Fig. 19).

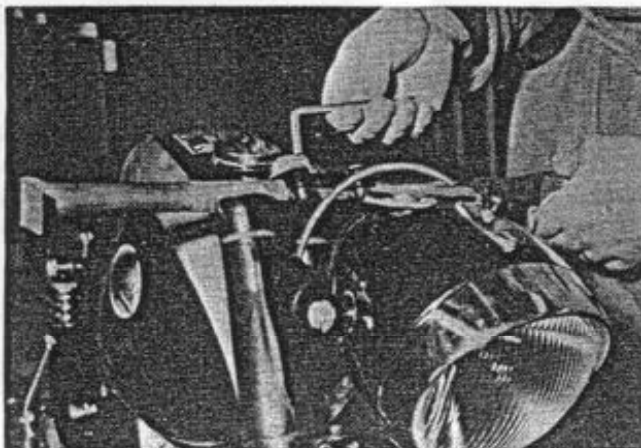


fig. 16



fig 17

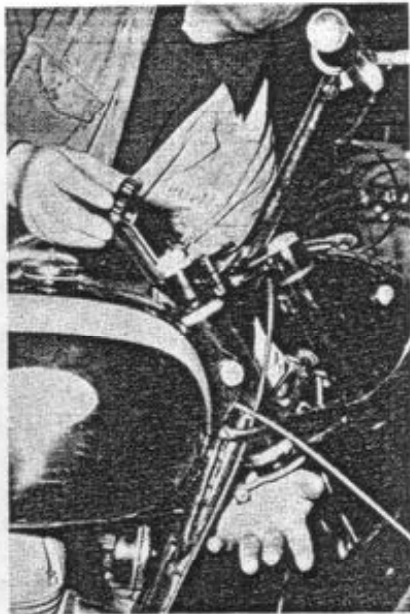


fig. 18

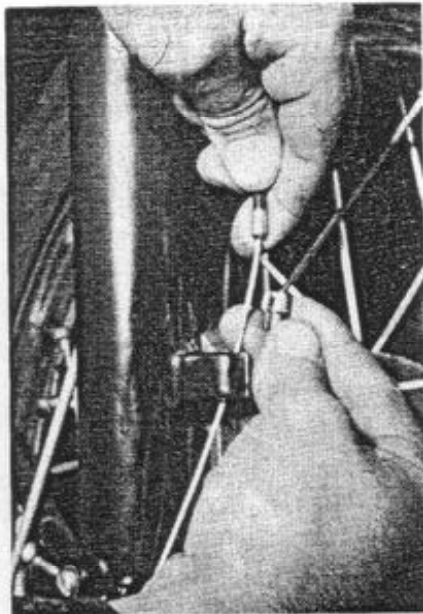


fig. 19

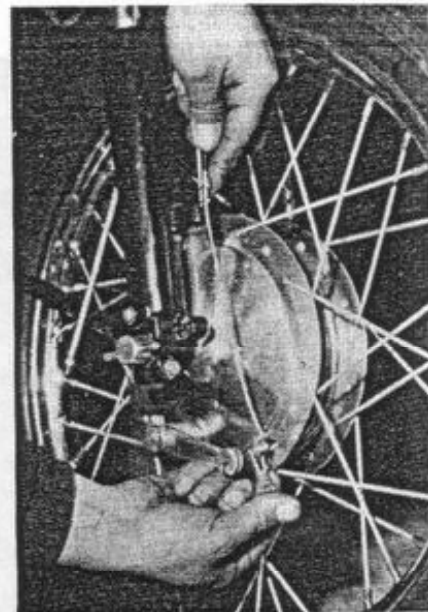


fig. 20

- f. To hook the brake cable to brake arm loosen as much as possible the brake cable lever regulator. (Fig. 20) which is located on the handlebar.
- g. Slip the throttle cable into the slot inside the grip. (Fig. 21 and 22).
- h. Slip the clutch cable into the handle-bar lever after removing the tape containing the end of cable and loosening the lever regulator as much as possible.
- i. Connect the clutch cable to the engine.
- j. Mount the light switch on handle-bar by opening the clamp as indicated in Fig. 23 and 24.

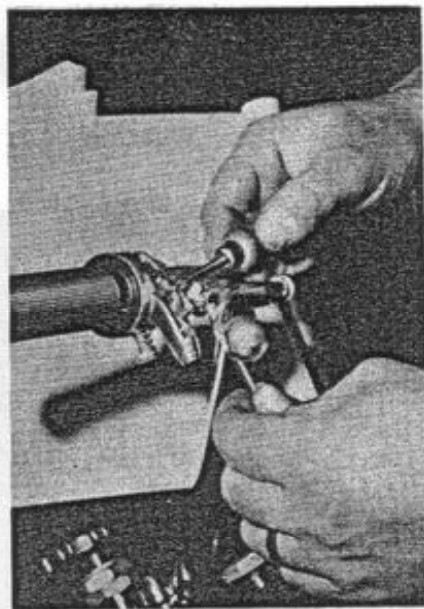


fig. 21

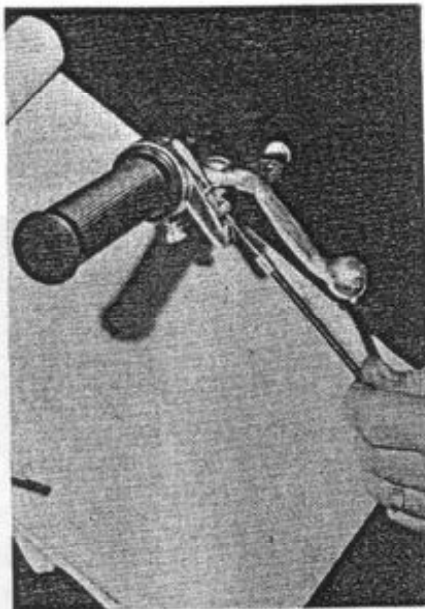


fig. 22

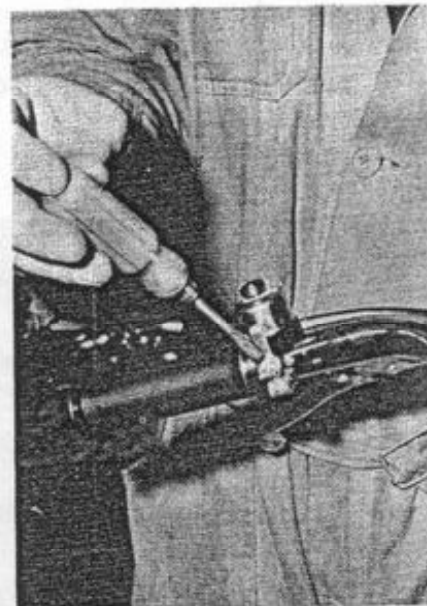


fig. 23





fig. 24

k. Adjust headlight to the correct position. (Fig. 25).

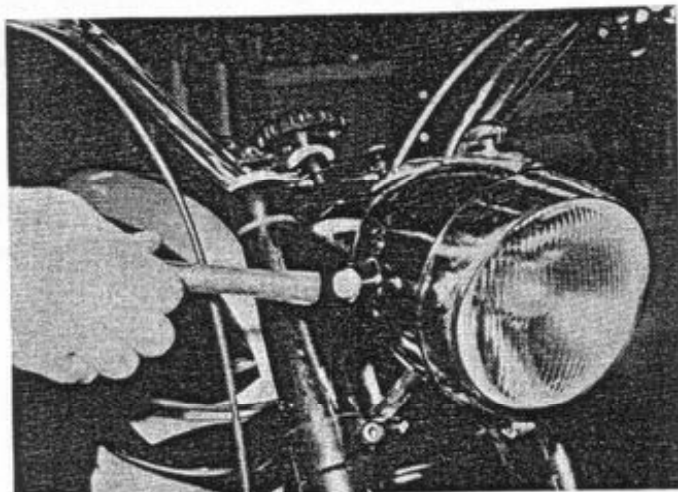


fig. 25

#### 4. PUTTING THE BATTERY IN OPERATION (DRY BATTERY):

- a. Disconnect battery, remove the lid and disconnect wires.
- b. Remove nut from retaining bolt (Fig. 26) and remove battery. (Fig. 27).
- c. Specifications: Make SAFA 3 V 2 - Capacity 8 Amp hours.
- d. Note position of battery and cables before removing. Remove battery from the machine. Make sure that cables (wires) are not reversed replacing the battery.
- e. Unscrew caps.
- f. Fill with pure sulphuric acid used for storage battery, having a specific gravity of 1275 at 60 degrees F. This operation is very important and, therefore, it is recommended that the specific weight be checked very carefully. Fill battery to approximately 3/4" above plates.
- g. Let the battery rest for about two hours, then bring back to the required level by adding as much sulphuric acid as necessary. Then charge at 1 AMP rate for eight to ten hours.
- h. Once all the above operations have been completed, the battery is ready to be placed in position (we suggest, however, that steps e, f & g be performed by a Wards Automotive Specialist). Every month, check the battery level which should always be about 3/4 of an inch above plate.

i. **IMPORTANT:** Only add chemically pure distilled water and **NOT** sulphuric acid to bring level back to the required position.

j. Return battery to the machine. Be sure not to reverse the wires. Black wire is negative. Blue wire is positive.

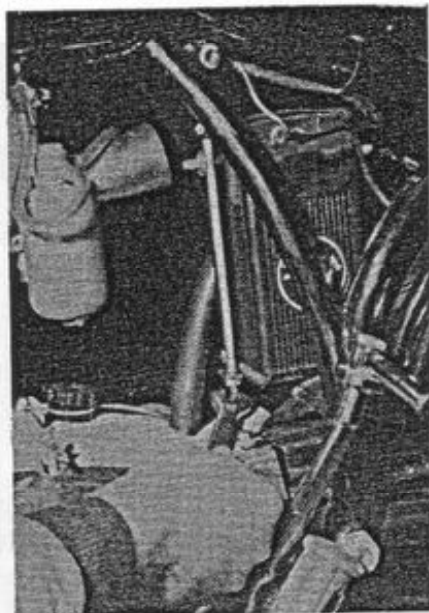


fig. 26

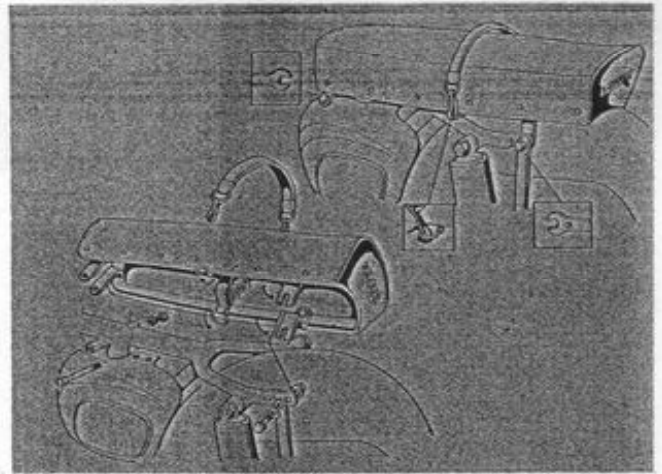


fig. 27



**5. MOUNTING SEAT: (Sketch B)**

- a. Pull out strap from under the double seat and place it over the seat snapping hooks to rings provided.
- b. Put the rear support brackets in vertical position (Fig. 28), and slip the seat into the slots provided. (Fig. 29).



Sketch B .

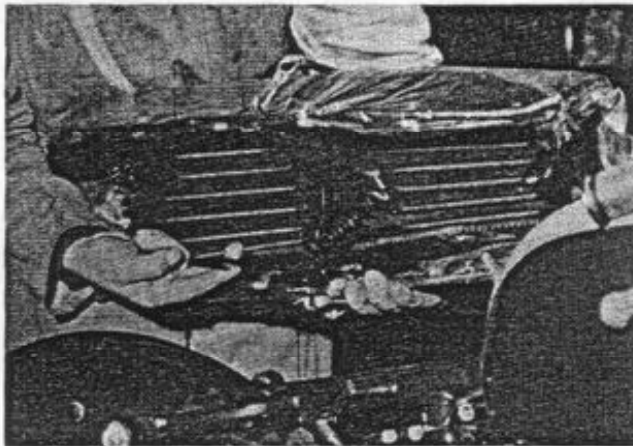


fig. 28



fig. 29

- c. Slip the bolt in the front position and tighten nut. (Fig. 30 & 31).

- d. It may be necessary to use two wrenches to tighten the rear bolts.



fig. 30



fig. 31

## T I R E S - (FRONT 2,75 X 18 - REAR 3. X 17)

Tire pressures are important to the safe handling of your Riverside. Check your tires at regular intervals and be sure to keep them at the following pressures (cold after standing):

Front Tire: 32 lbs.

Rear Tires: 36 lbs.

### 6. MAINTENANCE CHECK LIST:

BEFORE OPERATING YOUR CYCLE CHECK TO SEE THAT:

- All controls function properly
- All nuts and bolts are tight
- Both wheels turn freely
- The steering turns easily
- The tires are inflated properly
- There is oil in the transmission
- There is gasoline in the tank.
- Be sure there is oil in the crank-case.

## B. LUBRICATION

Your Riverside Touring cycle has a 4 cycle single cylinder engine. It is therefore necessary to watch your oil level very carefully. See Fig. 6 page 11.

## C. OPERATION

### 1. STARTING THE ENGINE:

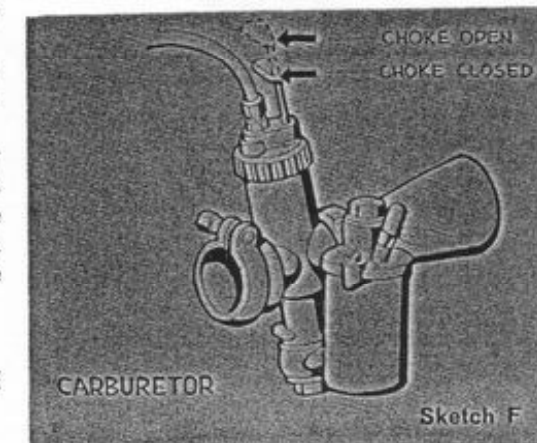
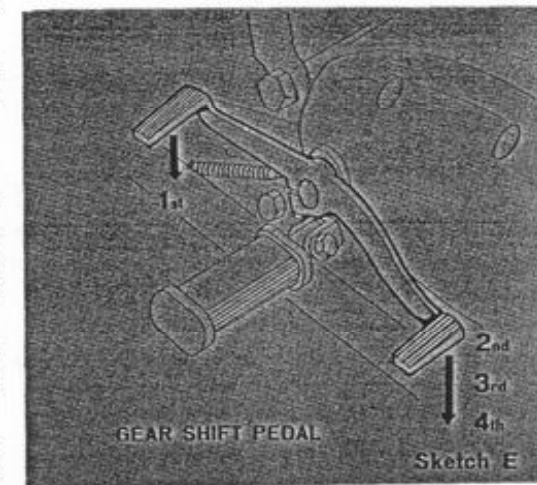
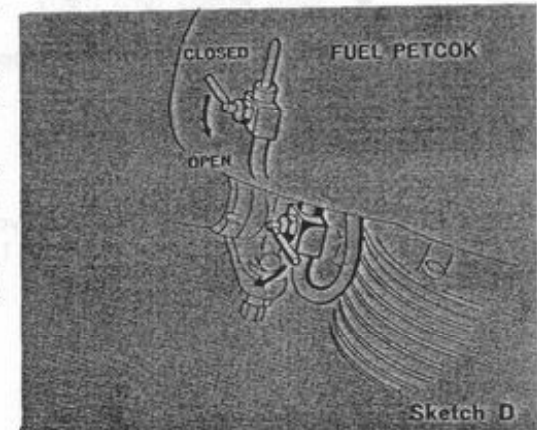
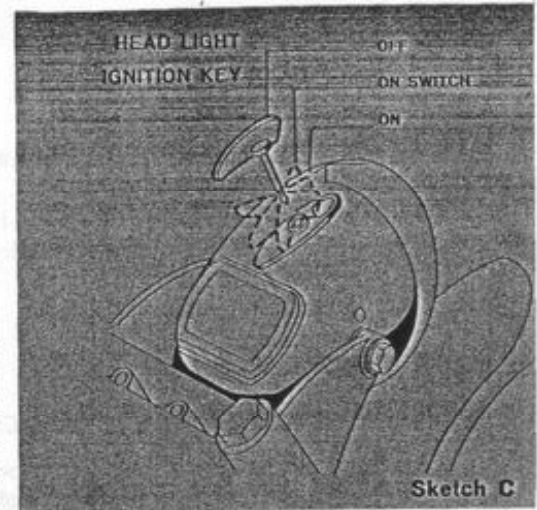
- a. Put the ignition key into the headlight and depress. (Sketch C).
- b. Open the fuel pet-cock. (Sketch D).
- c. Put the pedal shift on the right side of the machine in neutral position (Sketch E). Neutral position is between first and second gear. To find neutral, depress the foot shift lever with your heel three or four times (until it stops clicking). This will put you in first gear. Now with the toe, depress the lever very lightly until there is one click. You should **feel** the click rather than hear it. You can be sure the machine is in neutral by gently rocking it back and forth. If the rear wheel turns freely, the engine is not turning over and the cycle is in neutral.
- d. When the engine is cold, push down the choke pin on top of the carburetor and opening the throttle **only slightly**, kick the starter pedal briskly. (Sketch F).
- e. After the engine has been running for a few seconds, advance the throttle grip at least a half turn... this will force the choke pin to snap back to its normal position. (Open Choke).
- f. To clear a flooded engine, remove spark plug, shut off gas line and turn engine over several times. Then replace spare spark plug or thoroughly dry old plug.

### 2. CHANGING GEARS:

TO SHIFT GEARS YOU MUST COORDINATE THE THROTTLE AND THE CLUTCH.

- a. You will note that the foot operated gear shift mechanism is on the right side of the machine and is so constructed that you operate it with both the heel and the toe. (Sketch E).
- b. Depress the clutch lever on the left side of the handlebar.
- c. To put the cycle into first gear, depress the gear shift lever with the heel all the way down until you can feel a slight click. Hold the lever in this position with your heel while you gradually release the clutch lever with your left hand. At the same time you release the clutch lever, open the throttle gradually.
- d. You must learn to coordinate the release of the clutch and the advancement of the throttle to effect a smooth start. This may take a little practice...
- e. To change into second, third and fourth gears follow the same procedure, each time depressing the gear shift lever with your toe one click... Each time you change a gear remove your toe from the gear shift lever to allow it to return to its original position.
- f. In developing your driving technique, you will find that if you rely on your foot brake, especially at low speeds, it allows you freedom of your right hand to operate the throttle. Learn to down shift into the next lower gear when you reduce your speed, especially if the engine begins to miss or sounds like it is laboring. This practice will give you better control of your machine and minimize the possibility of skidding and sliding when stopping. This procedure will also give you better control of your machine when you re-accelerate.

(CAUTION - NEVER DEPRESS THE CLUTCH LEVER WITH THE THROTTLE ADVANCED).



### 3. BRAKING:

As you apply the brakes, disengage the clutch and shift to neutral. Complete your stop with the brakes only. The front wheel brake is applied by squeezing the lever at the right handle bar grip. The rear wheel brake is applied with the foot pedal. For skilled stops, apply the rear wheel brake momentarily before the front brake. **Never brake in a turn.**

### 4. STOPPING THE ENGINE:

Retard the throttle, depress the clutch lever and put the footshift in neutral position.

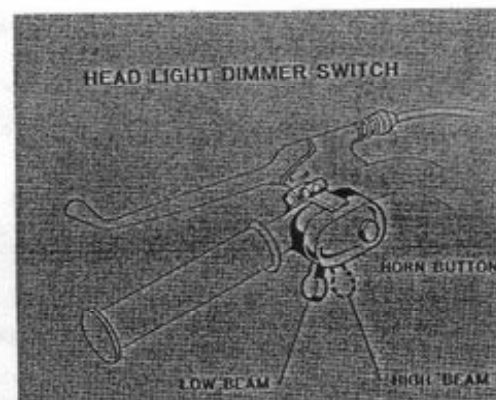
To stop the engine, pull (disconnect) the ignition key on the headlamp (Sketch C).

When engine is not running, always remember to close the fuel pet-cock. (Sketch D).

### 5. ELECTRICAL:

Your ignition key also serves as a headlight switch by turning it to left or right, you turn on your running lights. Sketch C.

The combination dimmer switch and horn button is located on the left handle-bar. (Sketch G).



Sketch G

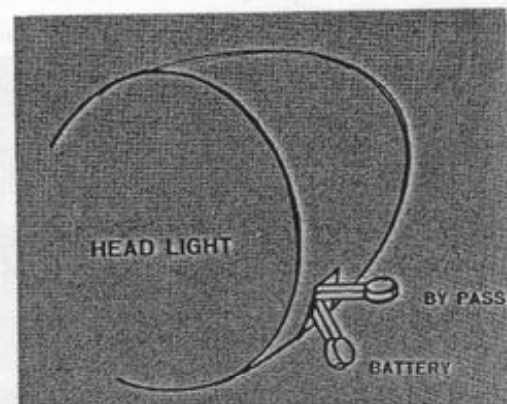
### 6. DAMPENER: (Fig. 17)

Stiffens the steering mechanism so that it will be more stable, especially at high speeds.

Tighten by turning clockwise.

### 7. BATTERY BYPASS SWITCH:

If for any reason the battery should go dead raise the battery bypass switch to the bypass position. In this position it is possible to operate the machine without a battery though it will be necessary to start it by pushing rather than with the kick starter. (Sketch H).



Sketch H



## D. BREAK-IN PERIOD

Your cycle is manufactured to very exacting tolerances. Because of this precision fitting of parts, a longer break-in period is recommended.

If you follow the procedure outlined, you substantially increase the life of your machine.

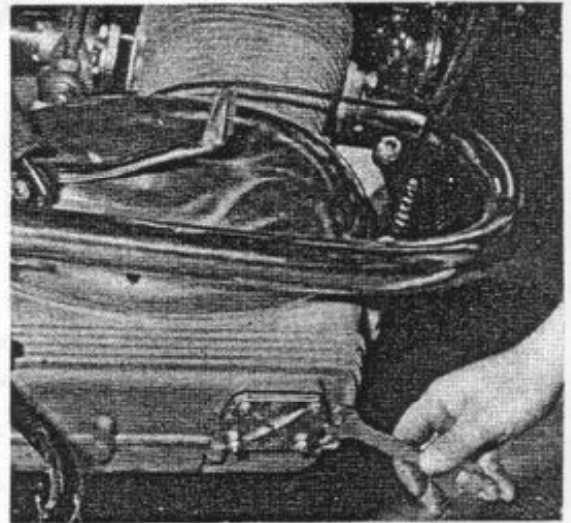
For the first 100 miles DO NOT EXCEED 30 MILES PER HOUR.

For the first 1250 miles DO NOT OPERATE AT HIGH ENGINE SPEEDS FOR MORE THAN ONE MINUTE AT A TIME.

You should not exceed these speeds in each gear during the break-in period.

Gear	Speed
1st	15
2nd	20
3rd	30
4th	40

It is permissible to exceed the fourth gear speed limit to full throttle after a few hundred miles but only for shorts periods.

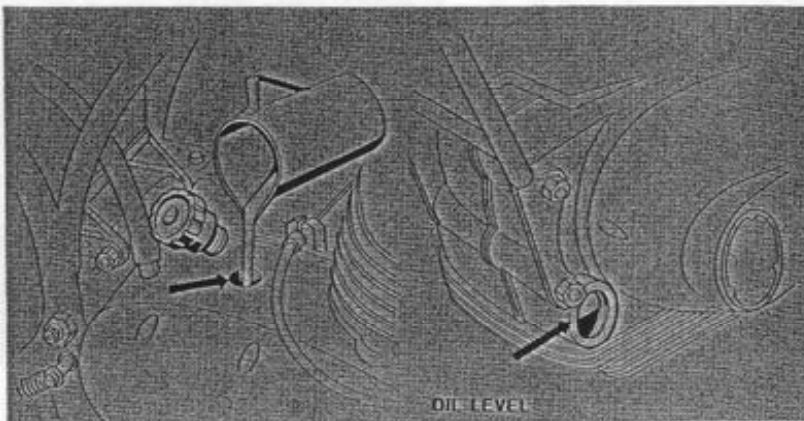
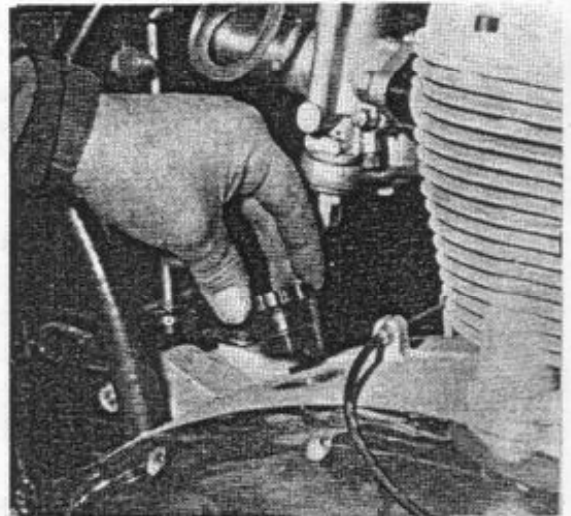


## E. LUBRICATION

Drain and refill crankcase after break-in period of 600 miles. Carefully wash filter placed on lower part of crankcase by loosening 4 nuts. (Fig. 32). Change filter every 1500 miles. Use Wards SAE No. 40 oil or equivalent. Fill through oil filler hole on upper part of crankcase. (Fig. 33 & Sketch I). Capacity 73 oz.

Oil level inspection glass on lower part of right crankcase half.

Proper oil level is to 1/2 of the inspection window. Keep window clean and make daily visual inspection. (Fig. 34 & Sketch L).



Sketch I

Sketch L

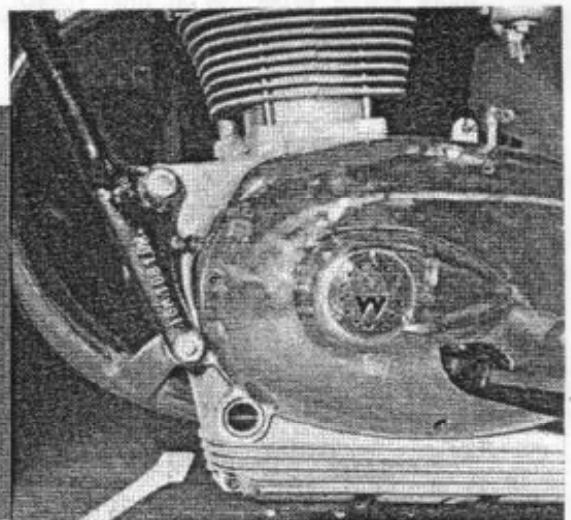


fig. 34

## F. MAINTENANCE

- 1. IMPORTANT** — Your Riverside 4 Cycle engine delivers exceptional power for its size and weight. Be sure to check oil level in the gear box.  
**ADJUSTING TAPPETS** — These must be adjusted when the engine is cool. The gap at the intake and exhaust strokes must be .06. It is imperative that this gap be maintained uniform to avoid wear or noise.  
Keep in mind that new spark plugs actually pay for themselves three ways: 1. better mileage, 2. longer engine life, 3. more power. **SPARK PLUG GAP .026.**
- 2. BREAKER POINT GAP** — 0.016 Inches.
- 3. TIRE PRESSURE:** Front: 32 lbs. — Back: 36 lbs.
- 4. DECARBONIZATION** — After 10,000 miles it is necessary to decarbonize the engine, muffler and exhaust pipe. It is necessary to remove the cylinder head, exhaust pipe and muffler to clean the exhaust port. Muffler must be opened up and cleaned with boiling hot soapy water.
- 5. LUBRICATION** — Oil all moving parts, clean first with gasoline.
- 6. FRAME** — Go over entire machine and tighten all nuts and bolts. Remember your machine is built with metric sized nuts and bolts, which cannot be replaced with standard nuts and bolts. See your Wards service department for replacement parts.
- 7. BRAKES** — Visually check brake drums and brake shoes. Worn brake shoes can ruin a brake drum and cause unnecessary expensive replacement.
- 8. ADJUSTMENT OF CABLES** — In general, all cables on your cycle can be adjusted at one end by loosening the clamp on the inner cable and sliding the cable either way in the clamp. Final adjustment is made by taking up or loosening the outer cable cover. Loosen the lock nut and turn the adjusting nut on the screw to proper position. Tighten the lock nut while holding the adjusting nut with a second wrench.

### EVERY 300 MILES:

- Check brake cable adjustment and adjust, if necessary. See adjustment of cables.
- Lubricate chain and adjust if necessary. There should be approximately 1/2" slack in the chain with no rider. Be sure wheel is properly centered.
- Check clutch adjustment and adjust cable if necessary. See adjustment of cables.
- First 600 miles only, drain and refill transmissions. See instructions under Lubrication, E on page 11.

### EVERY 1,000 MILES:

- Remove and clean spark plug. Set gap at .026.
- Ignition breaker point gap should be .016 inches.
- Adjust chain if necessary as per 300 miles instructions.
- Check cables and adjust if necessary. See adjustment of cables.
- Clean engine cooling fins.
- Check breaker point gap under the left crank-case cover. Gap must be .016".

### EVERY 1,500 MILES:

- Drain and refill transmission. See instructions under. Transmission Lubrication.

### EVERY 3,000 MILES:

- Lubricate cables and controls. Use light machine oil.
- Replace Spark Plug. Set gap carefully at .026 inches on the new plug.
- Check the full spark advance which is automatically controlled. This should be 48°.

- EVERY 4,000 MILES:**
- Remove head and exhaust system.
  - Remove, clean and lubricate chain. To clean, shake in kerosene. Lubricate with  $\neq$  40 oil thinned.
- EVERY 6,000 MILES:**
- Lubricate wheel bearings.
  - Inspect brake drums and linings.
- EVERY 10,000 MILES**
- Drain and refill oil in hydraulic front shock. The drain plug is a slotted screw fitting located just above the axle nut on the end of the fork. Remove and allow all fluid to drain. The fill fitting is the bolt located just below the bolt on the fender. Fill until fluid comes out of top hole. Check oil level on fork every 5,000 miles — especially if front becomes mushy.

### TROUBLE CHART

DIFFICULTY	CAUSE AND CORRECTION
Irregular flow of gas to carburetor	Clean filter and carburetor jets. Remove gas line from carburetor and clean out. Check to see that vent hole in gas cap is not plugged. Look for damaged carburetor float.
Irregular Spark	Replace spark plug. Check spark plug gap. Check magneto flywheel output. Check points and coil.
Preignition	Use cooler plug. Clean spark plug. Decarbonize the cylinder head.
Overheating	Check timing. Check gasoline. Clean spark plug.
Engine missing	Check plug gap. Replace spark plug. Check point gap. Replace if burned. Check flow of gasoline through carburetor.
Loss of engine efficiency	Check ignition and timing. Adjust gas and carburetor mixture. Replace carburetor jet. Decarbonize the exhaust system from port through muffler. Check piston rings. Tighten cylinder head. Replace head gasket.
Noisy tappets	If engine warms up too fast and performs poorly, check spark advance. Check clearance - Must be .06.

## SPECIFICATION - MODEL NO. FFA 14017

### SPECIFICATIONS

The Riverside Model N. FFA 14017 has a 247cc engine with a 68 mm bore and a 68 mm stroke. It has a four cycle engine. The engine has a 7 to 1 compression ratio and develops 20 HP at 8250 RPM — Because it is a 4 cycle engine you **do not** mix oil with the gasoline.

### POWER TRAIN

Primary drive is through helical gears in the transmission. Final drive to the rear wheel is by chain. The transmission has 4 speeds forward and is operated by the right foot pedal. Gear box capacity: 73 oz. Riverside Vitalized HD Motor Oil SAE  $\neq$  40 or equivalent.

**DISTRIBUTION:** By rocker arms and push rods.

### CLUTCH

Multiple disc in an oil bath controlled by the lever on the left handle-bar. The Riverside Cycle will develop speeds to 90 MHP yet is a miser with gaso'ine. It will deliver about 70 M.P.G. under ideal conditions.

### FRAME

Husky all-steel tubular frame electrically welded for maximum strength and safety. Open cradle for engine mounting.

### SUSPENSION

Front Suspension: Spring telescopic fork - mono-directional hydraulic shock absorbers. Rear Suspension: Springs with telescoping mono-directional hydraulic shock absorbers.

### WHEELS

Chrome-plated steel rims provide strength and add beauty. Wheel size: 17 and 18 in.; Tires: Front - 18 x 2.75"; Rear - 17 x 3.00". Tire Pressure: Front 32 lbs; Rear - 36 lbs.

### BRAKES

Internal expanding brakes on front and rear wheels. Two shoes on each wheel give added safety and smoother stops.

### WEIGHT

Dry - (Less fuel and lubrication) - 244 lbs.

### IGNITION

6 Volt 60 watt flywheel magneto with battery. Head light and the combination stop and tail lights. Platinum points with .016 gap. Spark plug .026 inches. Spark pug — Marelli CW 260 L or equiv.

### TIMING

See shop manual - point should open 12° before top dead center.

**GAS TANK CAPACITY:** 3.3 Gallons.

### FEEDING

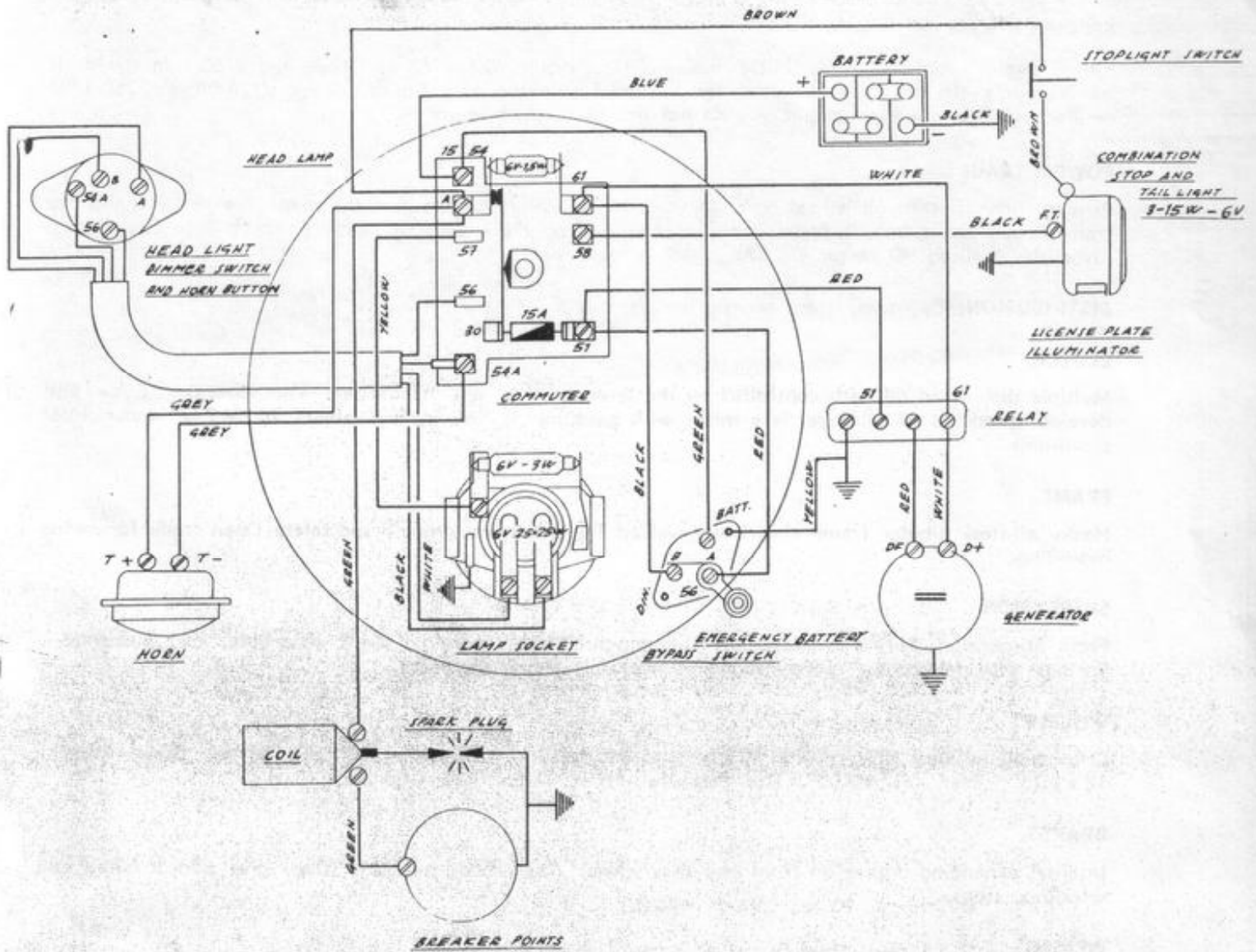
Gasoline (high test) carburator by Dell'Orto.

### LUBRICATION

Oil tank in crankcase — lubrication by gear pump — recovery by gravity.



# 250 cc. TOURING MOTORCYCLE WIRING DIAGRAM



## HOW TO OBTAIN SERVICE

The merchandise you have purchased from us has been carefully engineered and manufactured under Wards rigid quality standards and should give you satisfactory and dependable operation.

However, like all mechanical merchandise, it may occasionally require adjustment or maintenance.

Should you ever need technical assistance, please contact or write your nearest Wards Retail Store, Catalog Store or Catalog House.

**provide the following:**

1. Model, serial number and all of the other data shown on the model number plate.
2. The date and the Wards branch from which you purchased your Riverside.
3. State briefly the trouble you are having.

## HOW TO OBTAIN REPLACEMENT PARTS

Replacement Parts may be obtained from your Wards Retail Store, Catalog Store or Catalog House and will be made available at current prices. If requested, prices will be quoted in advance. When requesting replacement parts, be sure to give the model and serial number which is shown on the model number plate.

Also give the part number and the name of the part as shown in the parts list.

If you order by mail, you will pay the transportation charges from the shipping point.

# spare parts list

HOW TO OBTAIN REPLACEMENT PARTS

1. A spare parts list is provided for your convenience. It lists the part numbers and descriptions of the parts that are available for your machine. It also lists the quantity of each part that is included in the original price of the machine.

2. However, for all mechanical parts, a separate list is provided. This list contains the part numbers and descriptions of the parts that are available for your machine. It also lists the quantity of each part that is included in the original price of the machine.

3. Should you need technical assistance, please contact us. Write your nearest Ward Store, Catalog Store or Catalog Department.

## ● MODEL NUMBER **FFA - 14017**

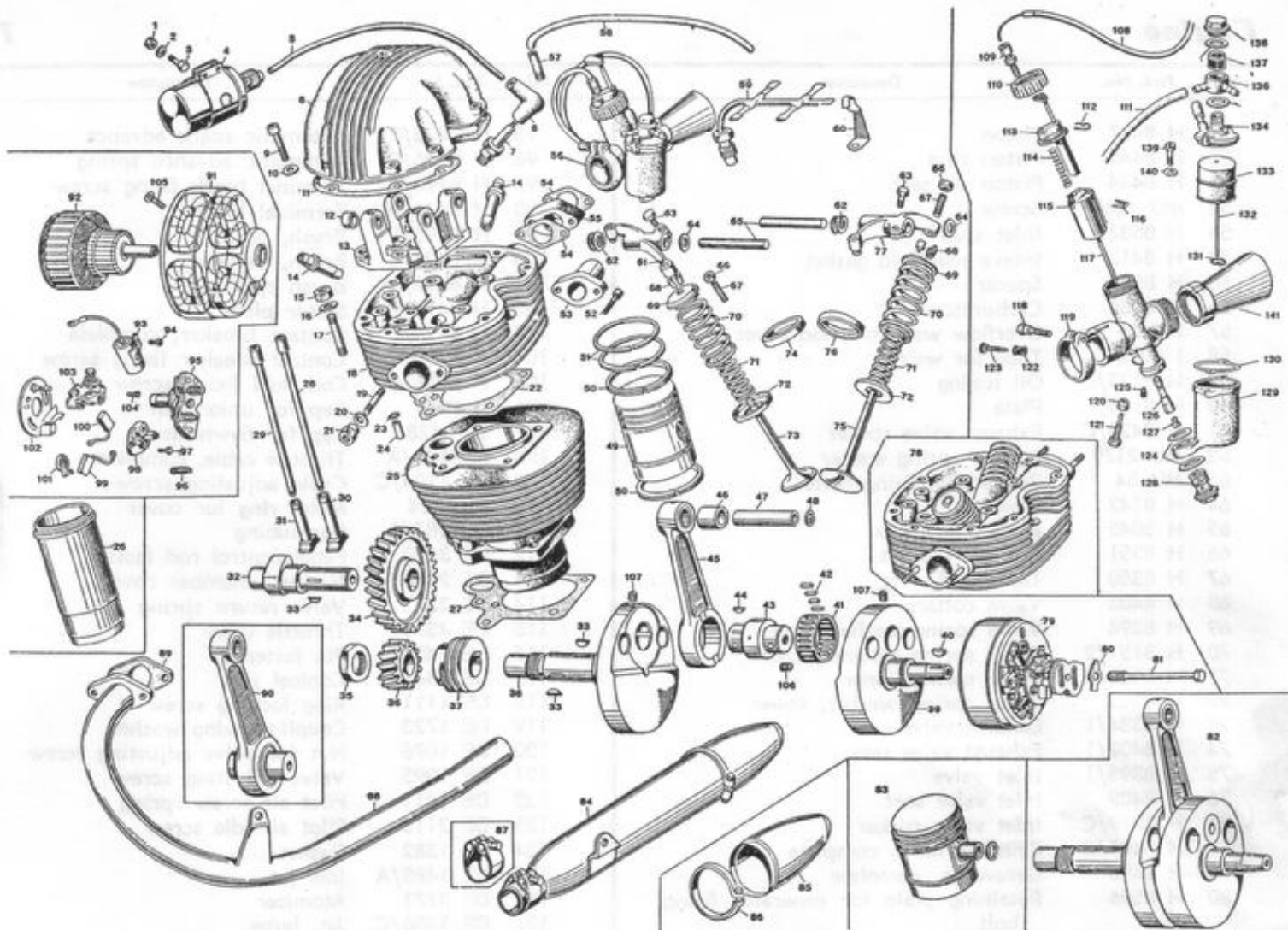
1. Model number and all of the other data shown on the model number plate.

2. The date and the Ward branch from which you purchased your machine.

3. State briefly the trouble you are having.

HOW TO OBTAIN REPLACEMENT PARTS

**Riverside** - SOLD EXCLUSIVELY BY **MONTGOMERY WARD**



## Engine

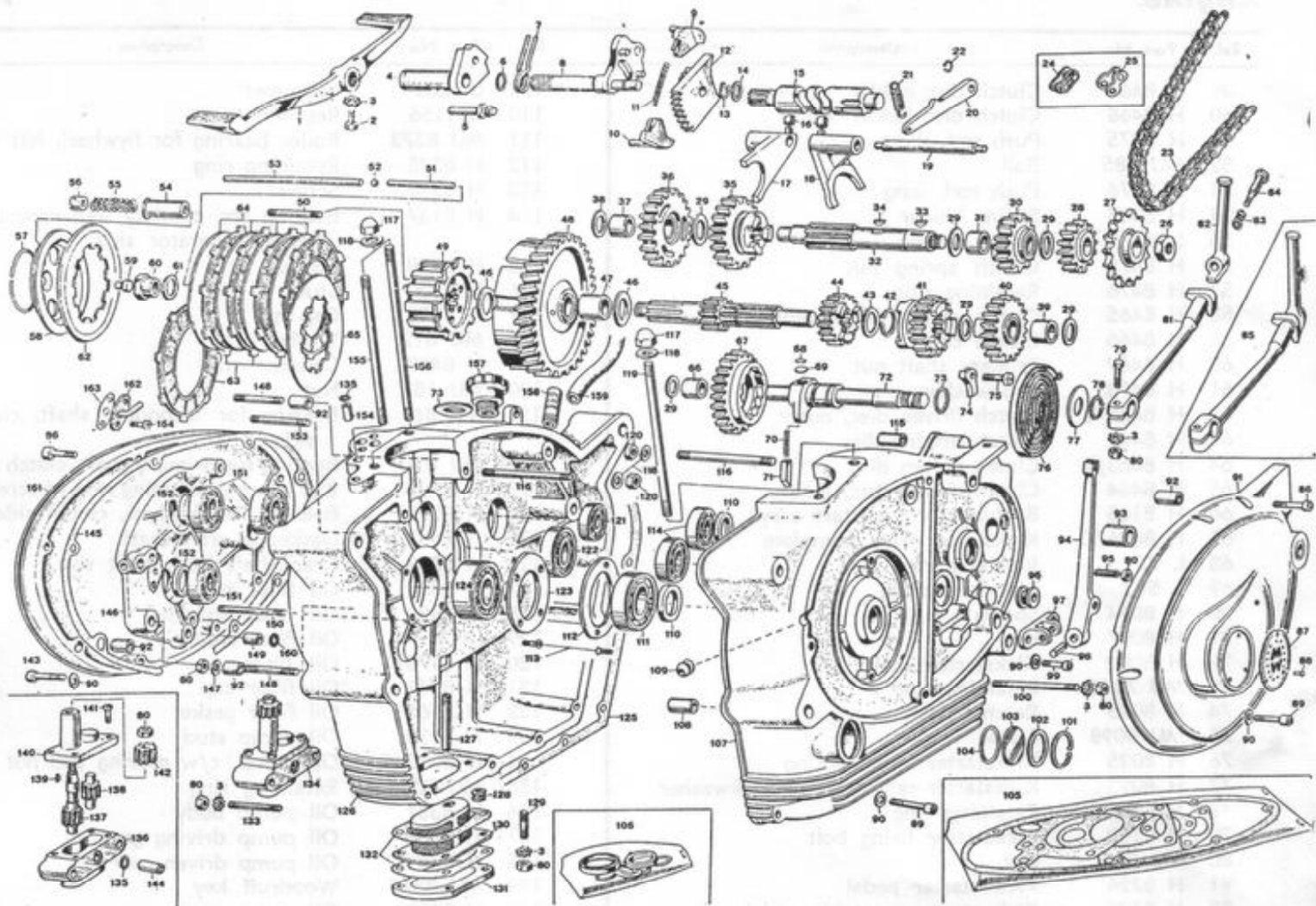
T. 1

Ref.	Part. No.	Description	Ref.	Part. No.	Description
1	MU 280	Nut	25	H 8436/C	Cylinder with sleeve
2	MU 332	Washer	26	H 8446	Cylinder sleeve
3	MU 1476	Bolt	27	H 8013/1	Cylinder base gasket
4	H 8495	Outer coil with bracket	28	H 8450/C	Push rod for exhaust valve, long
5	G 25	H. T. lead	29	H 8451/C	Push rod for inlet valve, short
6	G 7096	Rubber cap	30	H 8399/C	Exhaust valve tappet
7	H 8508	Spark plug 260 L	31	H 8398/C	Inlet valve tappet
8	H 8006	Cylinder head cover	32	H 8400	Cam shaft
9	MU 1414/1	T.C.E. screw	33	MU 164	Woodruff key
10	UI 1344	Lock washer	34	H 8498	Intermediate gear
11	H 8011	Cylinder head cover gasket	35	H 8030	Nut for crankshaft, clutch side
12	H 8164	Rocker arm support bushing	36	H 8497	Gear
13	H 8005/C	Rocker arm support w/ bushing	37	H 8028	Oil pump control screw
14	H 8396	Valve guide	38	H 8443	Flywheel, clutch side
15	MU 1530	Rocker arm support fixing nut	39	H 8442	Flywheel, dynamo side
16	MU 1560	Washer	40	MU 8024	Woodruff key
17	UI 8188	Rocker arm support stud	41	H 8448	Cage * (shop use only)
18	H 8401	Cylinder head	42	H 8449	Needle rollers * (shop use only)
19	B 1217	Exhaust pipe stud	43	H 8441	Union pin
20	MU 1556	Washer	44	MU 3817	Woodruff key
21	MU 1518	Exhaust pipe fixing nut	45	H 8511	Conecting rod with bushing
22	H 8012/1	Cylinder head gasket	46	H 8440	Bushing
23	MU 7068	Retaining ring	47	H 8438	Gudgeon pin
24	H 8125/1	Dowel	48	H 8434	Retaining ring



Ref.	Part. No.	Description	Ref.	Part. No.	Description
49	H 8437	Piston	95	H 8496/E	Automatic spark advance
50	H 8445	Piston ring	96	H 8496/F	Automatic advance spring
51	H 8444	Piston oil seal	97	H 8496/G	Terminal block fixing screw
52	MU 1263	Screw	98	H 8496/H	Terminal block
53	H 8537	Inlet stub	99	H 8496/I	Brush, positive
54	H 8413	Intake manifold gasket	100	H 8496/L	Brush, negative
55	H 8503	Spacer	101	H 8496/M	Brush spring
56	H 8536	Carburetor	102	H 8496/N	Stator plate
57	I 9024	Overflow weir for head cover	103	H 8496/O	Contact breaker, complete
58	I 9025	Tube for weir	104	H 8496/P	Contact breaker fixing screw
59	H 8135/C	Oil tubing	105	H 8496/Q	Coil field fixing screw
60	H 8126	Plate	106	H 8041	Cap for union pin
61	H 8420/C	Exhaust valve rocker	107	UI 8428	Cap for flywheels
62	MU 2179	Rocker spring spacer	108	H 8536/A	Throttle cable, complete
63	MU 84	Rocker pin fixing bolts	109	DE 1104/C	Cable adjusting screw
64	H 8142	Washer	110	DE 2324	Metal ring for cover
65	H 8045	Rocker arm pin	111	G 7187/3	Gas tubing
66	H 8351	Nut for tappets	112	DE 3570	Panel control rod fastener
67	H 8350	Tappet adjuster	113	DE 2330	Mixture chamber cover
68	H 8403	Valve cotters	114	DE 2372	Valve return spring
69	H 8394	Valve spring washer, upper	115	DE 4361	Throttle valve
70	H 8151/2	Valve spring retainer, outer	116	DE 1407	Pin fastener
71	H 8053/2	Valve spring, inner	117	DE 2343	Conical pin
72	H 8385	Valve spring washer, lower	118	DE 1111	Ring locking screw
73	H 8384/1	Exhaust valve	119	DE 1723	Coupling fixing washer
74	H 8402/1	Exhaust valve seat	120	DE 1096	Nut for valve adjusting screw
75	H 8395/1	Inlet valve	121	DE 1095	Valve adjusting screw
76	H 8402	Inlet valve seat	122	DE 1411	Pilot air screw spring
77	H 8419/C	Inlet valve rocker	123	DE 2115	Pilot air idle screw
78	H 8401/C	Cylinder head, complete	124	DE 1382	Gasket
79	H 8496	Generator, complete	125	DE 1488/A	Idle jet
80	H 8526	Retaining plate for generator fixing bolt	126	DE 3171	Atomizer
81	H 8026/11	Generator Fixing bolt	127	DE 1486/C	Jet, large
82	H 8510	Connecting rod assy.	128	DE 2086	Float fixing screw
83	H 8437/C	Piston, complete	129	DE 1866	Float chamber
84	H 8504	Muffler	130	DE 1414	Float chamber cover gasket
85	H 8504/A	Muffler tail	131	DE 1452	Rod retaining ring
86	H 8504/B	Muffler tail clamp	132	DE 1607	Float rod
87	H 8504/C	Muffler clamp	133	DE 2390	Float
88	H 8490	Exhaust pipe	134	DE 1584	Float chamber cover
89	H 8478	Exhaust pipe gasket	136	DE 3581	Gas tubing pipe
90	H 8511/C	Connecting rod	137	DE 1419	Gas filter
91	H 8496/A	Coil field	138	DE 1494	Pipe fixing screw
92	H 8496/B	Rotor	139	DE 1491	Float chamber cover fixing screw
93	H 8496/C	Condenser	140	DE 5010	Washer
94	H 8496/D	Screw	141	DE 2453	Air inlet

NOTE



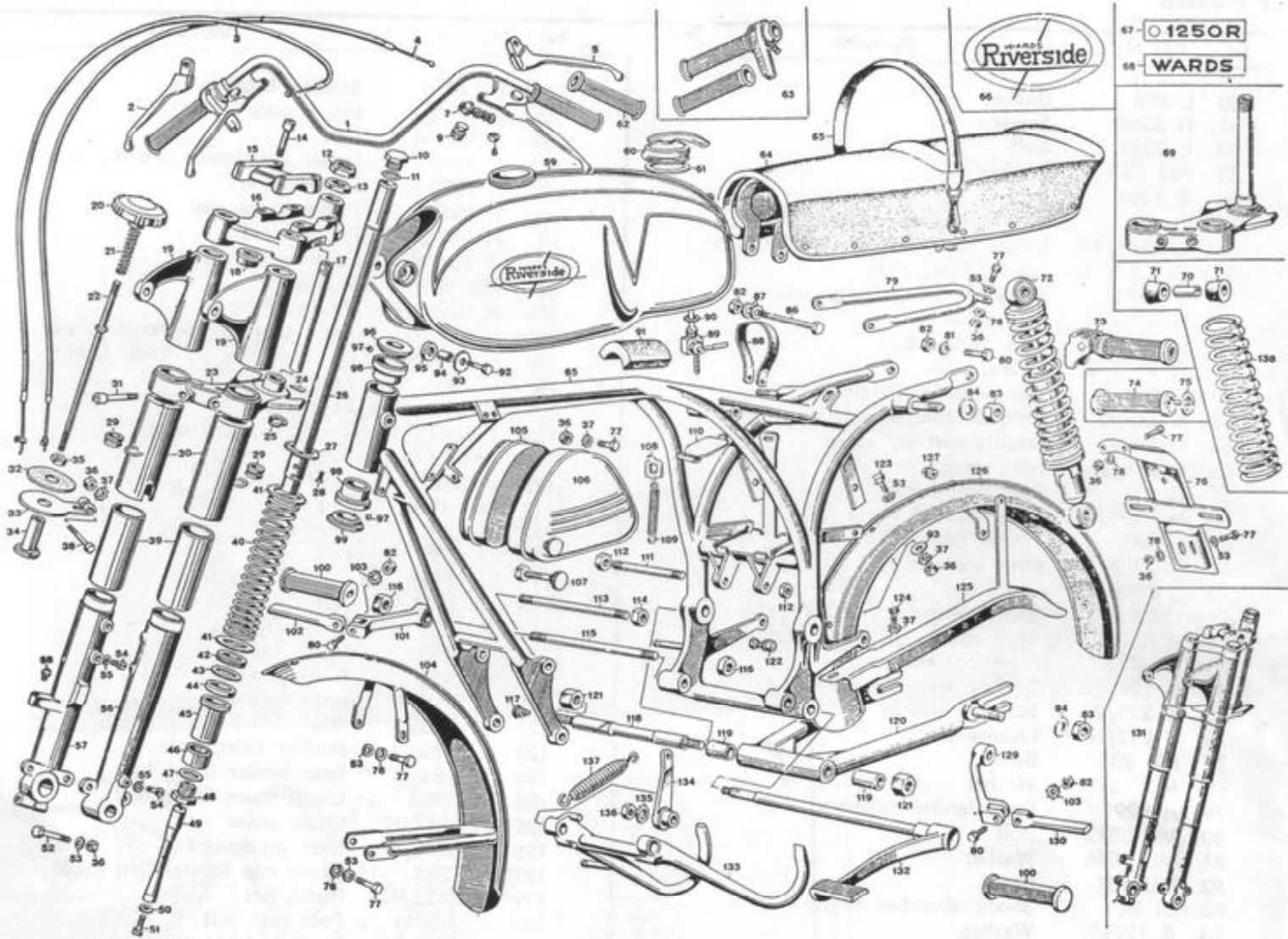
## Engine

T. 2

Ref.	Part. No.	Description	Ref.	Part. No.	Description
1	H 8488	Foot shift pedal	25	H 8156/F	Replacement link
2	MU 1476	Bolt for footshift pedal	26	UI 24	Drive sprocket nut
3	MU 432	Washer	27	H 8091	Drive sprocket
4	H 8071	Cam	28	H 8090	4th gear, secondary
5	H 8070	Dowel	29	H 8081	Washer
6	MU 8154	Retaining ring	30	H 8088/C	3rd gear, secondary, w/ spacer
7	H 8141	Return spring	31	H 8089	Spacer
8	H 8072/C	Calking holder picket	32	H 8084	Secondary shaft
9	B 1552/C	Right picket calking	33	MU 8024	Drive sprocket woodruff key
10	B 1551/C	Left picket calking	34	MU 411	Woodruff key
11	B 1443	Return spring	35	H 8087	2nd gear, secondary
12	H 8075/C	Gear control quadrant	36	H 8491/C	1st gear, secondary, w/ spacer
13	MU 8153	Retaining ring	37	H 8343	Spacer
14	MU 8074	Washer	38	H 8085	Washer
15	H 8061	Shaft gear selector	39	H 8083	Spacer
16	B 1545	Spacer	40	H 8082/C	4th gear, primary, w/ spacer
17	H 8063	Selector fork, secondary	41	H 8080	3rd gear, primary
18	H 8064	Selector fork, primary	42	MU 8079	Retaining ring
19	H 8062	Selector shaft	43	H 8078	Washer
20	H 8066	Selector pawl	44	H 8077	2nd gear, primary
21	H 8068	Selector pawl spring	45	H 8471	Primary shaft
22	MU 8067	Retaining ring	46	H 8099	Washer
23	H 8156/1	Drive chain	47	H 8472	Clutch bushing
24	H 8156/M	Chain link	48	H 8460/C	Clutch body w/ bushing

Ref.	Part No.	Description	Ref.	Part No.	Description
49	H 8461	Clutch disc holder	109	UI 281	Grommet
50	H 8468	Clutch disc holder stud	110	B 1156	Retaining ring
51	H 8375	Push rod, short	111	MU 8373	Roller bearing for flywheel, left side
52	MU 185	Ball	112	H 8335	Retaining ring
53	H 8376	Push rod, long	113	H 8329	Screw
54	H 8467	Spring holder	114	H 8137	Bearing for primary and secondary shaft, generator side
55	L 902	Clutch spring	115	H 8128	Dowel
56	H 8475	Clutch spring nut	116	H 8120	Stud
57	H 8476	Retaining ring	117	H 8288	Cap nut
58	H 8465	Clutch control disc, outer	118	MU 612	Washer
59	H 8466	Clutch cap	119	H 8453	Cylinder stud
60	H 8469	Primary shaft nut	120	MU 187	Nut
61	H 8473	Tab washer	121	MU 86	Bearing for secondary shaft, clutch side
62	H 8463/2	Clutch driven disc, outer	122	MU 85	Bearing for primary shaft, clutch side
63	H 8462	Clutch driving disc	123	H 8328	Ball bearing retaining ring (4 screws)
64	H 8463/1	Clutch driven disc	124	H 8025	Bearing for flywheel, clutch side
65	H 8464	Clutch driven disc, inner	125	H 8523	Gasket in crankshaft
66	H 8165	Bushing for kickstart assy	126	H 8002/1	Crankshaft half, right side
67	H 8096/C	Kickstarter assy complete	127	H 8456	Oil filter pipe
68	L 339	Retaining ring	128	H 8432	Oil filter grommet
69	L 593	Disc for spring	129	UI 317	Oil filter stud
70	H 8094	Spring	130	H 8178/1	Oil filter
71	H 8097	Key	131	H 8167	Oil filter cap
72	H 8092	Kickstarter shaft	132	H 8168	Oil filter gasket
73	MU 7075	Retaining ring	133	H 8138	Oil pump stud
74	H 8095	Ratchet pawl	134	H 8502/C	Oil pump, c/w gearing and nut
75	MU 8098	Screw	135	MU 7068	Retaining ring
76	H 8035	Kickstarter return spring	136	H 8387	Oil pump body
77	H 8093	Kickstarter return spring lockwasher	137	H 8388	Oil pump driving gear
78	MU 7074	Retaining ring	138	H 8389	Oil pump driven gear
79	H 8103	Kickstarter fixing bolt	139	MU 3817	Woodruff key
80	MU 280	Nut	140	H 8358	Oil pump cover
81	H 8326	Kick starter pedal	141	MU 10	Pump cover fixing screw
82	H 8327	Kick start retractable pedal	142	H 8060	Oil pump control gear
83	G 7382	Spring	143	MU 1229	Crankcase cover fixing screw, right side
84	G 7383	Bolt	144	H 8125/1	Dowel
85	H 8326/C	Kickstart assy.	145	H 8014	Crankcase cover gasket, right side
86	MU 1224	Crankcase cover fixing screw (set of 9)	146	H 8458	Bearing
87	M 93	Identification tag	147	MU 332	Washer
88	B 1219	Drive pin	148	H 8122	Stud
89	MU 3869	Allen screw	149	H 8455	Dowel
90	UI 1344	Washer	150	H 8123	Stud
91	H 8489/C	Crankcase cover w/ bushing, left	151	MU 3061	Bearing
92	H 8124	Dowel	152	MU 3769	Retaining ring
93	L 73	Kickstarter shaft bushing	153	UI 8121	Stud
94	H 8114	Clutch control lever	154	H 8125/2	Dowel
95	L 90	Clutch adjuster	155	H 8454	Cylinder stud, short
96	H 8374	Grommet	156	H 8452	Cylinder stud, long
97	H 8115	Clutch lever support	157	H 8136	Oil filler cap
98	H 8116	Clutch lever pin	158	H 8190	Breather
99	MU 8034	T.C.E. screw	159	H 8191/1	Breather tube
100	H 8139	Generator stud	160	H 8457	Retaining ring
101	MU 8148	Inspection window retaining ring	161	H 8008/C	Crankcase cover, right
102	H 8147	Inspection window washer	162	H 8157	Plate
103	H 8150	Inspection window glass	163	H 8158	Gasket
104	MU 8149	Retaining ring	164	B 1137	Screw
105	G 242/4	Set of gaskets			
106	G 243/4	Set of oil seals			
107	H 8001/1C	Crankcase half, left			
108	H 8127	Dowels			





## Frame

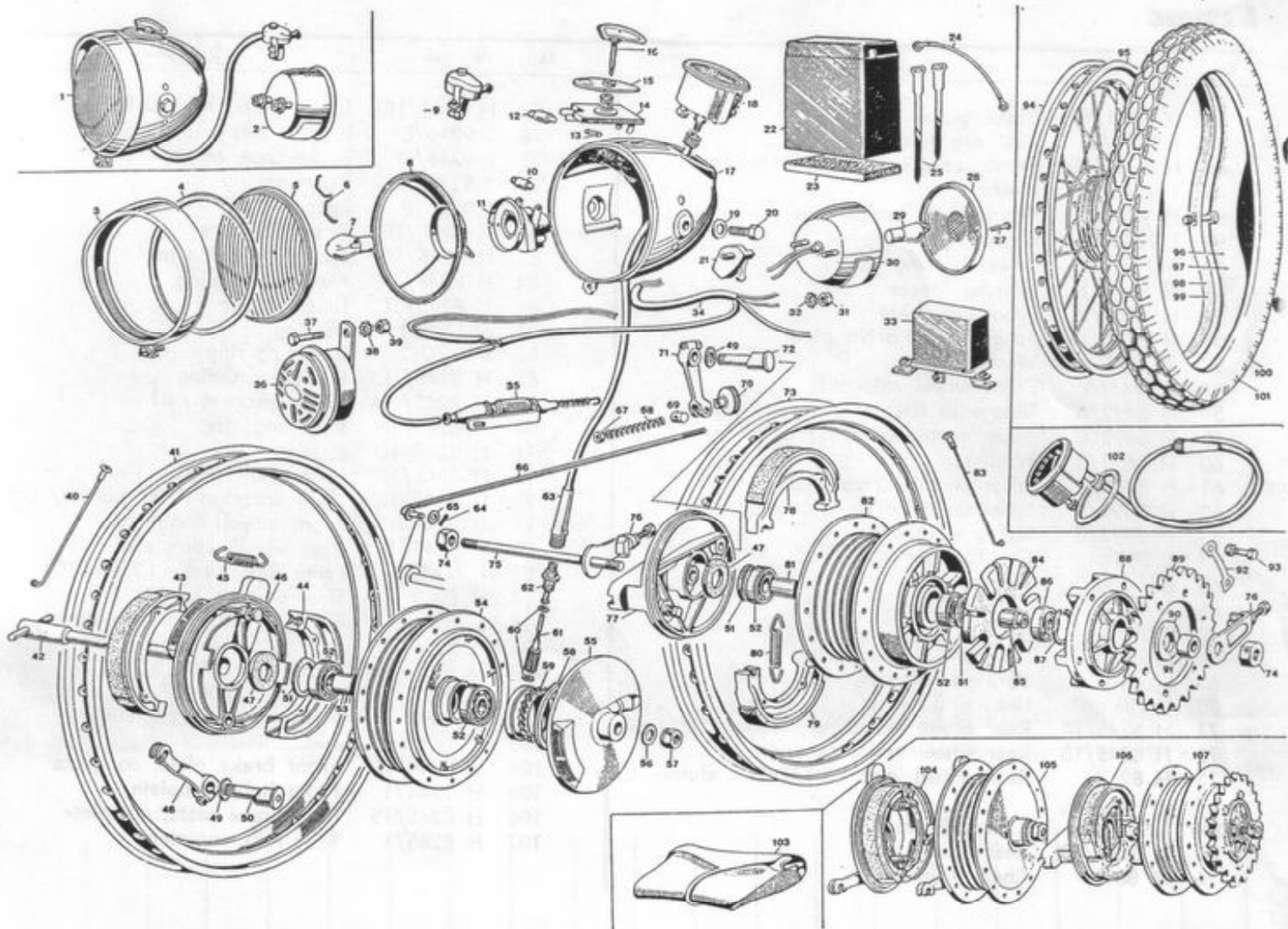
T. 3

Ref.	Part No.	Description	Ref.	Part No.	Description
1	M 91/A	Handlebar w/ controls	26	L 3206	Front fork tube
2	G 206/2	Front brake control lever	27	C 2259	Dust cap
3	L 3392/1	Front brake cable	28	B 1061	Screw
4	L 3392/2	Clutch cable	29	L 3456	Grommet
5	G 206/3	Clutch control lever	30	L 3207/N	Outer fork tube
7	G 206/6	Adjuster with spring	31	MU 1263	T.C.E. screw
8	G 206/5	Cable clamp	32	C 2275	Disc
9	G 206/4	Lever fulcrum screw	33	H 8257	Plate
10	C 2251	Tap bolt	34	C 2276	Special nut
11	C 2252	Washer	35	B 1335	Nut
12	B 1401	Lock nut	36	MU 280	Hex nut
13	B 1400	Nut	37	MU 432	Washer
14	MU 1323	T.C.E. screw	38	MU 8042	Bolt
15	B 1033/N	Clamp	39	L 3208	Inner fork tube
16	L 3527/N	Fork plate	40	L 3154	Front fork spring
17	L. 3600	Steering column	41	C 2260	Spring gasket
18	C 2255	Gasket	42	C 2263	Ferrule
19	C 2257/N	Uper fork, left and right	43	C 2264	Washer
20	L 899/A	Cover plate	44	MU 2265	Oil seal
21	L 664	Spring	45	C 2266	Bushing
22	L 3601	Tie rod	46	C 2269	Bushing
23	L 2254/N	Fork base	47	C 2252	Gasket
24	L 1099	Pin	48	C 2270	Tab bolt
25	L 161	Retaining ring	49	H 8264	Pin



## Frame

Ref.	Part. No.	Description	Ref.	Part. No.	Description
50	L 493	Gasket	95	L 777	Rubber bushing
51	H 8265	Screw	96	B 1412	Upper cone
52	C 2281	Bolt	97	MU 1039	Ball
53	MU 332	Washer	98	C 2280	Upper and lower steering race
54	B 1067	Screw	99	B 1038	Lower cone
55	L 419	Gasket washer - drain plug	100	H 8252	Rubber foot rest
56	C 2268/1N	Lower fork, left	101	H 8485/N	Pedal, right
57	C 2267/1N	Lower fork, right	102	G 164/N	Foot rest, right
58	G 7191	Niple for front brake cable	103	MU 589	Washer
59	H 8433/N	Fuel tank	104	H 8296/N	Front fender
60	H 8433/1	Fuel tank cap	105	H 8298/N	Right tool box w/ knob & nut
61	H 8433/2	Gasket	106	H 8299/N	Left tool box w/ knob & nut
62	G 206/7	Handgrip, left & right	107	BS 331	Knurled bolt
63	L 376/C	Throttle control with hand grip	108	I 9302	Connector
64	H 8493	Double seat w/ strap	109	I 9299	Spring, battery case
65	G 255/1	Seat strap	110	I 9298	Battery clamp
66	G 235	Riverside decal	111	H 8522	Stud bolt
67	H 8499	Decal 1250 S	112	MU 1530	Nut
68	G 248	Wards nameplate	113	H 8254	Stud bolt
69	C 2254/C	Fork base assy.	114	H 8255	Nut
70	L 3209/1	Bushing	115	H 8253	Stud bolt
71	L 3209/2	Shock absorber rubber cone	116	UI 1474	Nut
72	H 8525	Rear shock absorber, complete	117	B 1531	Grease fitting
73	H 8474	Rear foot rest	118	H 8232	Brake axle
74	G 229/1	Rubber rear foot rest	119	C 2232	Bushing
75	G 229/2	Screw x washer	120	H 8202/N	Rear fork
76	G 212/N	License plate	121	UI 1202	Nut
77	MU 235	Bolt	122	L 3163/C	Muffler fixing bolt
78	MU 1553	Washer	123	MU 84	Rear fender fixing bolt
79	H 8291	Rear fender support	124	MU 324	Chain cover fixing bolt
80	MU 8312	Bolt	125	H 8247/N	Chain cover
81	MU 1556	Washer	126	H 8295/N	Rear mudguard
82	MU 187	Nut	127	B 1235	Upper cap for taillight cable
83	UI 24	Shock absorber fixing nut	129	H 8486/N	Pedal, left
84	B 1291	Washer	130	G 165/N	Foot rest, left
85	H 8479/N	Frame	131	H 8290/N	Front fork, complete
86	H 8214	Bolt	132	H 8243/N	Rear brake pedal
87	L 635	Washer	133	H 8203/N	Kickstand
88	G 7597	Gas tank bracket	134	H 8241/N	Rear brake pedal lever
89	G 7186	Petcock	135	MU 1559	Washer
90	L 425	Gasket	136	MU 1524	Nut
91	G 7903	Tank felt	137	H 8427	Kickstand return spring
92	MU 8042	Bolt	138	H 8525/A	Spring
93	L 721	Washer			
94	L 776	Bushing			



## Frame

T. 4

Ref.	Part No.	Description	Ref.	Part No.	Description
1	H 8246/1	Head lamp, complete	25	L 478	Bracket
2	G 213/CN	Tail light, complete	27	G 213/1	Bolt
3	I 9247/1R	Bezel	28	G 213/2	Lens
4	I 9247/1P	Gasket	29	G 213/3A	Bulb 6V - 3/15W
5	I 9247/1Q	Lens	30	G 213/4N	Body, rear light
6	I 9247/1F	Spring	31	MU 187	Nut
7	I 9247/1N	Bilux bulb	32	MU 432	Washer
8	I 9247/1O	Reflector	33	H 8494	Rectifier
9	H 8275	Dimmer switch	33/A	L 3116	Screw
10	I 9247/1M	Torpedo light 6V - 3W, long	33/B	L 214	Nut
11	I 9247/1H	Lamp socket	33/C	L 11	Washer
12	H 8246/1A	Torpedo light, 6V - 1.5W, short	34	H 8532	Wiring harness
13	I 9247/1L	Fuse	35	I 9211/A	Stoplight switch, complete
14	H 8246/1B	Switch	36	L 3217	Horn
15	I 9247/1B	Ferrule plate w/ indicator	37	UI 321	Bolt
16	I 9247/1A	Ignition key	38	MU 3289	Washer
17	H 8246/1CN	Head lamp body w/ indicator	39	UI 315	Nut
18	H 8492/A	Speedometer body	40	H 8244/1A	Spoke w/ nipple, front wheel
19	MU 612	Washer	41	H 9245/4	Front wheel rim (21/4x18" aluminum)
20	UI 7558	Bolt	42	I 9246/Q	Front axle
21	H 8246/1D	Emergency battery by pass switch	43	H 8244/1C	Brake shoe - front wheel
22	I 9159	Battery	44	H 8244/1D	Brake shoe - front wheel
23	I 9162	Felt battery pad, bottom	45	H 8244/1E	Brake spring
24	I 9159/1	Ground wire			

Ref.	Part. No.	Description	Ref.	Part. No.	Description
46	H 8244/1F	Brake plate	77	H 8245/1E	Brake plate, rear stripped
47	I 9246/G	Dust cap felt	78	I 9246/E	Brake shoe, rear wheel
48	H 8244/1G	Front brake control lever w/ bolt	79	I 9246/O	Brake shoe, rear wheel
49	I 9246/L	Washer	80	I 9246/F	Brake spring
50	H 8244/1H	Front wheel brake cam	81	I 9246/P	Spacer
51	I 9246/H	Bearing dust cap	82	H 8245/1F	Rear hub, bare
52	MU 86/A	Wheel bearing	83	H 8245/1G	Spoke for rear wheel
53	H 8244/1I	Bearing spacer	84	H 8245/1H	Flexible coupling
54	H 8244/1L	Front hub, bare	85	H 8245/1I	Inner spacer
55	H 8244/1M	Speedometer drive plate	86	MU 3061	Bearing
56	B 1291	Washer	87	MU 7062	Retaining ring
57	I 9246/A	Front wheel axle nut	88	H 8245/1L	Flexible coupling
58	H 8492/B	Ring with felt	89	H 8245/1M	Drive sprocket Z 41
59	H 8492/C	Speedometer drive sprocket	90	H 8245/1N	Retaining ring
60	H 8492/D	Washer	91	H 8245/1O	Spacer
61	H 8492/E	Speedometer drive gear	92	H 8245/1P	Fixing bolt plate
62	H 8492/F	Speedometer drive gear connection	93	H 8245/1Q	Drive sprocket fixing bolt w/ nut
63	H 8492/G	String w/ sheath	94	H 8244/1N	Front wheel, complete
64	L 305	Clip for rear brake rod	95	H 8245/1R	Rear wheel, complete
65	MU 332	Washer	96	I 9246/4	Front wheel tube (2,75x18")
66	H 8263	Rear brake rod	97	H 8269	Rear wheel tube (3x17")
67	MU 280	Nut	98	L 385	Front wheel inner rim liner
68	L 255	Rear brake rod spring	99	H 8268	Rear wheel inner rim liner
69	L 257	Spring tension bar	100	M 89	Front tire 2,75x18"
70	L 256	Nut - brake rod	101	H 8270	Rear tire 3.00x17
71	H 8245/1A	Rear brake actuating lever w/ bolt	102	H 8492	Speedometer, complete
72	H 8245/1B	Rear wheel brake cam	103	G 142/3	Tool kit
73	H 8267	Rear wheel rim (2 1/2x17" aluminum)	104	H 8244/1O	Front brake plate, complete
74	I 9245/M	Rear axle nut	105	H 8244/1	Front hub, complete
75	H 8245/1D	Rear axle	106	H 8245/1S	Rear brake plate, complete
76	M 86	Chain adjuster	107	H 8245/1	Rear hub, complete

# SERVICE MANUAL

## Riverside

### MOTORCYCLES

MODELS FFA-14017, 14020 AND 14023

#### FOREWORD

This Manual provides the necessary information and procedures for disassembly, reassembly, repair and adjustment of the basic components of Riverside Motorcycles, Models 14017, 14020 and 14023.

Service procedures and techniques were prepared to take full advantage of special tools to make fast service possible.

The following subjects:

1. Assembly and Adjustment
2. Lubrication
3. Operation
4. Break-in
5. Maintenance
6. Specifications
7. Exploded Views with Parts Index
8. General Information

are covered in the Owner's Guide for Model 14017 which has been assembled within the covers of this Manual.

Please note that the Manual is concluded with a Service Quiz that includes instructions for taking the quiz and mailing it to the Regional Service Training Specialist.

MONTGOMERY WARD  
CUSTOMER SERVICE DEPARTMENT  
CHICAGO



## CHAPTER II

### SERVICING

The Owner's Guide included with this Manual contains an insert with exploded views and a parts list. The Owner's Guide and insert should be used with the following service procedures for each of the machines covered by this Manual.

Figure 5 is an additional exploded view of the engine-transmission unit that shows more clear-

ly the relationship among the major parts identified in the Owner's Guide insert.

Figure 6 is a photograph of the set of special tools needed for servicing the engine-transmission unit. Each tool is identified with an index letter. These identifying letters are referred to in the following service procedures.

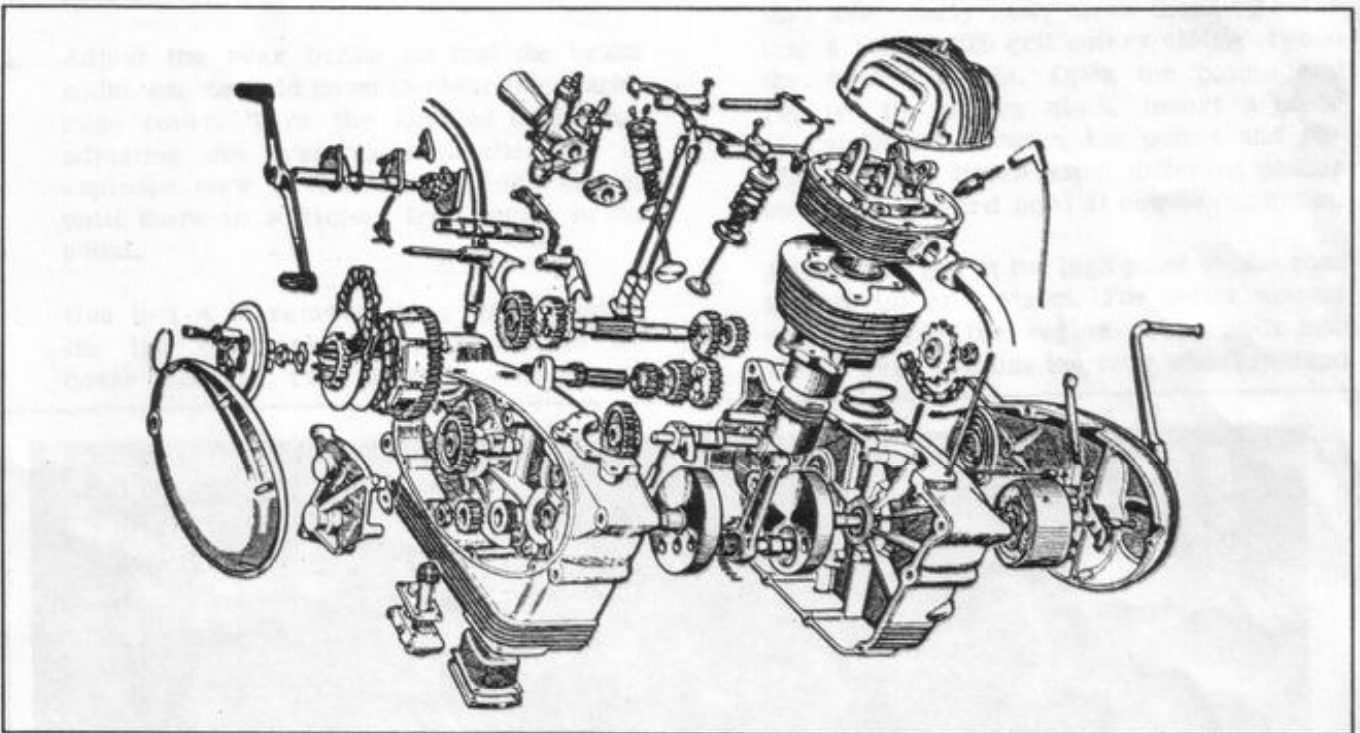


Figure 5.

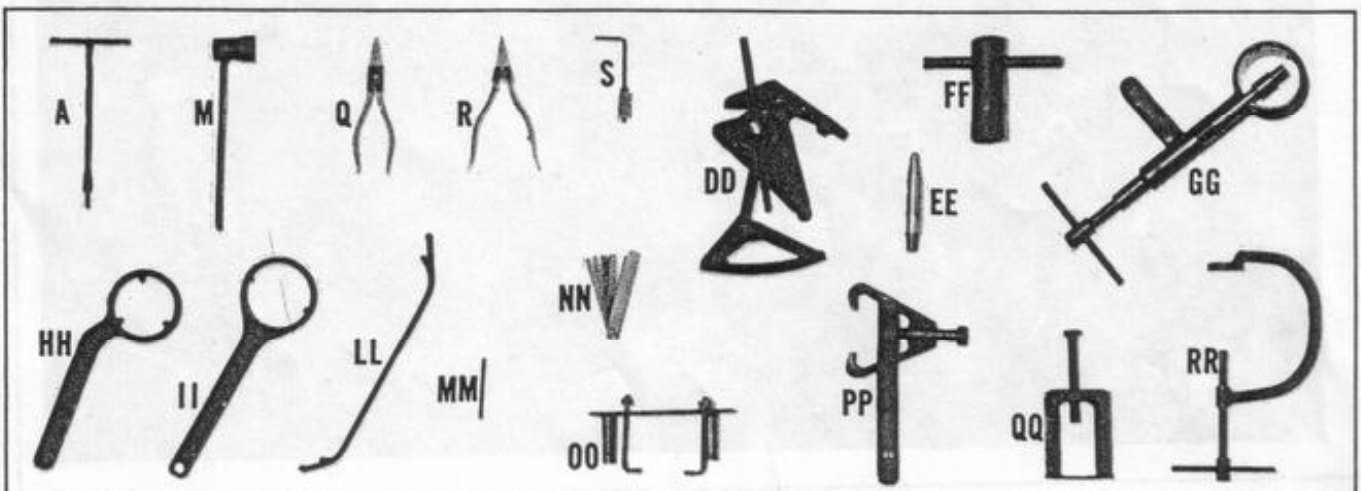


Figure 6.



### A. TIMING (IGNITION)

1. Before removing the left crankcase cover, note the installed positions of the kickstarter and foot peg arm (for easier replacement in the same positions).
2. Remove clamping bolt from kickstarter and slip pedal off shaft.
3. Loosen the nut holding the foot peg arm and rotate the arm back to clear the crankcase cover.
4. Adjust the rear brake so that the brake pedal can be held down to clear the crankcase cover. Turn the knurled brake-rod adjusting nut (reference number 70 in exploded view T. 4 in the Owner's Guide) until there is sufficient free travel in the pedal.
5. Use tool A to remove the screws holding the left crankcase cover and slide the cover off the two locating dowels and

the kickstarter shaft (Figure 7).

Note that the two screws on the right side, upper and lower, are longer than the other three because they pass through the locating dowels.

6. Remove spark plug.
7. Check the condition of the points and replace if they are burned, pitted or appear frosted. If it is determined that the points are in good condition or it is known that they are nearly new, clean them by rotating a folded 320 grit emery cloth between the closed points. Open the points and remove the emery cloth. Insert a piece of cardboard between the points and rotate several times using different places on the cardboard until it comes out clean.
8. Adjust the gap at the high point on the cam to .016 in. or 0.4 mm. For better control when turning the engine over, shift into fourth gear and use the rear wheel instead

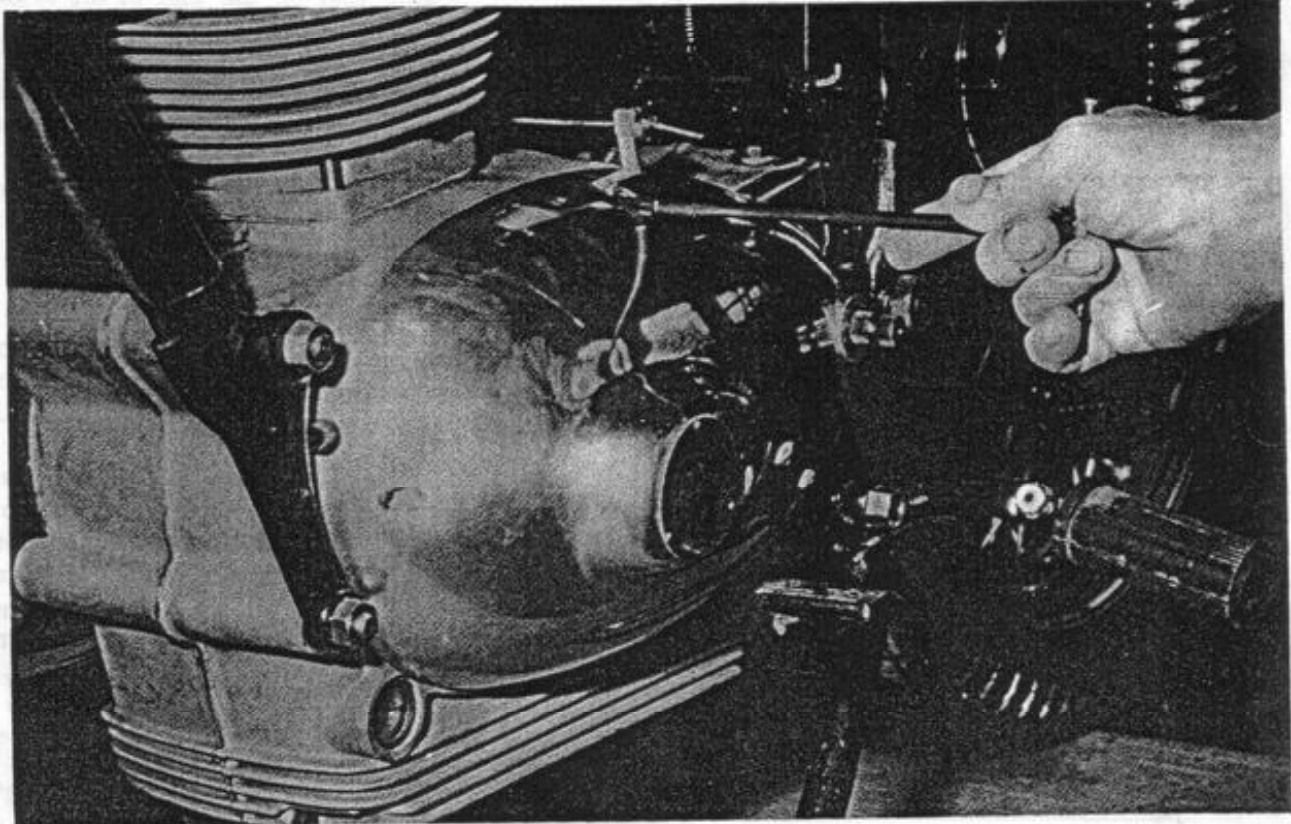


Figure 7.



of the kick starter. Be sure the spark plug is removed. Turn the engine over two or three revolutions to cover the cam with the normal operating grease film. Always turn the engine forward — clockwise as viewed from the generator side. Loosen the screw adjacent to the points and use the notch provided to make adjustment (Figure 8).

Adjust points carefully with a clean gauge. (Figure 9). A small error in the breaker gap can have considerable effect on engine timing. Tighten screw.

The 250 c.c. and 350 c.c. engines are equipped with an automatic centrifugal spark advance. Below about 800 R.P.M. spark is advanced the minimum of 12°. Above 800 R.P.M. the amount of advance will increase with the speed up to a maximum of 48°.

Early-production machines had no markings indicating the relative positions of TDC (top dead center), minimum advance, or maximum advance. On later machines these points are indicated. Going clockwise, the first reference mark indicates the maximum advance 48°; the second, minimum advance 12°; and the third, TDC. (The distance between the 48° mark and the 12° mark is three times the distance between the 12° mark and TDC.) On machines

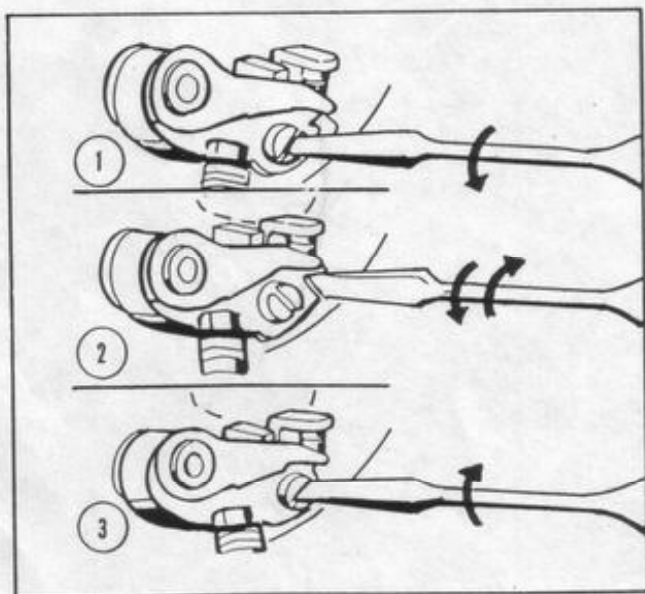


Figure 8.

where these points are not indicated, proceed as follows:

- a. At a convenient point around the top (circle) of the generator (part reference number 79 in exploded view T.1) pencil or scratch a reference mark and label it 12°. This first mark will indicate minimum advance.
  - b. Measure off 15/32 inches clockwise from the minimum advance (12°) mark, scribe a second mark, and label it with the letters, TDC.
9. Remove generator "fixing" bolt, reference number 81.
  10. Fashion a pointer from a piece of wire as follows:
    - a. Bend a loop at one end through which the generator "fixing" bolt can be put.
    - b. Bend the other end so that it will pass over the reference marks when the looped end is mounted under the generator bolt on the end of the crankshaft as shown in Figure 10.
  11. Set the piston exactly at top dead center and set the wire indicator so that it points to the TDC reference mark. Either the compression or exhaust stroke can be used because the spark plug fires on the exhaust stroke as well as the compression stroke (for simplicity of design).
  12. Turn the engine over by hand forward (clockwise when facing the generator side) until the wire indicator reaches the 12° reference mark. At this point the points should open. Use a continuity tester to determine when points open. Another simple but somewhat less accurate method of determining when the points open may be substituted as follows. Open the points and allow them to close on a gauge or strip of paper .002 to .003 inches thick. Apply a slight pull to the strip. When the points open, the strip is released to the pull.
  13. If the points do not open at the 12° point, loosen the screws holding the "stator plate", reference 102, and rotate the plate



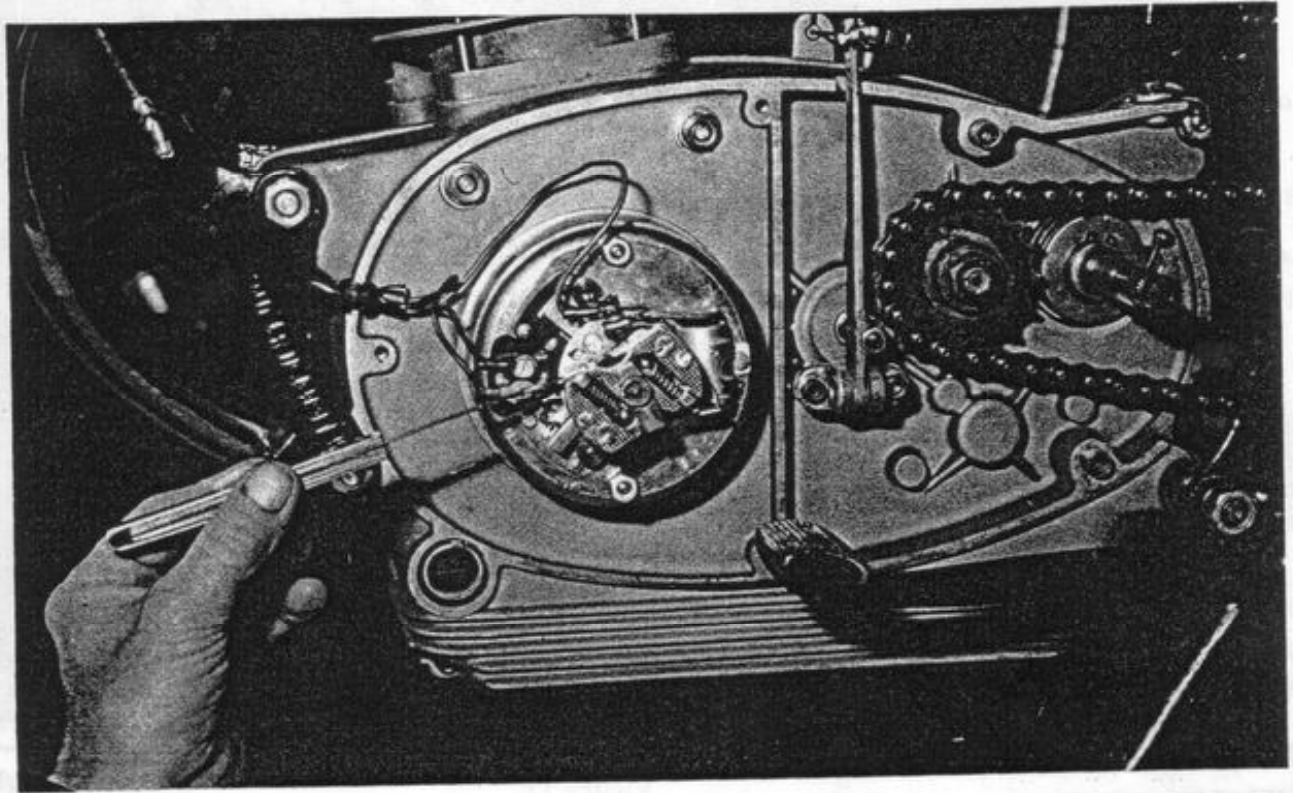


Figure 9.

in the proper direction until the points open at  $12^{\circ}$

14. It is not safe or practical to check the automatic spark advance using the preceding method. A timing disc as illustrated in Figure 11 and a timing light would be necessary to check the automatic advance under operating conditions. It will be sufficient, however, to check the action of the springs of the automatic advance. They should hold the weights firmly in the rest position. Replace the springs if necessary. Move the weights out by hand to check for free movement. Run the engine. The weights should begin to move out at 800 R.P.M., a slightly fast idle. Replace the entire automatic advance if there is any doubt about its performance (Figure 12). Torque the generator fixing bolt to 15 foot pounds.

#### B. CLUTCH CONTROL LEVER ADJUSTMENT

1. Carry out steps 1 through 5 in the pre-

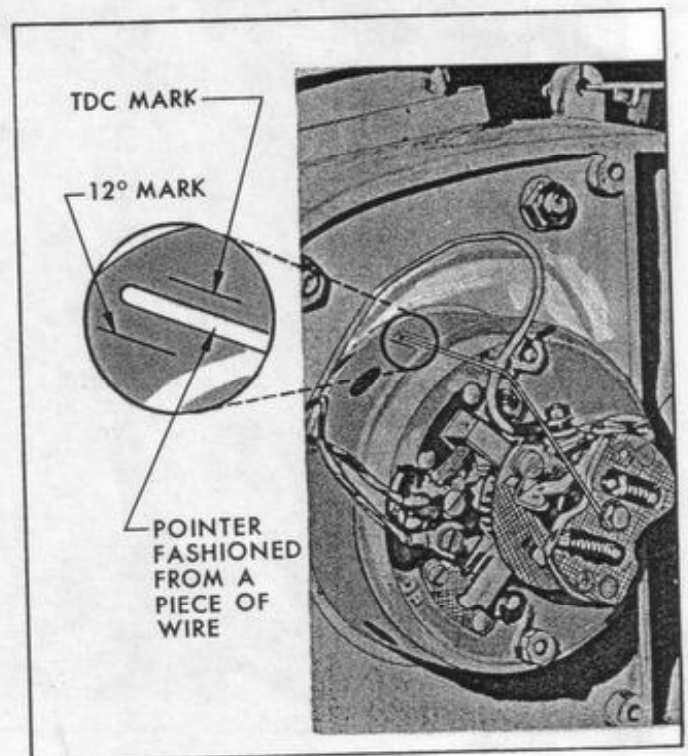


Figure 10.



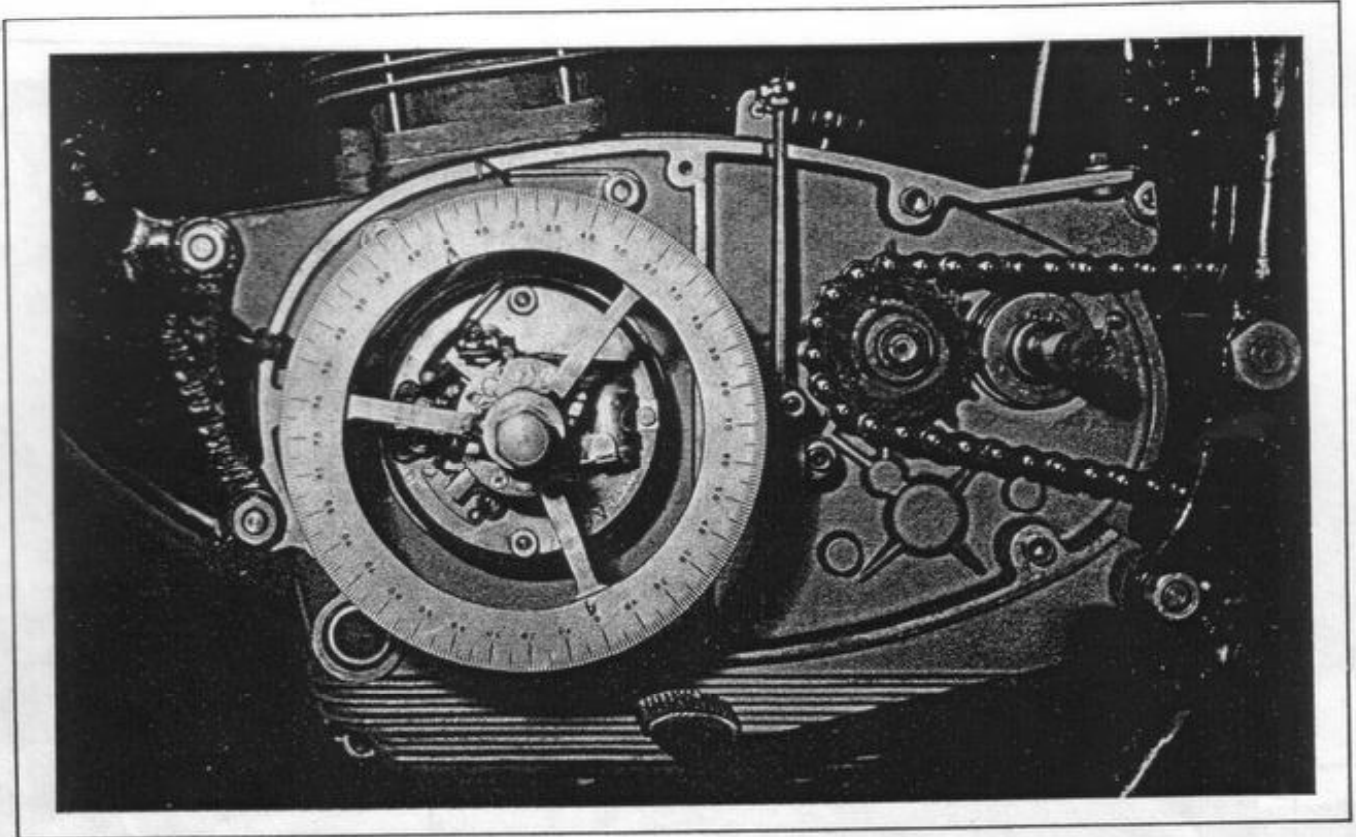


Figure 11.

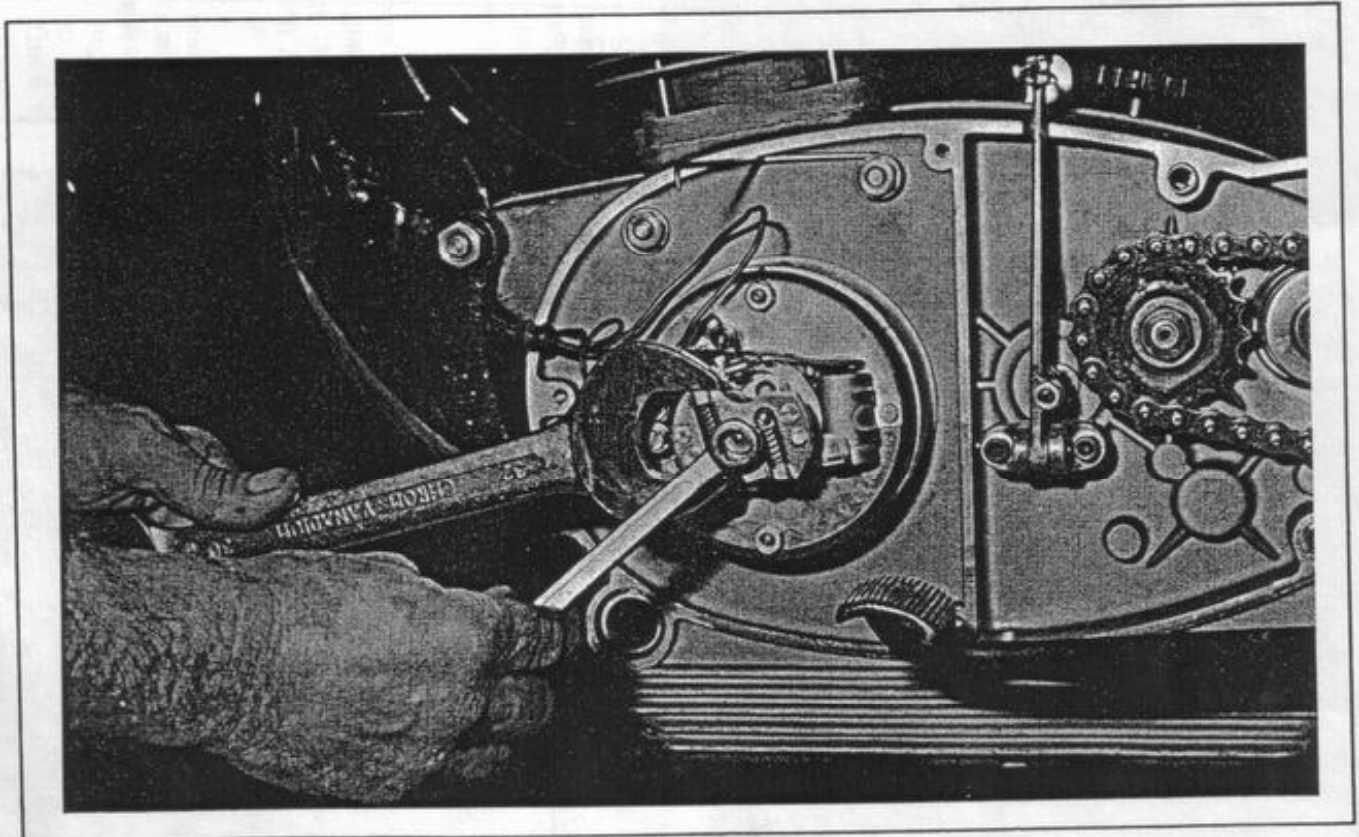


Figure 12.



ceding Section A.

2. If the clutch control lever, reference number 94 in exploded view T.2, hits either the crankcase or cover when operated, loosen the nut and adjust the set screw as shown in Figure 13.

#### C. DRIVE SPROCKET

1. Carry out steps 1 through 5 in the preceding Section A.
2. Hold the sprocket with tool HH and take off the drive sprocket nut (19 mm.), reference 26 in exploded view T2 (Figure 14). On reassembly torque the sprocket nut to 36 foot pounds.
3. Use puller PP to pull off the sprocket. (Figure 15).

#### D. REMOVAL OF RIGHT CRANKCASE COVER

1. Loosen the nut holding the foot peg arm

and rotate the arm to clear the crankcase cover.

2. Loosen or remove the exhaust system if necessary.
3. Put the transmission in fourth gear. See Section C Operation on page 9 of the Owner's Guide for instructions. The foot shift lever with the shift indexing mechanism on the inside of the cover may be left in position when the cover is removed.
4. Oil may be drained by removing the oil filter cap (reference number 131, illustration T. 2) or may be dumped with removal of the crankcase cover. See the following Section K, Steps 2 and 3.
5. Use tool A to remove the eight screws holding the right crankcase cover. Note that the lower forward screw and the rear screw are longer than the other

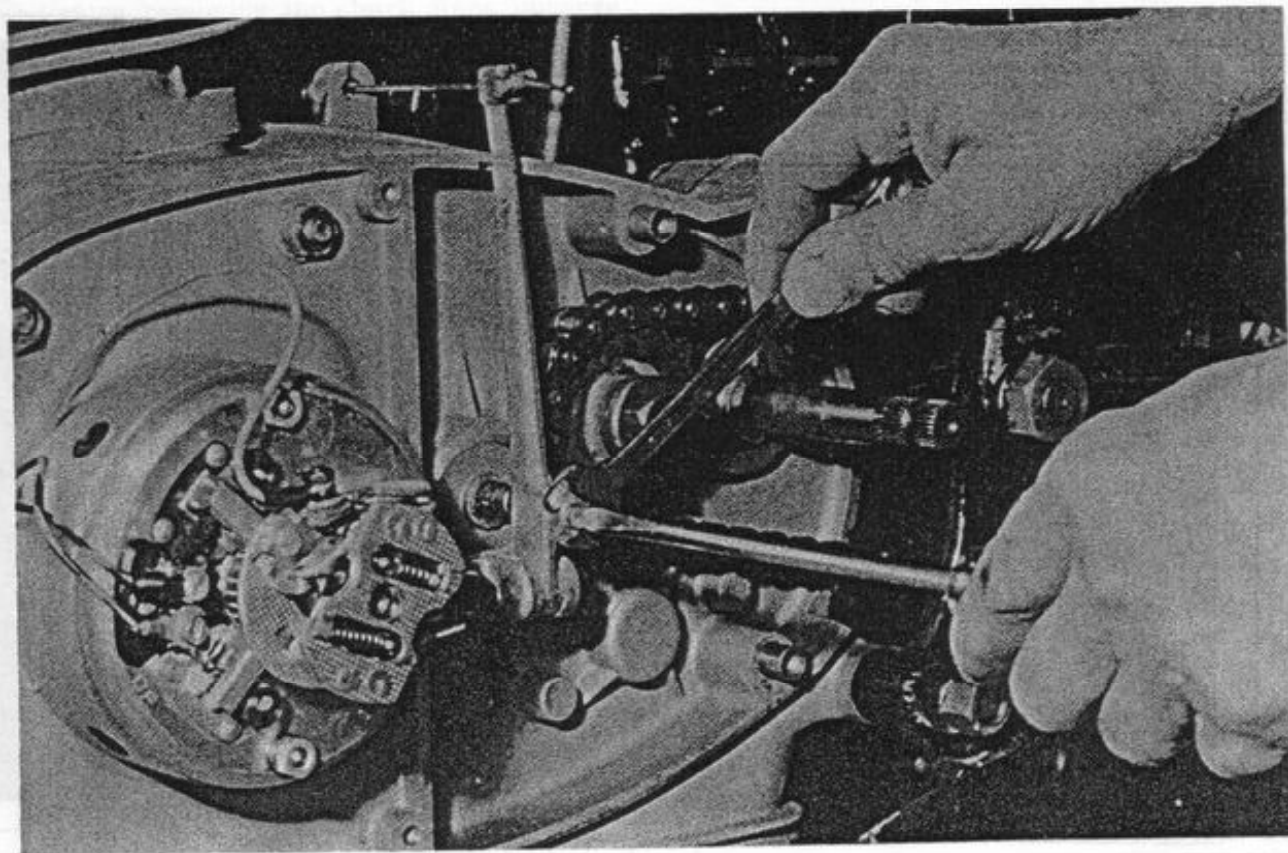


Figure 13.

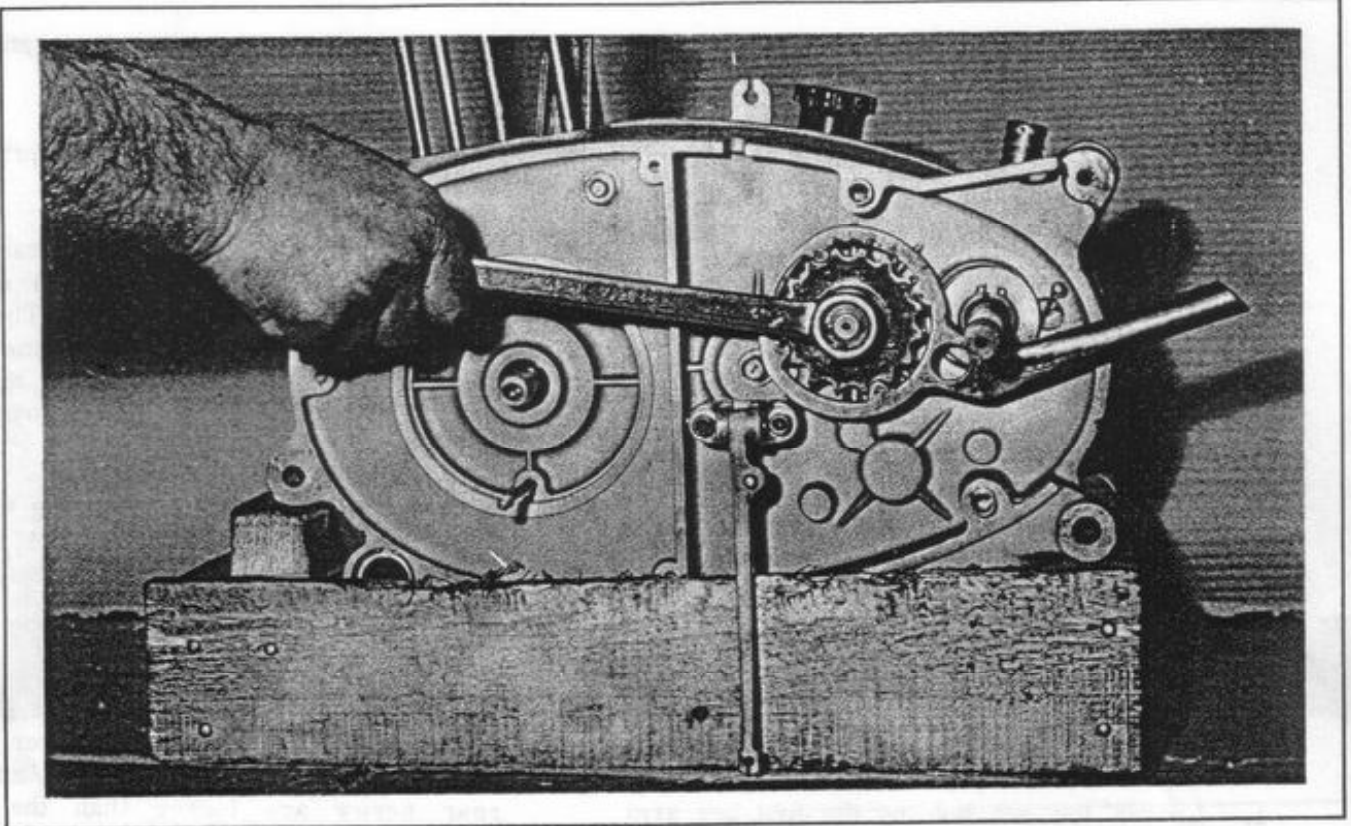


Figure 14.

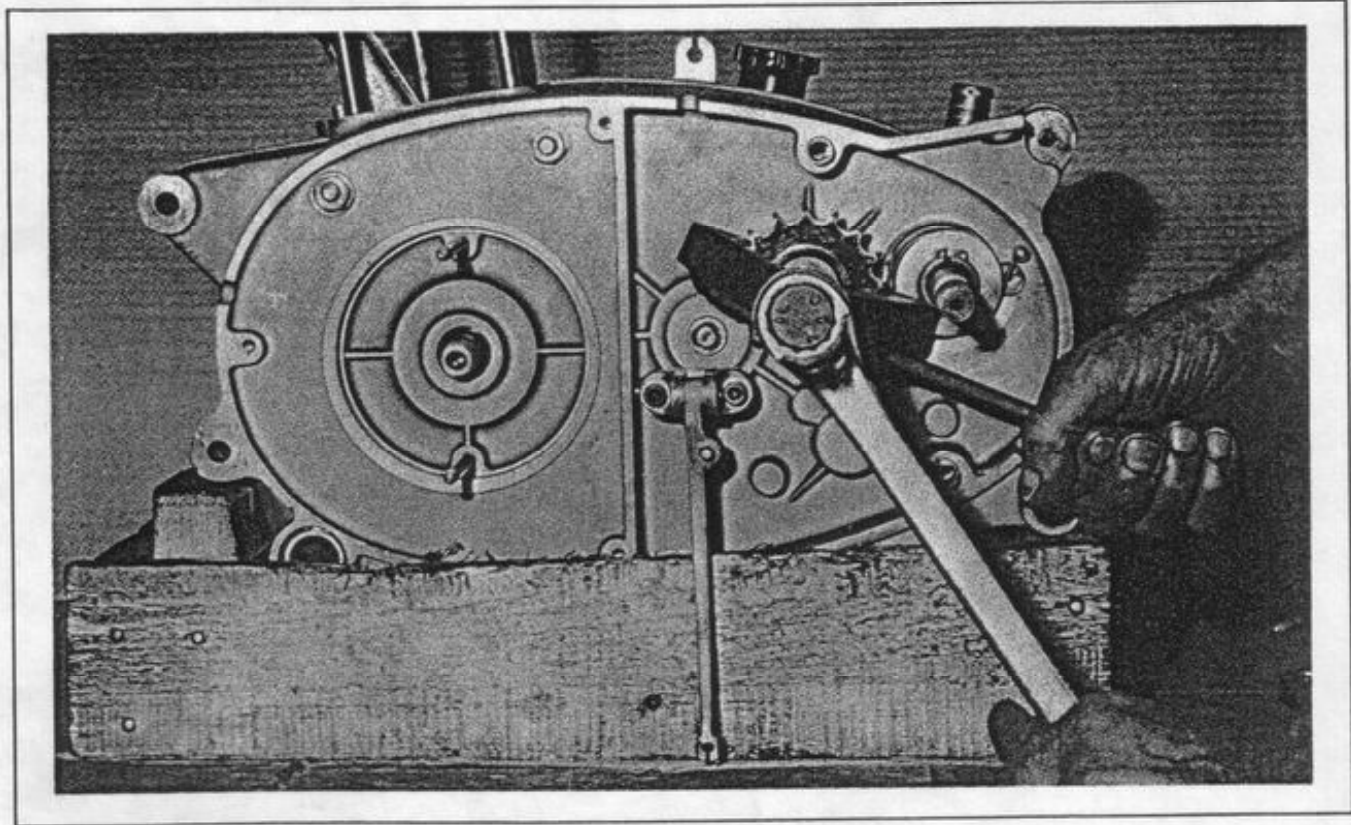


Figure 15.





six because they pass through the two locating dowels.

6. Tap the foot shift pedal carefully with a soft-faced hammer to help slide the cover off the dowels and also help slide the "calking holder picket" (reference number 8) out of the crankcase half (Figures 16 and 17). If the transmission is not in fourth, the indexing mechanism will hit the clutch drum when the cover is removed.

#### E. CLUTCH DISASSEMBLY

1. Carry out all the steps in the preceding Section D for access to the clutch.
2. Remove the wire (reference number 57) that is threaded through the clutch spring nuts (reference number 56).
3. Remove the six clutch spring nuts.
4. Slide off the clutch control disc, number 58, with the springs and spring holders.
5. Before removing the clutch discs, observe that the outer driven disc, reference number 62, and the inner driven disc, number 65, are different from each other and

different from the other four driven discs, number 64. The outer disc is thicker and the inner disc is beveled. The beveled side faces the crankcase. All of the inner driven discs can be interchanged and all of the driving discs are identical. Remove all the discs.

6. Remove clutch cap, reference number 59.
7. Open tab lock washer, reference 61, and use tool M to remove primary shaft nut 60 while holding the clutch disc holder (clutch hub), reference 49 with tool II (Figure 18).
8. Pull off disc holder (clutch hub).
9. Take off washer 46.
10. Slide off the clutch body (drum with gear) with the steel bushing, both reference number 48.
11. Take off second washer 46. One washer is placed on each side of the bushing.
12. If three-piece clutch shaft is removed, note that it is made up of a long push rod, 53 on the clutch side, a short push

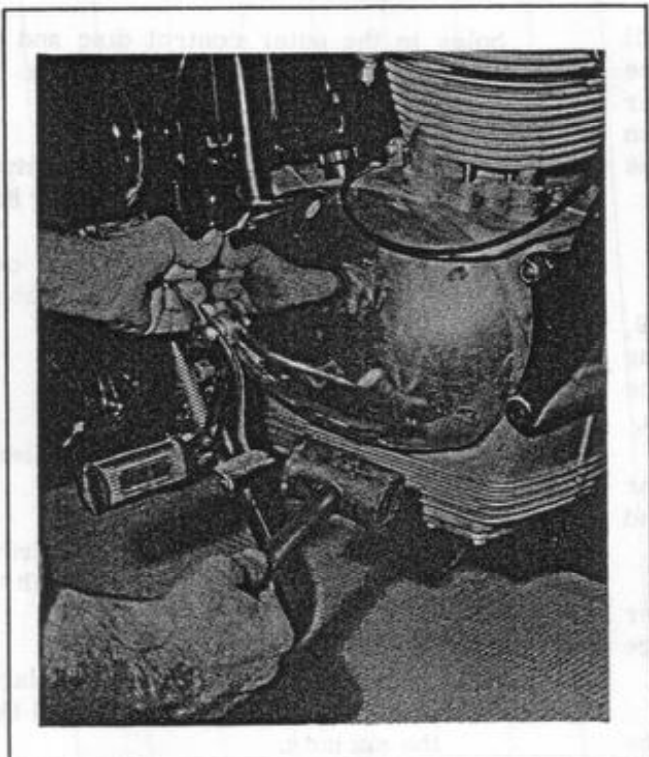


Figure 16.

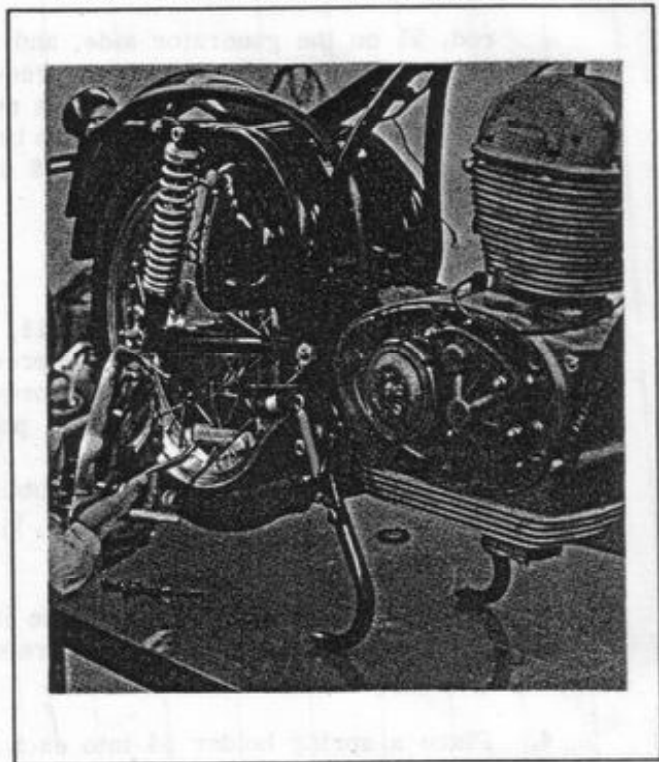


Figure 17.



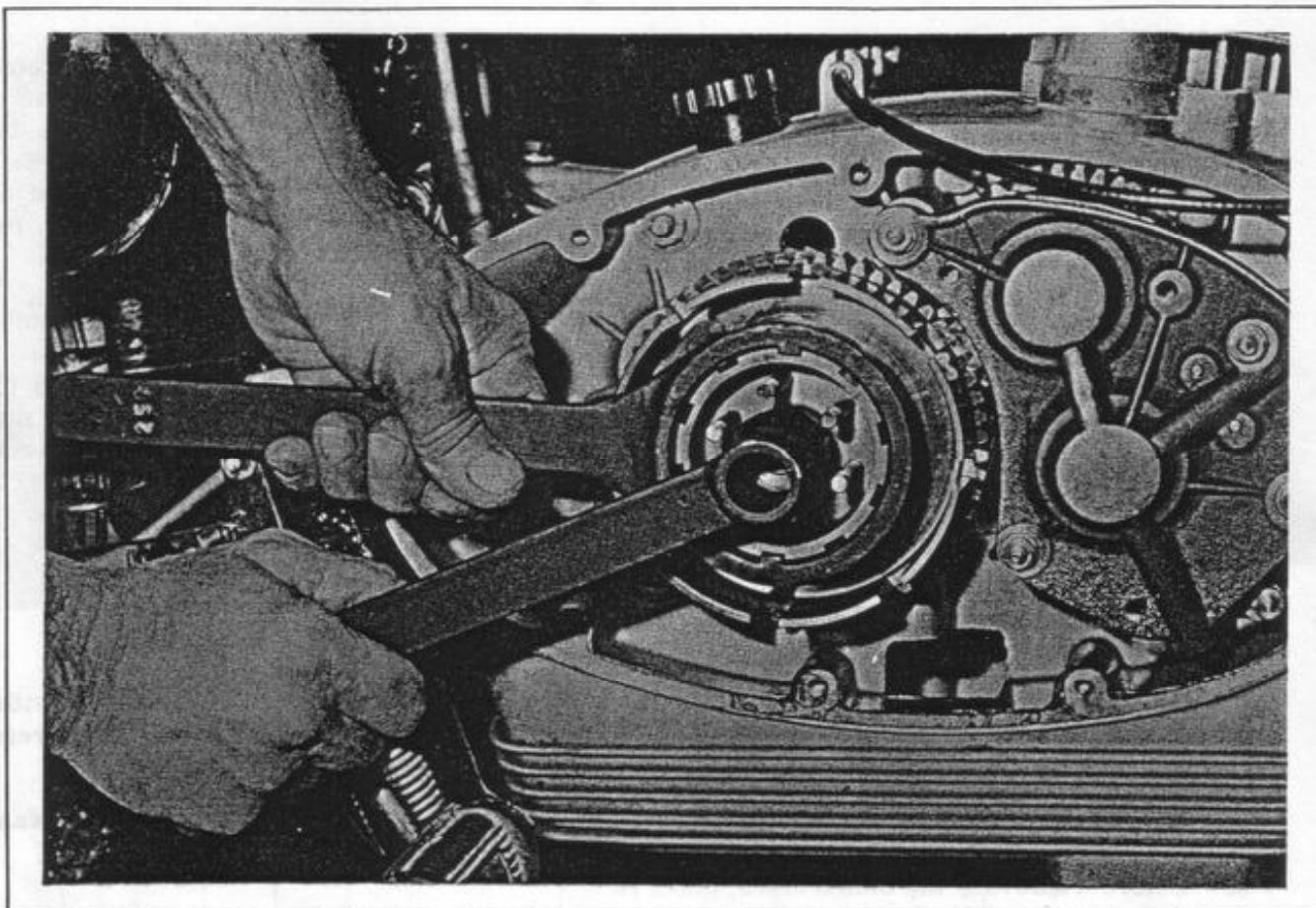


Figure 18.

rod, 51 on the generator side, and a ball 52 between the two rods. The three-piece clutch shaft is assembled in this manner because it is held in compression between the turning clutch control disc 58 and the stationary clutch adjuster 95.

#### F. CLUTCH REASSEMBLY

1. Carry out in reverse steps 12, 11, 10, 9, 8 and 7 in that order under the preceding section, Clutch Disassembly. Torque the primary shaft nut to 36 foot pounds.
2. After step 7 be sure that the clutch gear turns. Then proceed with steps 6, 5, 4 and 3 in that order.
3. Place the outer clutch control disc 58 over the six clutch disc holder studs, reference number 50.
4. Place a spring holder 54 into each of the holes in the outer control disc and at the same time over each of the six clutch disc holder studs.
5. Place a clutch spring over each stud and at the same time into each spring holder.
6. Run each clutch spring nut four or five turns onto each stud. The nuts should be adjusted so that there is:
  - a. Maximum spring pressure.
  - b. Even, free movement of the outer control disc.
  - c. Sufficient clearance for full travel of the control disc when the clutch is fully disengaged.
  - d. Enough stud exposed to replace the retaining wire that is threaded through the six nuts.



7. Replace retaining wire.

8. Adjust clutch control lever as described in Section B.

**G. DISASSEMBLY OF THE BEARING SUPPORT PLATE**

1. Carry out steps 1 through 5 in the following Section J.

2. Use tool A to remove the cylinder head cover screws (Figure 19). Remove cover.

3. Use tool LL to lift the rocker arms as shown in Figure 20. Take out the push rods. The longer rod is for the exhaust valve and is mounted on the outside.

4. Remove the four nuts (10 mm.) and washers securing the bearing support plate, reference number 146, exploded view T.2.

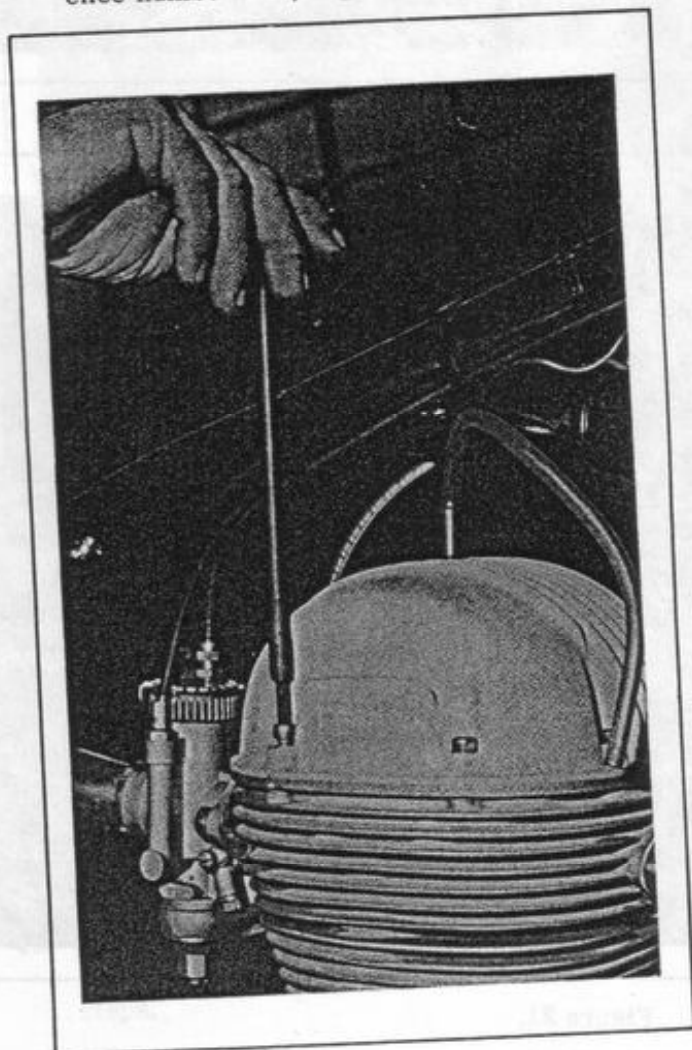


Figure 19.

5. Set the piston at TDC (top dead center) at the end of the compression stroke so that both valves will be closed and the cam lobes will be away from the tappets (lifters). This will make removal of the camshaft, reference 32, exploded view T.1 easier. Note — the camshaft is illustrated backwards and the gear, 34 is shown on the wrong side. Also, the descriptions for the push rods are reversed. In the exploded view showing the relationship of the major parts (Figure 6), the camshaft and gear are shown correctly. However, in this illustration the push rods are matched with the wrong rocker arms; they are reversed.

6. Use puller DD to remove the bearing support plate. The support plate has three threaded holes to accept the three bolts (14 mm.) on the special puller. Attach the puller as illustrated in Figure 21 and remove the bearing support plate as shown in Figure 22. If the camshaft remains with the bearing in the bearing support plate, lift the tappets (lifters) to clear the camshaft and catch the tappets to avoid possible damage (Figure 23). Note that the bearing support plate also distributes the oil from the oil pump reference 134.

7. If the camshaft remains with the bearing in the crankcase half, observe the timing marks on the camshaft gear and the crankshaft pinion. These marks must be matched when re-meshing the gears on reassembly.

8. If the camshaft remains in the crankcase bearing, use puller 00 to pull out the camshaft (Figure 24). Lift the tappets as the camshaft is withdrawn.

9. To remove the crankshaft pinion; reference 36:

a. Use tool FF with a hammer to remove the crankshaft nut, reference 35 (Figure 25).

b. Use puller QQ, with a soft-metal spacer between the end of the crankshaft and the puller bolt, to pull off the pinion gear (Figure 26).

10. The oil pump drive screw is mounted on the crankshaft behind the crankshaft pinion.

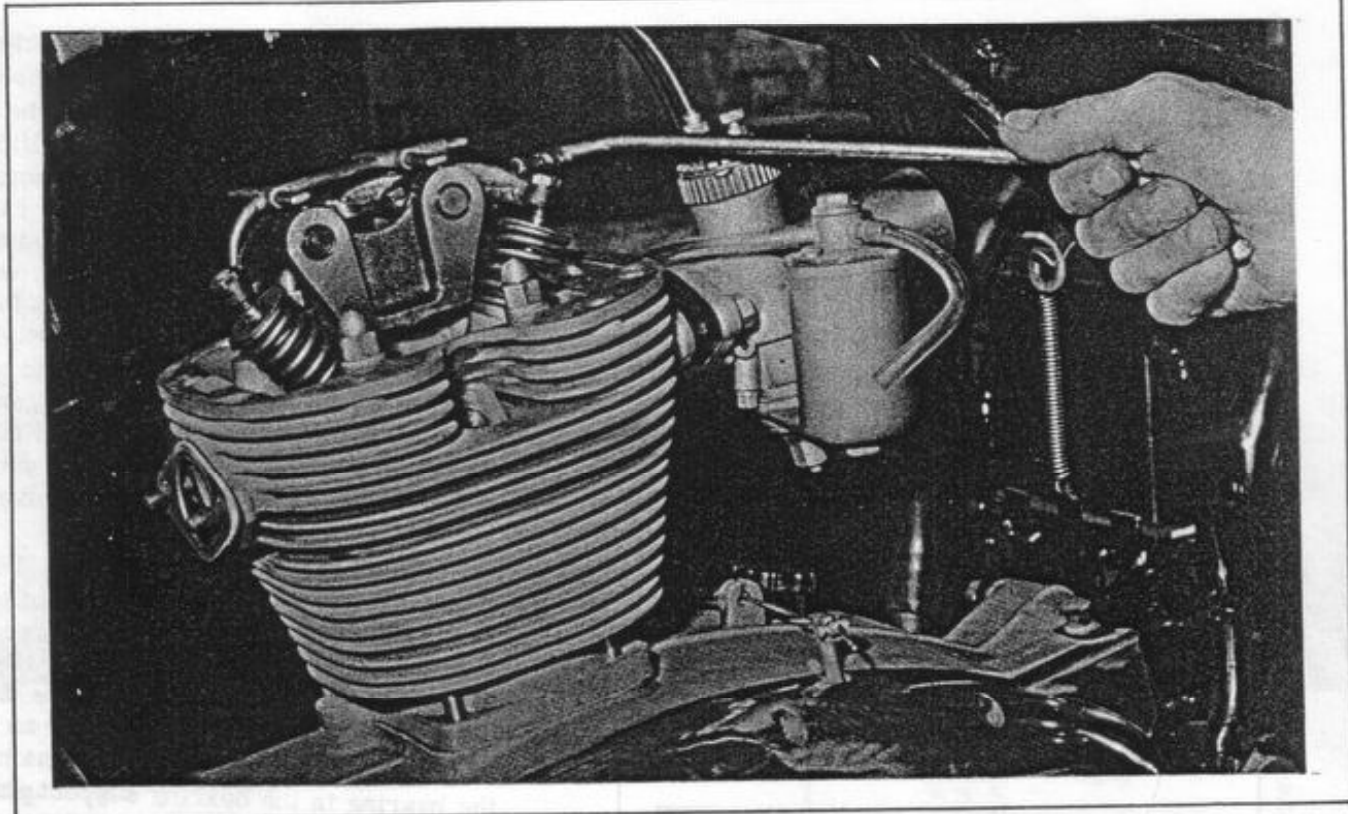


Figure 20.

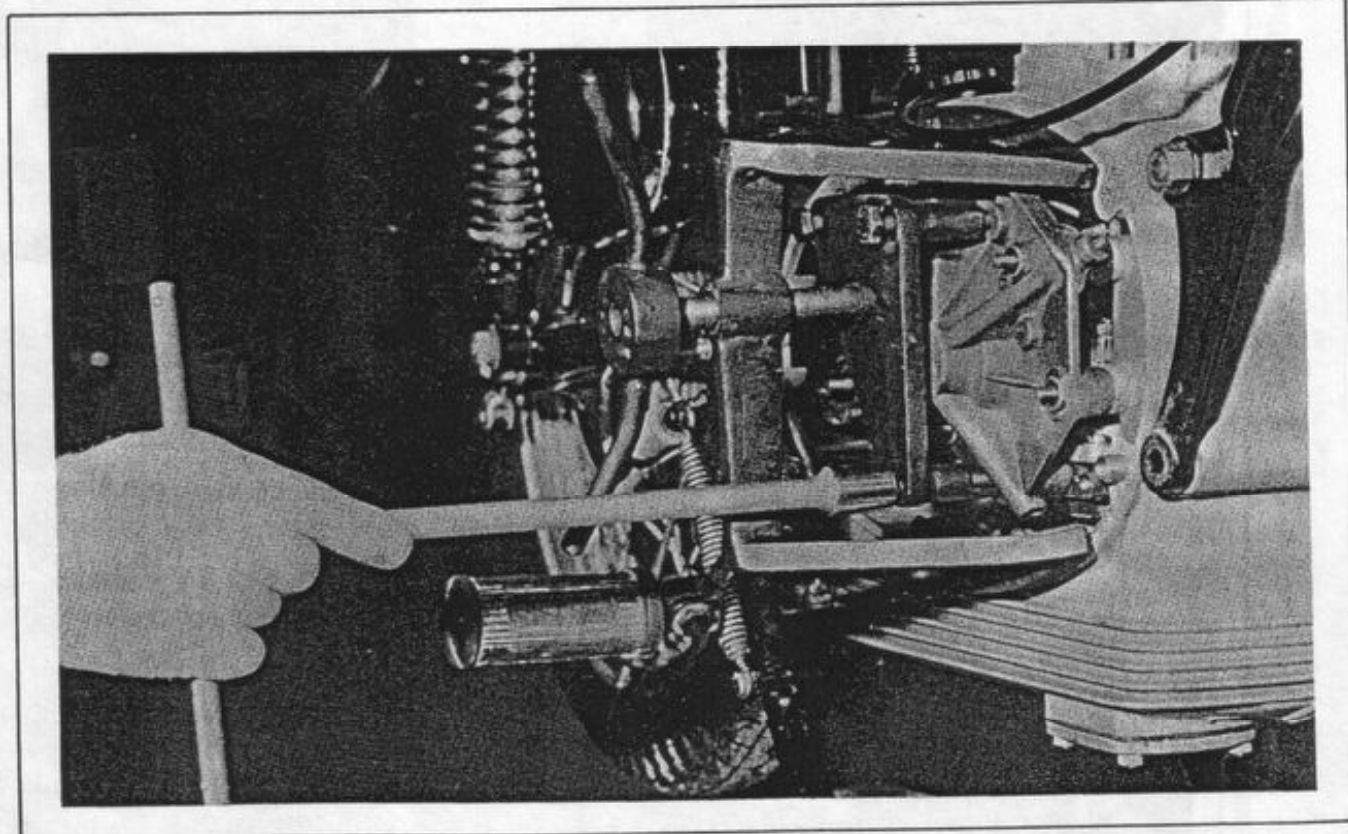


Figure 21.

OF THE DAMPING SUPPORT PINS, AND HOW TO...



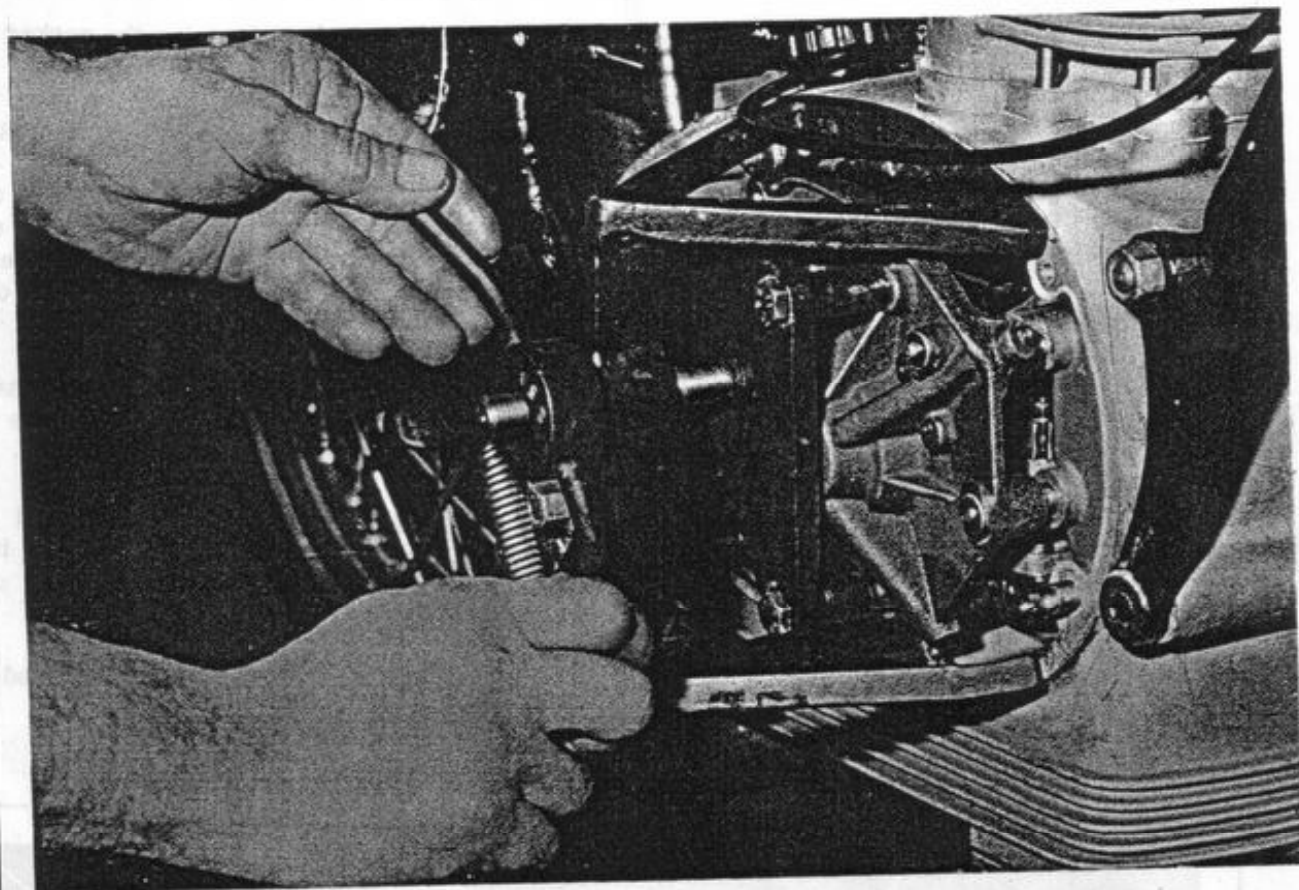


Figure 22.

(Note its mounting. It is shown reversed in exploded view T.1 but correctly in Figure 6). To take off the drive screw, remove the two pinion gear woodruff keys and use puller QQ in the same manner as when removing the pinion gear in the preceding step 9.b.

11. The oil pump is removed by taking off the two nuts, reference number 80. Although the pump can be disassembled and parts are available for it, repairs to the pump in the service department are not practical. The entire pump assembly, reference number 134, should be replaced.

12. Reassembly of the bearing support plate is the reverse of the preceding eleven steps.

13. When replacing the gears, be sure that the timing marks are on the outside.

14. The bearing support plate contains oil seals and should be replaced with care. Tap the plate lightly to make replacement easier.

15. If the crankshaft does not turn freely, tap the bearing support plate lightly until it does.

#### H. CYLINDER HEAD

1. Carry out steps 1 through 5 in the following section J.

2. Remove exhaust pipe and muffler.

3. Remove the screws and washers holding the valve cover and the spark plug cable clamp. Lift off cover.

4. Loosen carburetor clamp and slip carburetor off intake pipe.



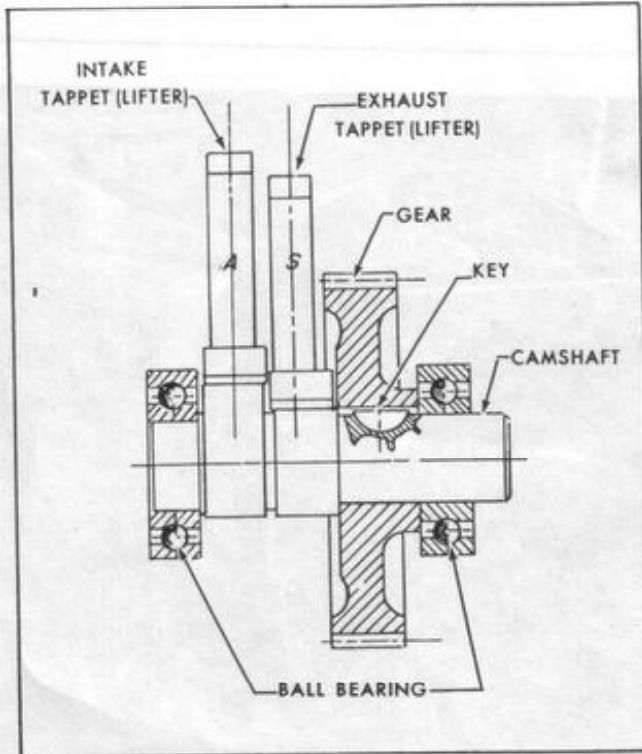


Figure 23.

5. Unscrew the flare nut (17 mm) on the oil tubing.
6. Loosen the bolts clamping the rocker arms onto the rocker pins.
7. Slip out the intake (rear) rocker pin and move the rocker arm so that the crown nut on the cylinder stud beneath it can be removed. Do not lose the rocker spring spacer, reference 62, exploded view T1, on the right side of the rocker or the washer 64 on the left side.
8. Remove the stud crown and washer and take off the oil tubing with the plate (bracket), reference 60.
9. Take off the other cylinder stud crown nut and the two nuts and washers holding the rocker arm support and lift out the support with the rocker bushings.
10. Take off the remaining cylinder stud crown nuts and washers.

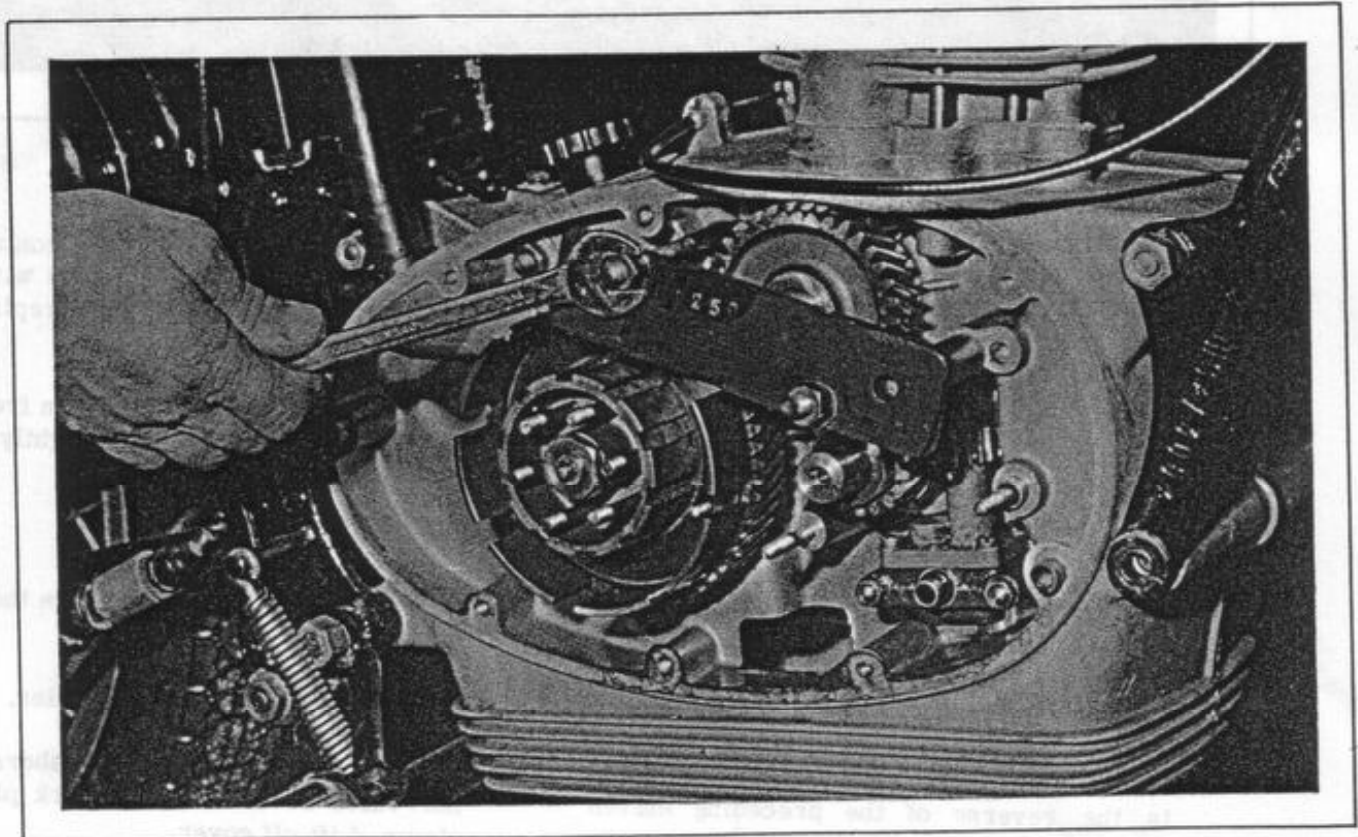


Figure 24.

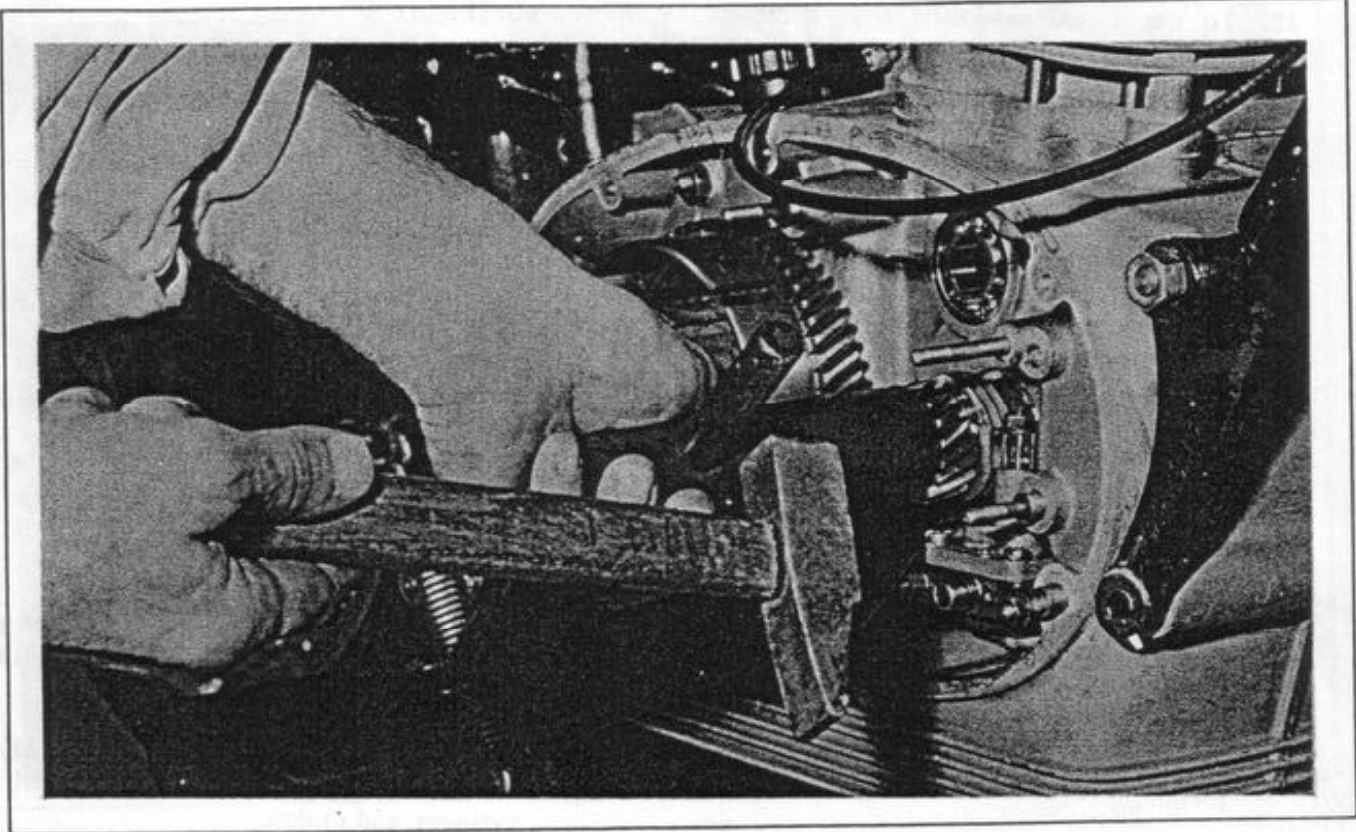


Figure 25.

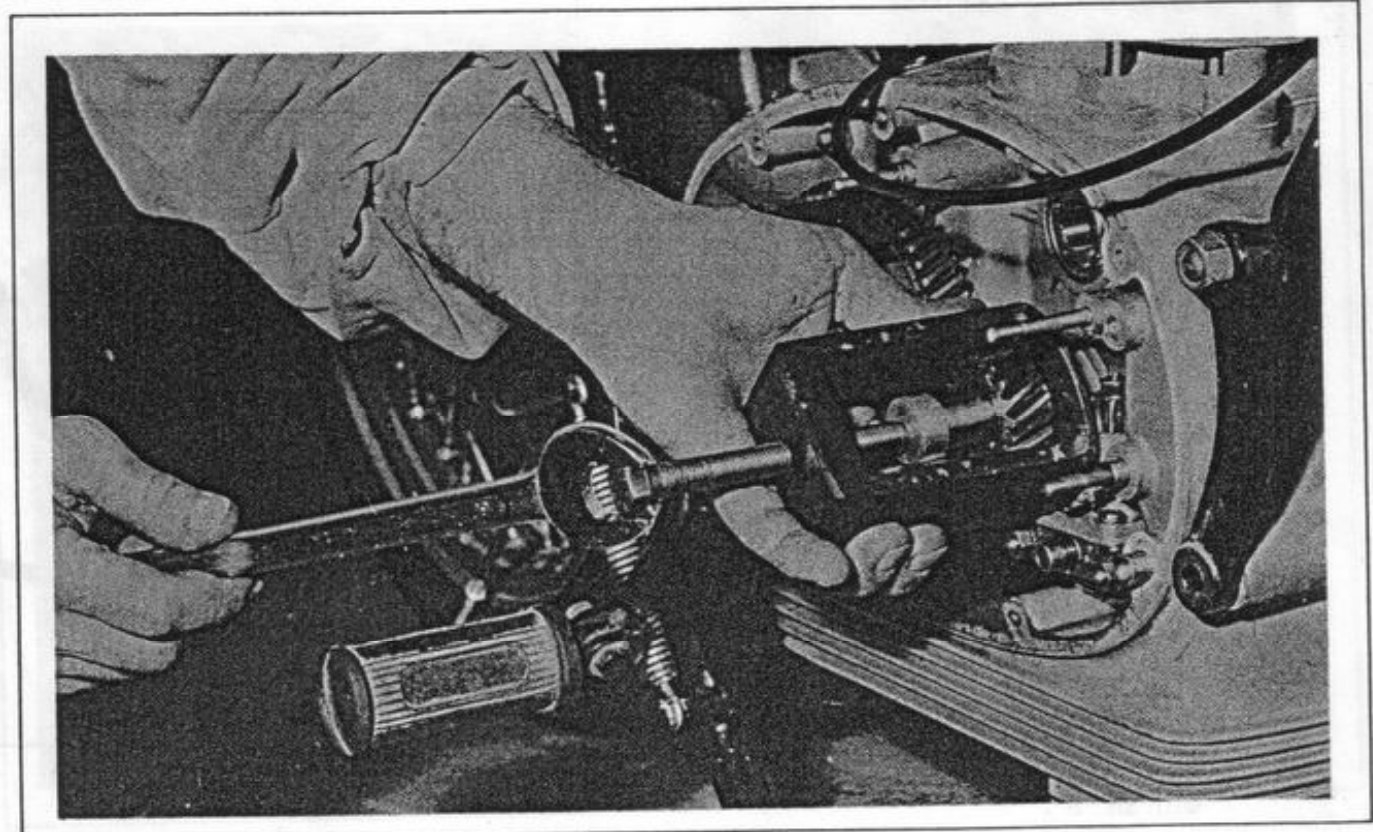


Figure 26.



11. Lift off the cylinder head.
  12. To check valve seating pour some gasoline around the valves. If any gasoline seeps through, the valves should be ground.
  13. To remove the valves for grinding or replacement:
    - a. Use spring compressor RR to compress valve springs and remove the valve cotters (keepers) as shown in Figure 27.
    - b. Release compressor, take off springs and plates, and remove valve.
  14. Grind valves with a good-grade fine grinding (lapping) compound.
  15. Clean head and valves of compound thoroughly.
  16. For reassembly, reverse each step from thirteen back through one. Tighten the cylinder head nuts to 22 foot pounds of torque.
10. Use retaining ring pliers Q to remove the retaining rings from each side of the piston pin (Figure 28).
  11. Use tool GG to force out the piston pin (Figure 29).
  12. To reassemble the piston pin into the piston:
    - a. Be sure the "S" is at the front toward the exhaust.
    - b. Put one end of the piston pin on the shank of the screw on tool GG.
    - c. Withdraw the screw and piston pin and put the shank of guide (tool) EE on the other end of the piston pin.
    - d. Advance the screw of tool GG to push guide and then piston pin into piston.
  13. See Figure 30 and chart (Figure 31) for assembly tolerances and wear limits of cylinder and piston.

## I. CYLINDER AND PISTON

1. Engine may first be removed as detailed in Section M, Engine Removal.
2. If engine is not removed, carry out steps one through five in the following section J.
3. Carry out steps two through eleven in the preceding section H.
4. Take off master link and drop chain.
5. Remove chain guard.
6. Remove the upper rear and two front engine mounting bolts and loosen the nuts on the lower rear one.
7. Rotate front of engine down to provide sufficient clearance to remove cylinder.
8. Slide cylinder carefully off studs.
9. Note that the front of the piston is marked with an "S".

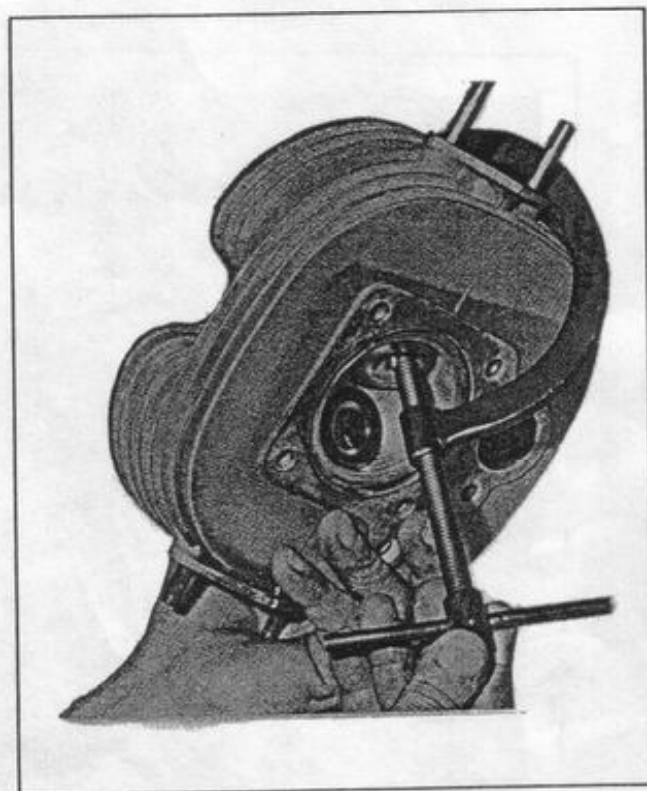


Figure 27.



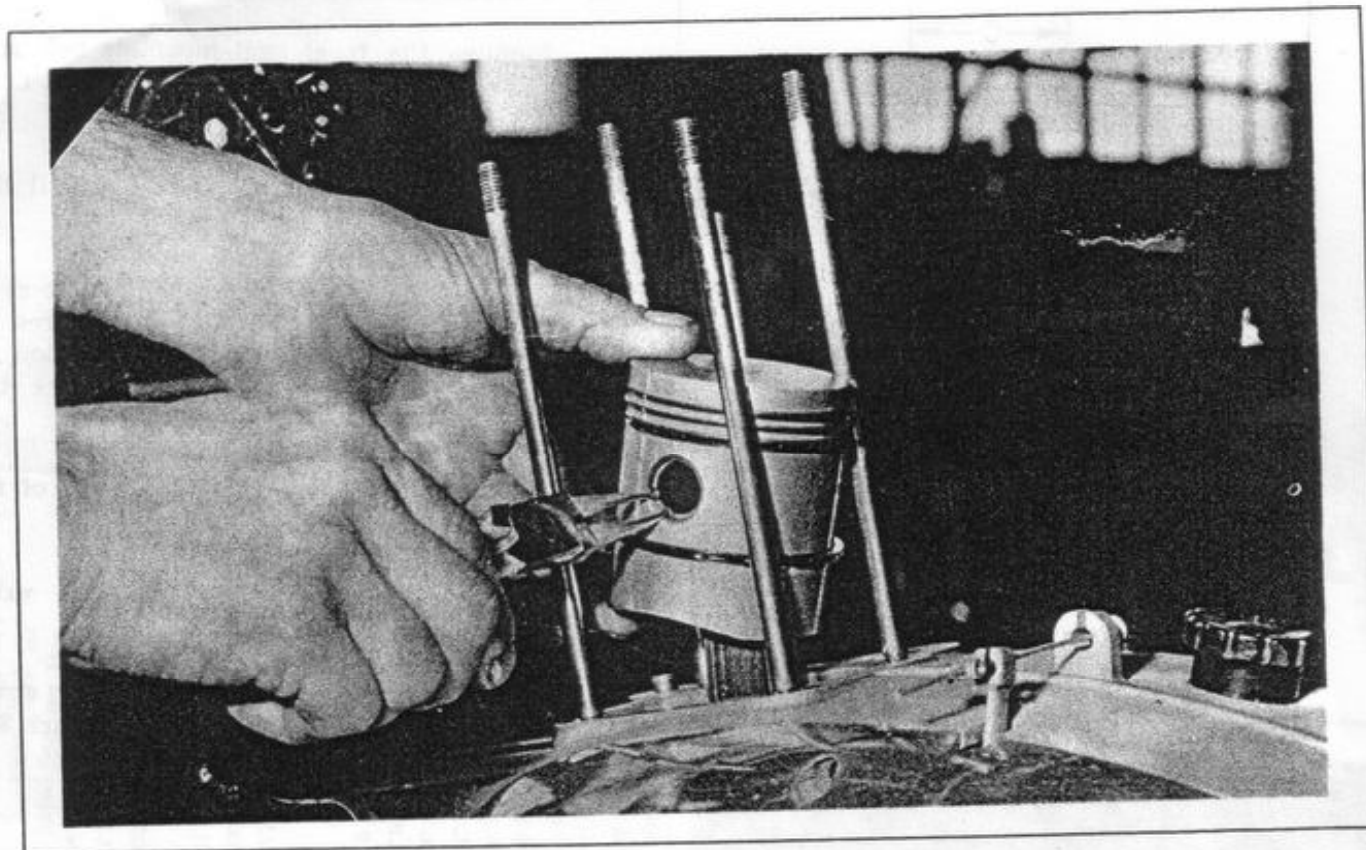


Figure 28.

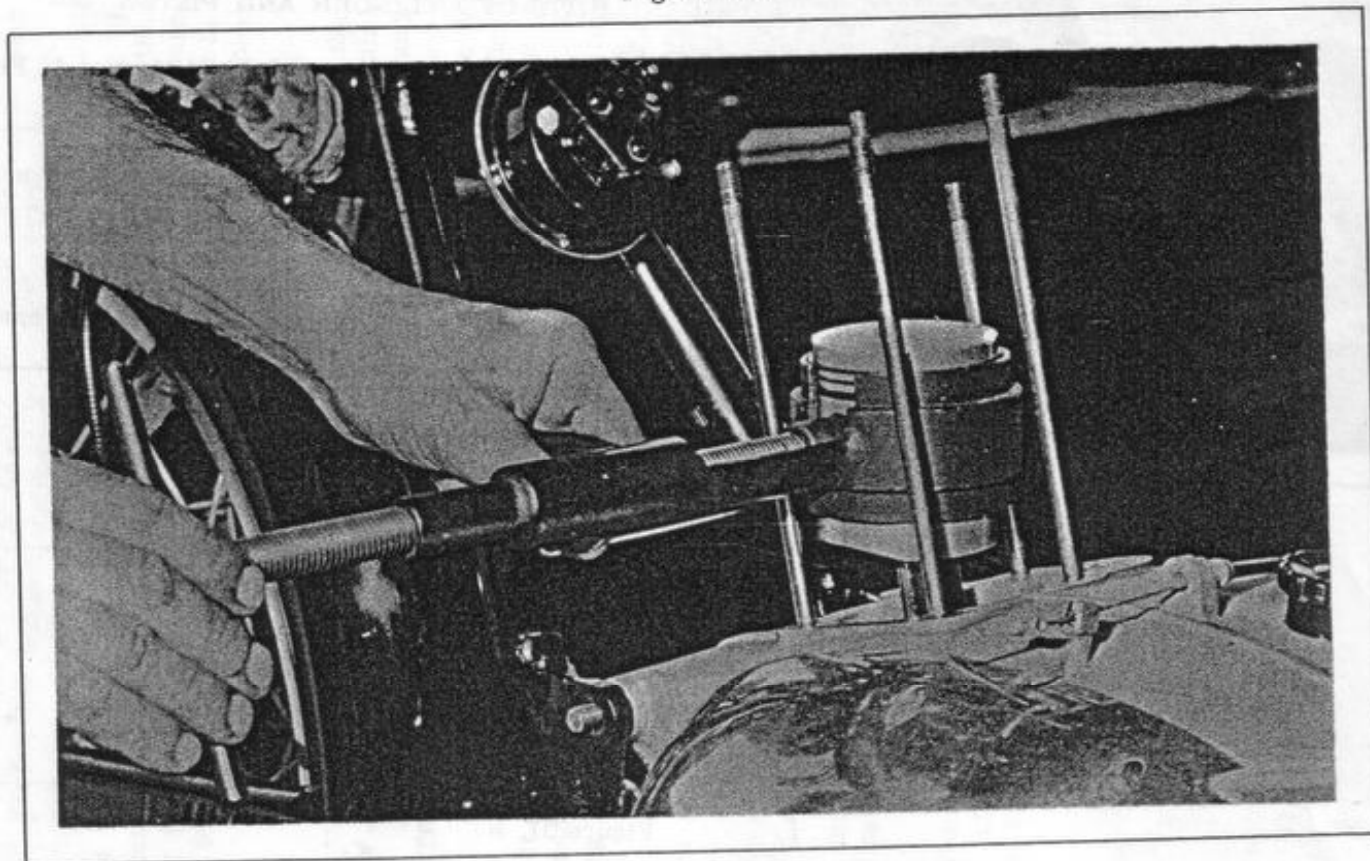


Figure 29.

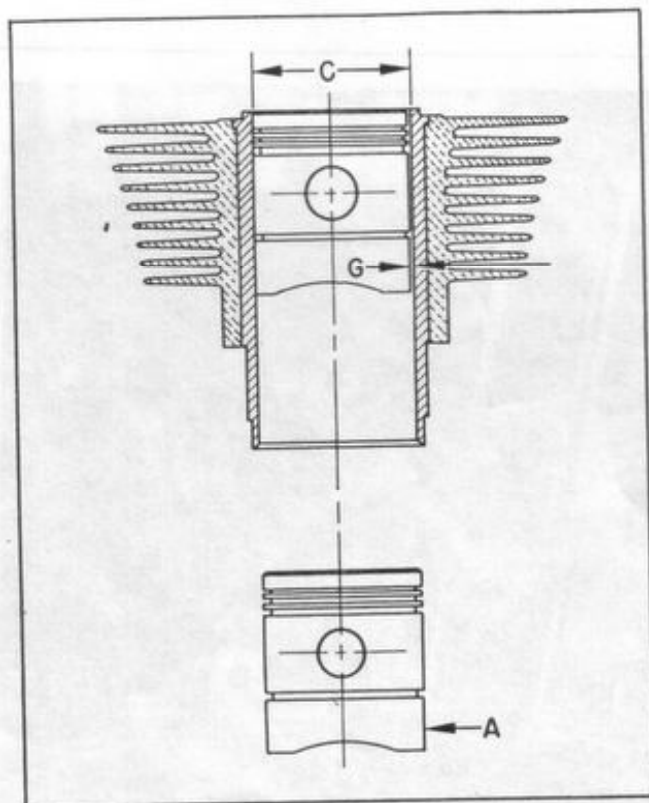


Figure 30.

## J. ADJUSTING THE VALVES

1. Remove the front seat-mounting bolt and raise the seat for access to the gas tank rear mounting.
2. Close the fuel tank petcocks and pull the plastic fuel lines from the gas tank.
3. Remove the rubber strap holding the rear of the gas tank. The tank is anchored in this manner to prevent transmission of frame stresses which could rupture the tank.
4. Remove the bolt at the front end of the gas tank and pull off the tank.
5. Pull the breather tube from the valve cover.
6. Use tool A to remove the valve cover screws and take off the cover (Figure 32).
7. Take out the spark plug.

## ASSEMBLY TOLERANCE AND WEAR LIMITS OF CYLINDER AND PISTON

Tolerances UNDER or ABOVE the NOMINAL SIZES of the PISTON are checked at point A, Figure 30.

Condition	Diameter of Cylinder C	Diameter of Piston taken at point A	Play between Cylinder and Piston (Maximum Wear) G
New	-0 68 mm. +0.015	-0.070 68 mm. -0.075	0.10 mm.
1st Oversize	+0.2 mm.	+0.2 mm.	
2nd Oversize	+0.4 mm.	+0.4 mm.	
3rd Oversize	+0.6 mm.	+0.6 mm.	

Figure 31.



8. Set the piston at top dead center at the end of the compression stroke so that both valves are closed.
9. Check the (valve) clearance at the rocker arm adjustment. It should be .006 inches cold for both intake and exhaust valves (Figure 33).
10. If adjustment is necessary, loosen the "nut for tappets", reference number 66, view T.1, and turn the "tappet adjuster", reference 67, to obtain the correct clearance.
11. The clearance adjustments can be checked while hot. The clearance when hot for both valves should be .004 inches.

#### K. CRANKCASE - TRANSMISSION

1. Strip the engine as detailed in Sections I, C, E and G in that order. Remove the stripped crankcase assembly from the frame; see the following Section M, Engine Removal.
2. Arrange to catch oil from the sump and remove the four nuts securing the oil filter "cap", reference 131, view T.2, at the bottom of the right crankcase half.
3. Take off the cap and filter along with the gaskets above and below the filter.
4. Remove the nut from the crankcase (tie) stud on the right side (14 mm.). Remove the two crankcase stud nuts on the left side (14 mm.).
5. Use tool A to take out the four screws, reference number 89, along the bottom of the crankcase.
6. Remove the screws holding the clutch lever support, reference 97, and take off the lever assembly.
7. Place tool S between the two crankshaft counterweights (flywheels) at a point opposite the crankpin and turn the handle of the tool to apply a very small amount of pressure to the counterweights to prevent distortion of the crankshaft.

8. Split apart the crankcase halves by tapping the primary shaft on the clutch side with a soft-faced mallet (Figure 34). Separate halves carefully to avoid damage and to keep inside gear shafts assembled on the left crankcase half (generator-sprocket side). Try to pull off the right crankcase half (clutch side) as a cover. Observe carefully the relationship of the inside parts. The relationship of the internal parts is also shown in the exploded views. Study both the exploded views and the assembled parts.

Inside the crankcase there are seven shafts: three in the power train — crankshaft, primary (gear) shaft, and secondary (gear) shaft; three in the gear change — the selector (fork) shaft, the gear selector shaft, and the "calking holder picket" (selector sector shaft); and the kickstarter shaft.

Power is transferred from the crankshaft gear 36, T1, through the intermediate

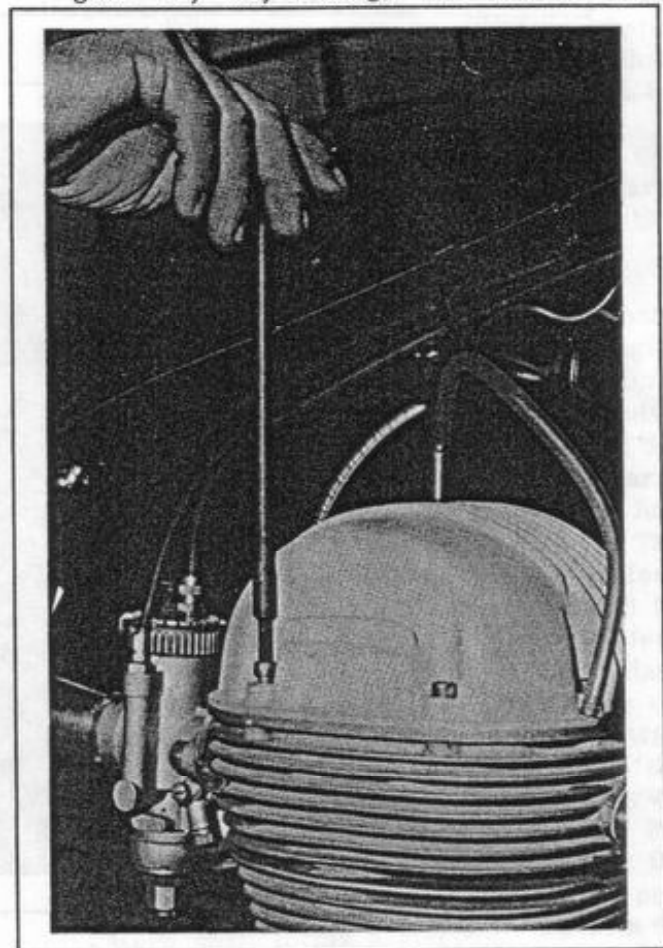


Figure 32.



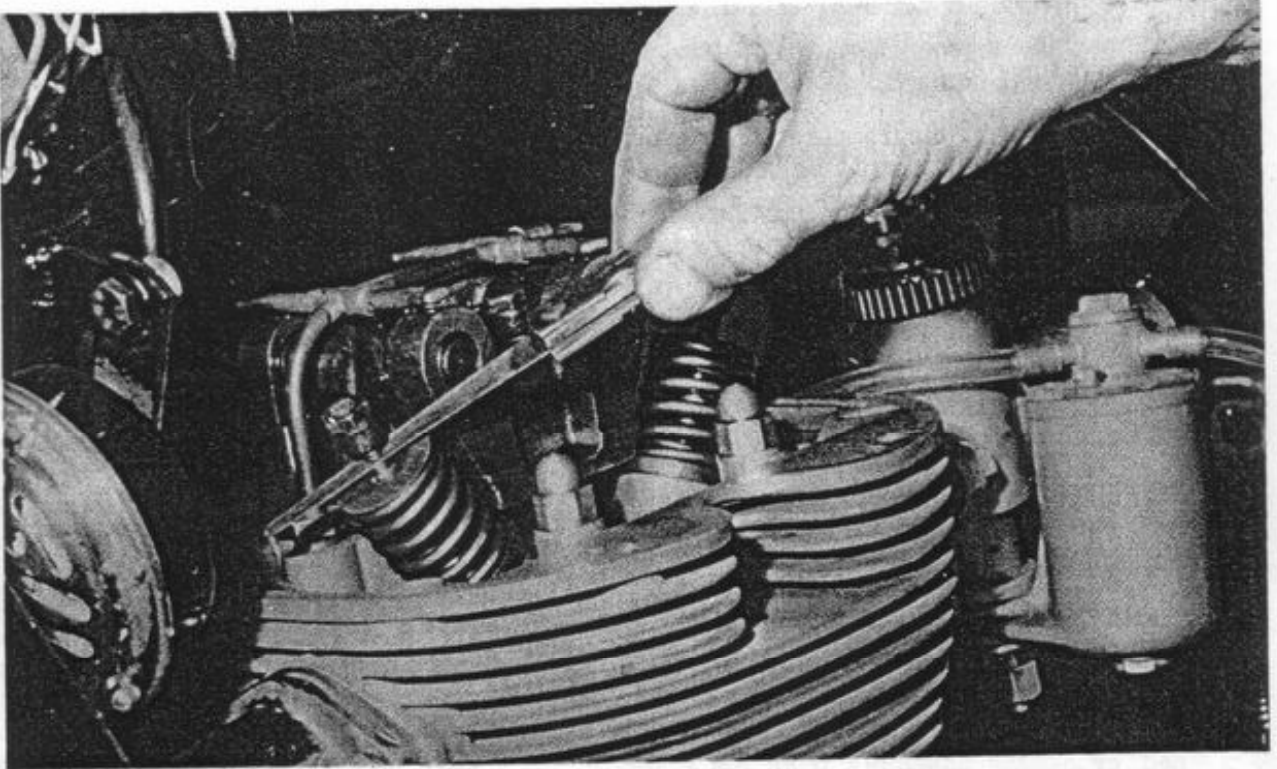


Figure 33.

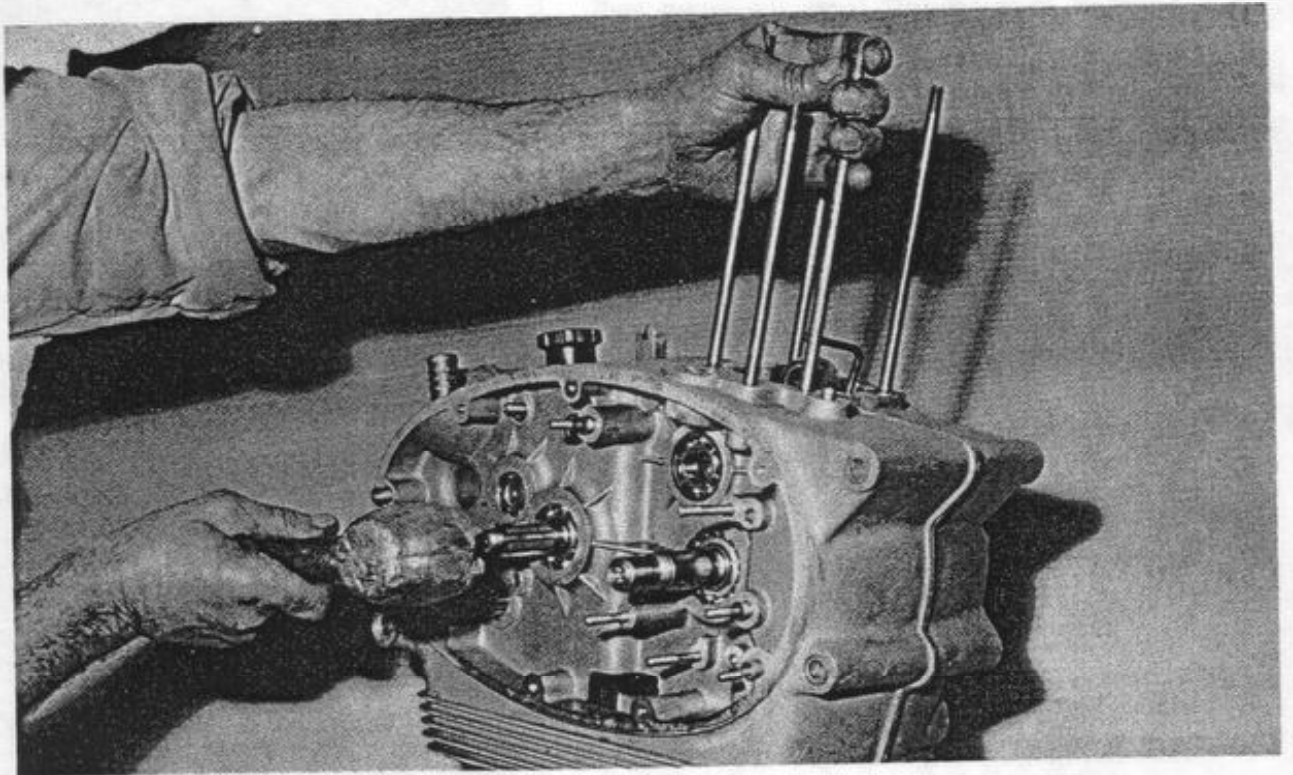


Figure 34.



(camshaft) gear, 34; to the clutch body (gear), 48, T2; to the clutch driving discs, 63; to the driven discs, 64; to the clutch clutch disc holder (hub), 49, which is mounted on the primary shaft. From the primary shaft, power passes through one of four pairs of constant-mesh gears. First gear is milled right on the primary shaft and meshes with first, 36, T2, on the secondary shaft. Second primary, 44, meshes with second secondary, 35; third primary, 41 with third secondary, 30; and fourth primary, 40 with fourth secondary, 28. Looking down the gears on the primary shaft from the clutch (right) side to the generator (left) side, the gears get bigger from top to bottom. On the secondary shaft, they go from largest at the top to smallest at the bottom. The sprocket is mounted on the secondary shaft.

Gears are selected as follows: The footshift pedal is clamped onto the "calking holder picket" (gear-change indexing shaft), reference number 8. The shaft turns inside the bushing portion of the cam, reference number 4. The cam is fitted into the right crankcase cover at the factory along with the dowel, reference 5. The dowel is fitted through the smaller hole in the cam into the cover. When the indexing shaft is turned in either direction it moves against spring pressure provided by return spring, 7. The return spring moves the foot shift pedal back to its original position after it is moved in either direction. Pedal movement is limited in either direction by the dowel on which the curved slot in the indexing shaft rides. As the indexing shaft turns, it catches, and turns with it, parts reference-numbered 9 and 10, called right and left "picket calking" (pawl). These pawls ride on ratchets cut into the outside of the gear control quadrant (sector), reference 12. When the footshift is moved down at the front, pawl number 9 is lifted off the ratchet when its pin rides up over the cam. Pawl number 10 catches one of the three notches on its ratchet and moves the sector through a small arc. The sector meshes with the pinion milled onto the shaft gear selector, 15, and the shaft turns a small amount counterclockwise as viewed from the clutch side. A counterclockwise movement of shaft 15

causes a shift to a higher gear. When the footshift pedal is moved down at the rear, pawl 10 rides high on the cam and pawl 9 moves the sector the distance of one ratchet tooth in the opposite direction. When the sector moves forward, thus, the shaft gear selector 15 turns clockwise and a lower gear is selected.

As the shaft gear selector turns, it is indexed by selector pawl 20 riding, under the pressure of spring 21, on the detent grooves cut into the end of the shaft. There are five detent grooves; one each for (going clockwise): first, neutral, second, third and fourth.

There are two cam grooves cut into the shaft gear selector 15. As the shaft is turned, the primary selector fork 18 and secondary selector fork 17 are moved along selector shaft 19 as "spacers" (cam followers) 16 follow the cam grooves in the shaft gear selector. As the selector forks move back and forth along their shaft, they slide gears into position so that first, second, third, fourth or neutral is selected.

The kickstarter gear engages the primary shaft and turns the engine through the clutch.

9. When reassembling the transmission note the following: The primary shaft is longer than the secondary, has a gear cut onto it, and is threaded at the top for the clutch nut. The secondary shaft is threaded on the bottom for the sprocket nut. Of all the gears, the kickstarter gear is the largest and has a ratchet cut into the inner side of it. The two sliding gears are different; one, reference number 41, is smaller and will fit on the primary shaft and the other, reference number 35, fits on the secondary shaft. The two other gears, that slide off the shafts, are smooth on one side. With the above information and following the relationship shown in the exploded views, all gears can be arranged properly. Put the smooth sides of washers against the gears. The gear arrangement on the primary shaft forms a stepped cone with the largest gear at the bottom when assembled on the left (generator - sprocket) crankcase



half. The secondary shaft has the largest gear at the top. The secondary shaft has larger gears than the primary shaft. The small washer on the secondary shaft is placed at the top.

10. Install the kickstarter shaft assembly first.
11. Install assembled primary shaft.
12. Lightly tap the assembled secondary shaft into position. Its position is nearer the kickstarter shaft than the primary shaft. The gears won't turn freely without the selector forks installed.
13. Place the selector forks on the sliding gears.
14. Slide the selector (fork) shaft through the selector forks and into position. It may be installed either end up.
15. To remove the crankshaft-connecting rod assembly, tap the shaft lightly with a soft-faced mallet. If replacement of the assembly is necessary it is replaced as a unit; individual parts of the assembly are provided only on special request (to specially equipped shops such as the Refrigerator Repair Station).
16. If the cycle has more than 10,000 miles on it, clean the oil passages in the crankshaft assembly as follows:
  - a. Remove plugs, reference A, Figure 35.
  - b. Clean passages from A to B and B to C with a wire and flush thoroughly with a petroleum solvent.
  - c. Replace plugs and stake (upset) the heads to prevent them from coming loose.
17. Turn the shaft gear selector as far as it will go counterclockwise to put the transmission in fourth before reassembling the crankcase halves.

#### L. GENERATOR

1. Carry out steps one through five in the preceding Section A.

2. Observe the color coding and wire connections on the generator terminals. Make notations if necessary to make rewiring easier. Disconnect the wires.
3. Straighten the tab on the "retaining plate for generator fixing bolt", reference number 80 in exploded view T.1., and remove the (11 mm.) generator "fixing" bolt, reference 81. Keep the automatic spark advance from turning by putting a wrench over the flat sides of it as shown in Figure 36.
4. Pull off the automatic spark advance, reference 95.
5. Take off the two nuts (10 mm.) securing the generator field coil (and housing assembly), reference 91, to the crankcase.
6. Lift the brushes in the brush holders and pull off the generator field coil housing.
7. Insert pin MM into the generator "fixing" bolt hole and use the "fixing" bolt, with the pin, as a puller to remove the generator armature.
8. When replacing the field coil, be sure to hold the brushes up to clear the armature commutator. Then make sure the brushes are in good condition, make good contact with the armature, and move freely in the brush holders. Replace brushes, holders, and springs if necessary.
9. Reconnect the green (ignition) wire with the condenser wire to the terminal on the points.
10. Connect the white wire to the upper terminal on the left side of the generator housing and the red wire to the lower terminal.

#### M. ENGINE REMOVAL

1. Remove the front seat-mounting bolt and raise the seat for access to the gas tank rear mounting.



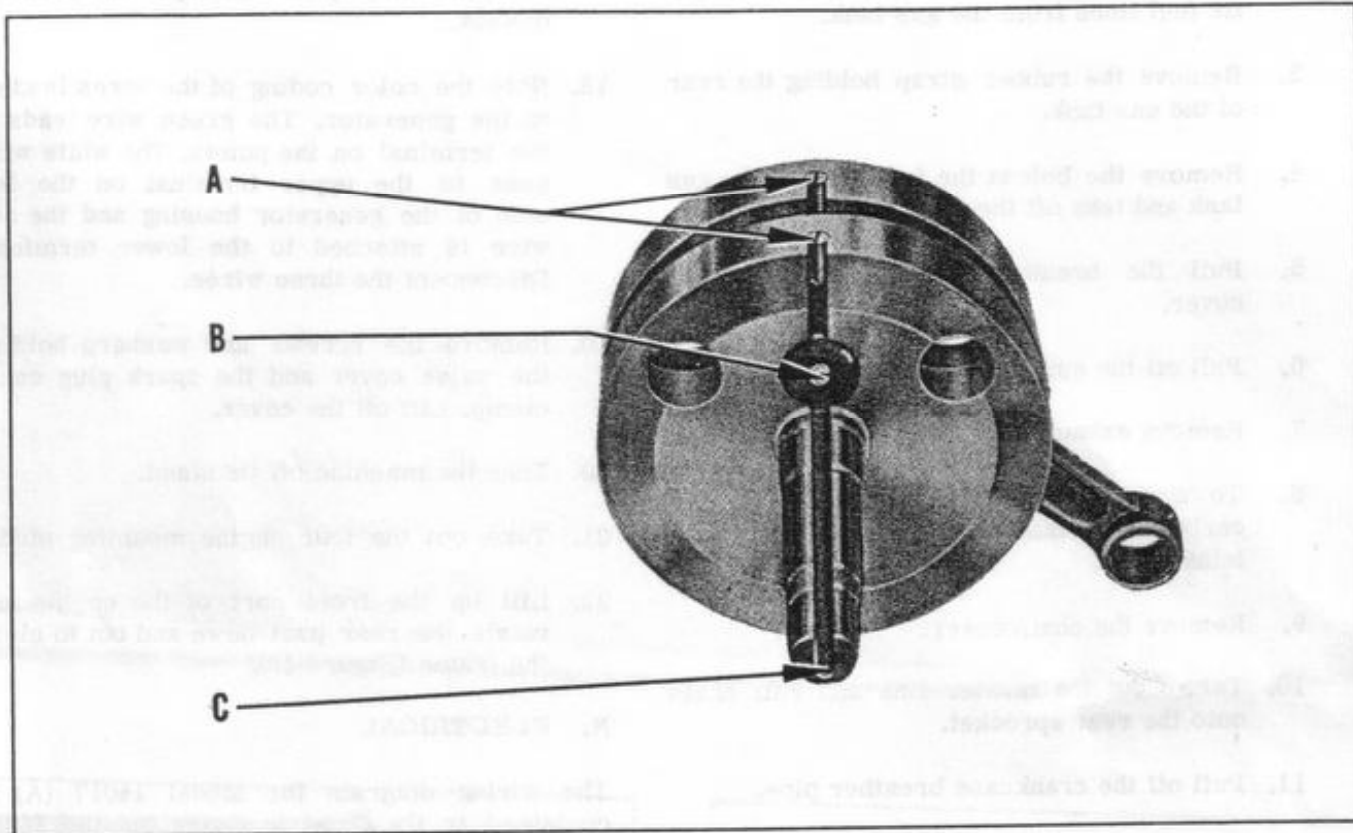


Figure 35.

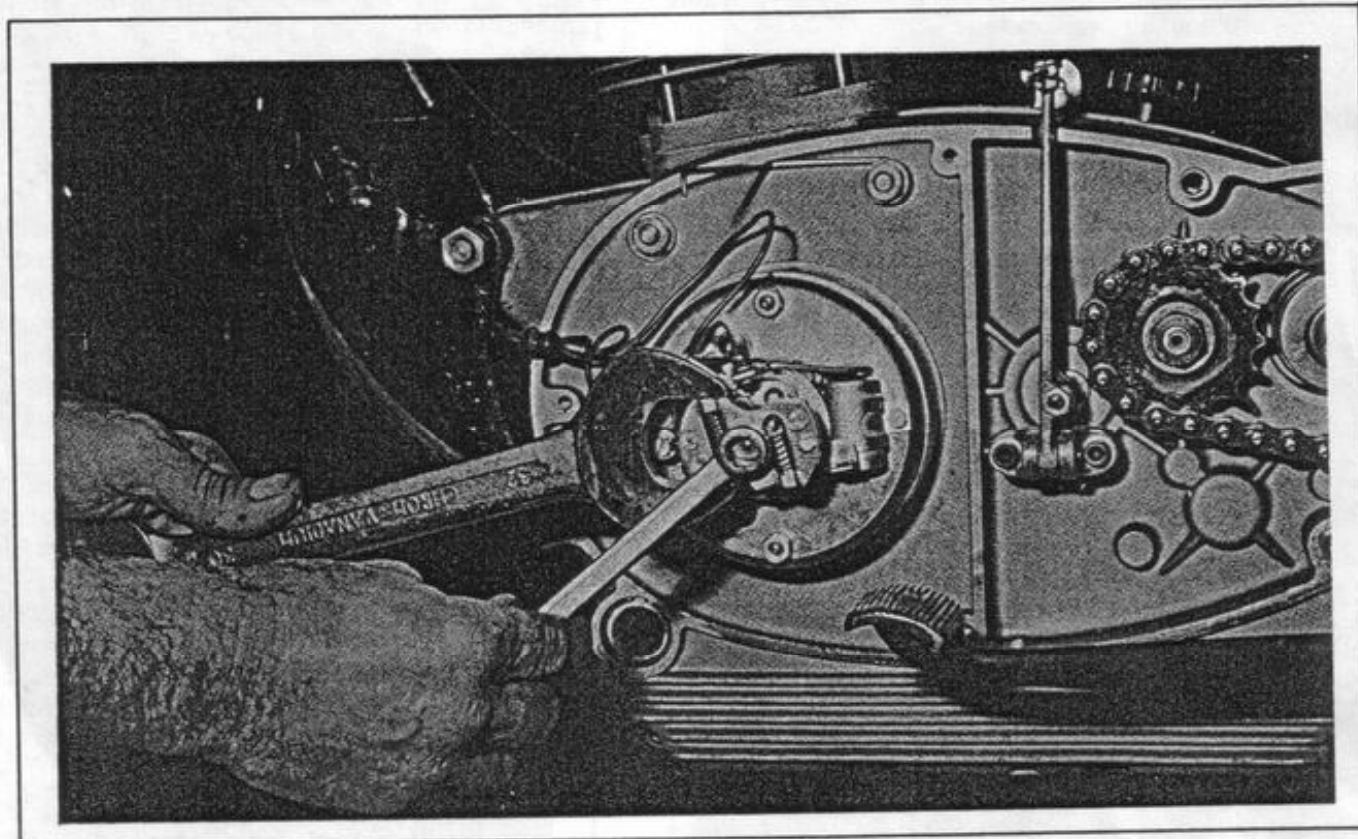


Figure 36.



2. Close the fuel petcocks and pull the plastic fuel lines from the gas tank.
3. Remove the rubber strap holding the rear of the gas tank.
4. Remove the bolt at the front end of the gas tank and take off the tank.
5. Pull the breather tube from the valve cover.
6. Pull off the spark plug lead.
7. Remove exhaust pipe and muffler.
8. To make engine removal easier, loosen carburetor clamp and slip carburetor off intake pipe.
9. Remove the chain cover.
10. Take out the master link and roll chain onto the rear sprocket.
11. Pull off the crankcase breather pipe.
12. Slip the clutch cable end out of clutch control lever and free the clutch cable from the crankcase.
13. Note installed positions of the kickstarter and foot peg arm (for easier replacement in the same positions).
14. Remove the clamping bolt from the kickstarter and slip the pedal off the shaft.
15. Loosen the nut holding the foot peg arm and rotate the arm back to clear the crankcase cover.
16. Adjust the rear brake so that the brake pedal can be held down to clear the crankcase cover. Turn the brake-rod adjusting nut (number 70 in exploded view T.4 in the Owner's Guide) until there is sufficient free travel in the pedal.
17. Use tool A to remove the screws holding the left crankcase cover and slide the cover off the two locating dowels and the kickstarter shaft (Figure 37). Note that the two screws on the right side, upper and lower, are longer than the other three because they pass through the locating dowels.
18. Note the color coding of the wires leading to the generator. The green wire leads to the terminal on the points. The white wire goes to the upper terminal on the left side of the generator housing and the red wire is attached to the lower terminal. Disconnect the three wires.
19. Remove the screws and washers holding the valve cover and the spark plug cable clamp. Lift off the cover.
20. Take the machine off its stand.
21. Take out the four engine mounting studs.
22. Lift up the front part of the engine and rotate the rear part down and out to clear the frame (Figure 38).

#### N. ELECTRICAL

The wiring diagram for Model 14017 (A) is contained in the Owner's Guide for the 14017 (A) assembled with this manual. Refer to Figure 39 for the wiring diagram for Models 14017B, 14020 (A) and 14023 (A).

#### O. CARBURETOR

Type — Dell 'Orto, UB 24 BS2; throttle needle, standard adjustment — middle reference mark; main jet — 102; choke — manual. The carburetors on the machines covered by this manual are assembled and adjusted at the factory for average use, and the engine will operate efficiently over a wide range of normal conditions.

##### 1. Idle Adjustment

The idle adjustment will not affect the performance of the engine under load but will affect the ease with which it can be started. Since the engine must be hot to properly make the final adjustment, a preliminary adjustment may be necessary to get the engine started. An approximate setting can be made by turning the idle (air) adjustment screw (reference number 123, T.1, in the Owner's Guide) all the way in (clockwise) and backing it out about

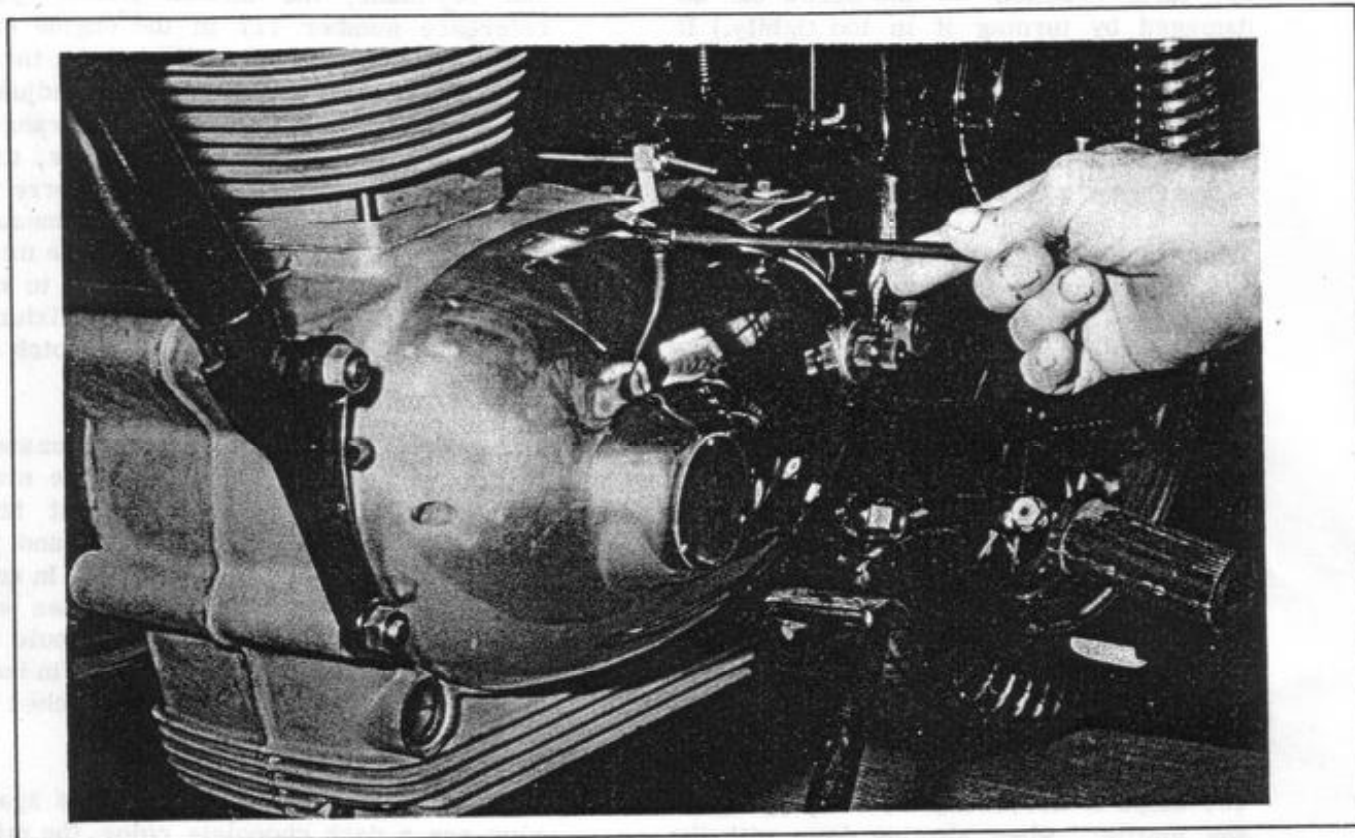


Figure 37.

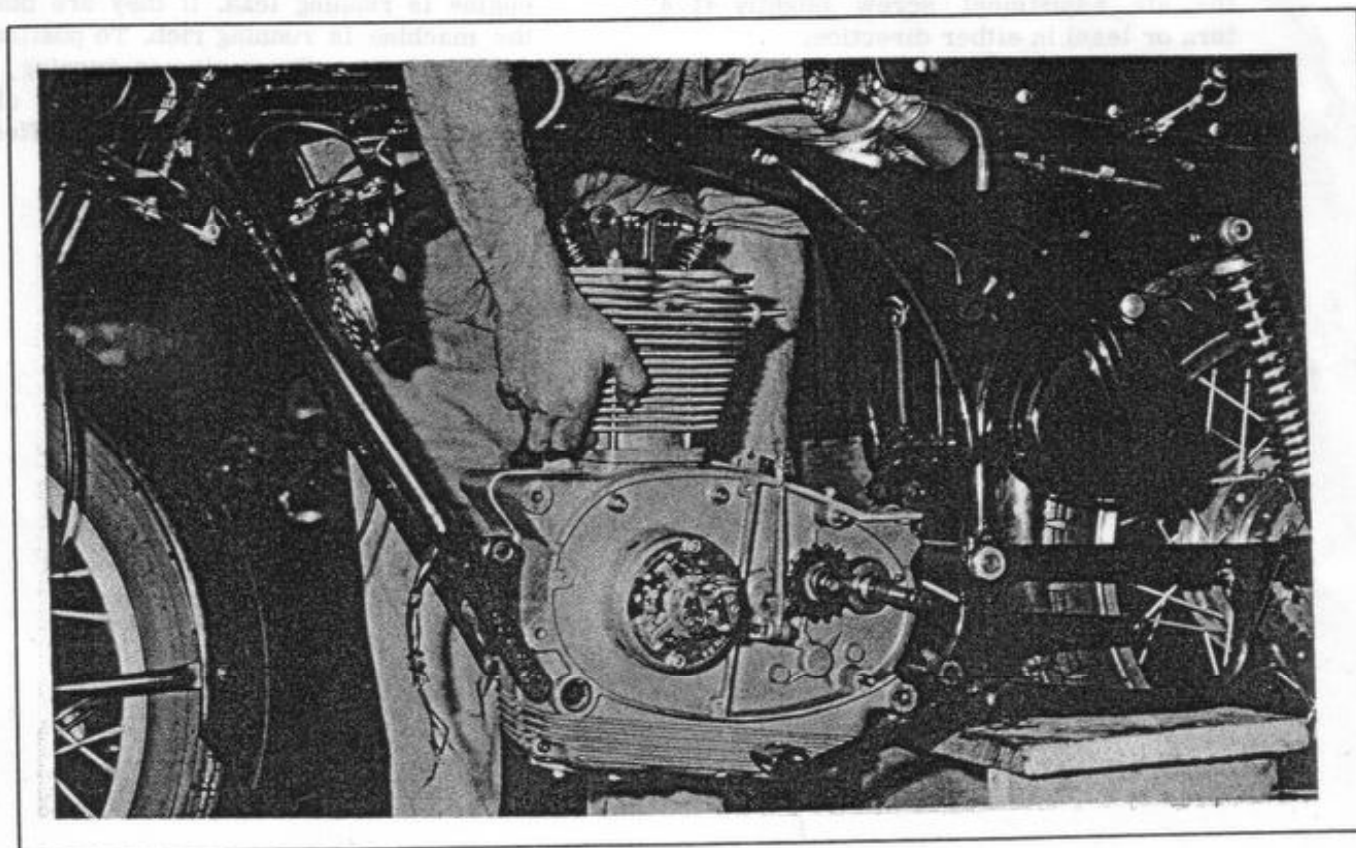


Figure 38.





one turn. (Caution — the screw can be damaged by turning it in too tightly.) If the engine refuses to start, a push-start may be necessary. Be sure the fuel tank cut-off is open and the battery bypass switch is set. See number 7 on page 10 of the Owner's Guide.

After the engine has started and warmed, set the throttle stop adjustment screw (Reference Number 121) at a slightly fast idle. Turning clockwise will increase the R.P.M.

Turn idle (air) adjustment screw, Reference Number 123, out toward lean until the engine runs roughly and then in toward rich until it runs roughly again. Find the point (about midway between) where the engine runs most smoothly.

Adjust the throttle stop adjusting screw, 121 to correct idle speed; and then, reset idle (air) adjusting screw. Readjust throttle stop again if necessary. Repeat these last two steps if necessary. Some "popping" in the muffler, when slowing down with the throttle closed, can be reduced by turning the air adjustment screw slightly (1/4 turn or less) in either direction.

## 2. Operating Speeds

At operating speeds only one adjustment

can be made; the throttle needle (pin, reference number 117 in the engine exploded view) may be adjusted to three different positions. However, this adjustment is effective only in the middle ranges of the throttle openings. Therefore, this adjustment has limited value as a corrective measure to compensate for unusual conditions of operation. To make the mixture "richer," move the needle up to the bottom notch. To "lean out" the mixture, move the needle down to the top notch of the three positions.

At higher altitudes or in extreme climates, it may be necessary to change the main jet. Number 102 is standard. At high altitudes, machines will run rich, and jet number 101 should be substituted. In cold climates and wooded areas machines will run lean, and jet number 104 should be substituted. The jet numbers (size in hundredths of millimeters) are die punched on each jet.

Generally, if the electrodes on the spark plug are a dark chocolate color, the mixture is correct. If they are light grey, the engine is running lean. If they are black, the machine is running rich. To positively determine how the engine is running, the spark plug must be examined only after cutting the engine immediately after a five-minute wide-open run.

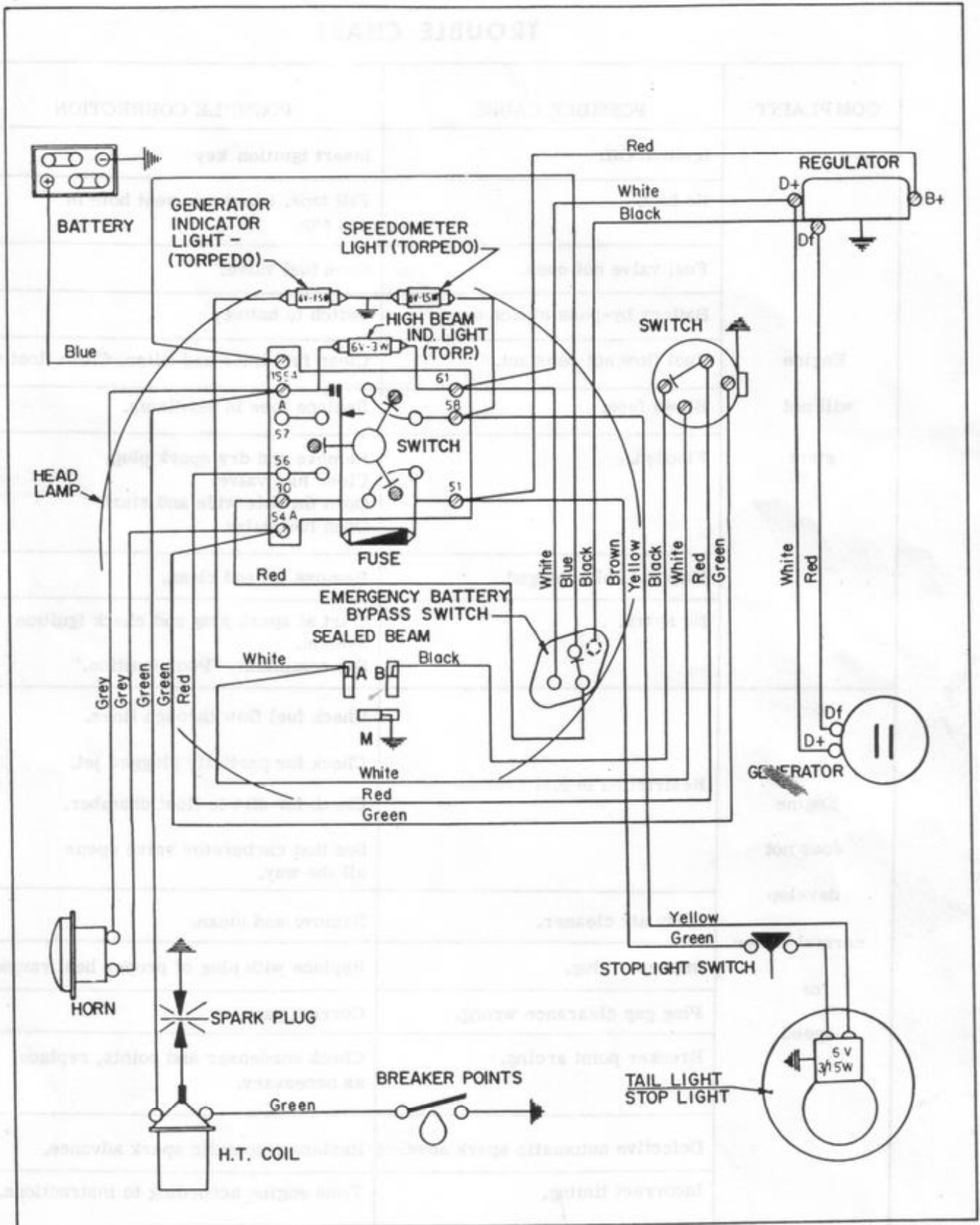
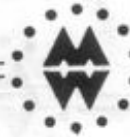


Figure 39. Wiring Diagram - Models FFA-14017B, 14020 and 14023

  
**CHAPTER III**  
**TROUBLE CHART**

COMPLAINT	POSSIBLE CAUSE	POSSIBLE CORRECTION
Engine will not start	Ignition Off.	Insert ignition key
	No fuel.	Fill tank. Check air vent hole in gas cap.
	Fuel valve not open.	Open fuel valve.
	Battery by-pass switch on	Switch to battery.
	Fuel flow not constant.	Clean fuel lines and filter. Clean float valve
	Blown fuse.	Replace fuse in headlamp.
	Flooded.	Remove and dry spark plug. Close fuel valve. Open throttle wide and start. Open fuel valve.
	Main jet hole clogged.	Remove jet and clean.
Engine does not develop normal power or speed	No spark.	Start at spark plug and check ignition system. See complaint, "Poor Ignition."
	Restriction in fuel system.	Check fuel flow through lines. Check for partially plugged jet. Check for dirt in float chamber. See that carburetor valve opens all the way.
	Dirty air cleaner.	Remove and clean.
	Improper plug.	Replace with plug of proper heat range.
	Plug gap clearance wrong.	Correct gap.
	Breaker point arcing.	Check condenser and points, replace as necessary.
	Defective automatic spark advance	Replace automatic spark advance.
	Incorrect timing.	Time engine according to instructions.





COMPLAINT	POSSIBLE CAUSE	POSSIBLE CORRECTION
Engine does not develop normal power or speed (Cont'd)	Air leaks.	Torque cylinder head nuts and tighten carburetor screws and nuts.
	Worn piston rings.	Replace rings.
	Poor valve seating.	Grind or replace valves.
	Wrong main jet for conditions.	Change jet according to Manual.
Poor ignition	Breaker points dirty.	Replace.
	Breaker points out of adjustment.	Adjust according to instructions.
	Breaker points not matching.	Adjust so that point surfaces match exactly.
	Poor breaker contact pressure.	Replace points.
	Poor connections at terminal or cables.	Inspect connections and tighten.
	Defective condenser.	Replace condenser.
Engine misfires	Breaker arm sticking on its pin.	Free breaker arm and lubricate.
	Defective condenser.	Replace condenser.
	Ignition coil shorted.	Replace coil.
	Loose connections at cables.	Inspect cables, terminals, and connections. Tighten as required.
Engine knocks	Plug is wrong type. May be too hot.	Replace with correct type plug.
	Ignition advanced too far.	Check timing.