HONDA

SERVICE MANUAL

61-68

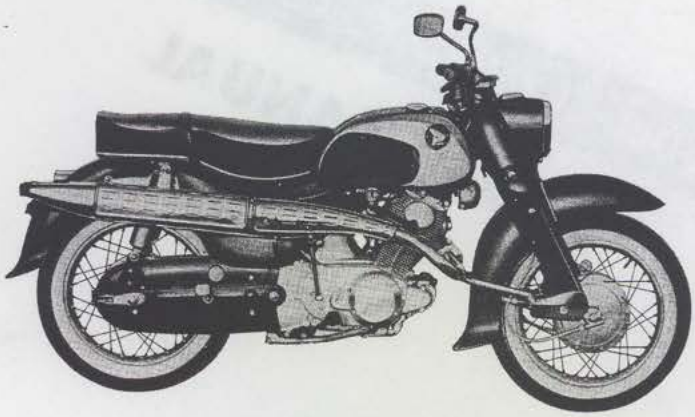
C/CS/CB 72/77

MODEL C72/C77 CS72/CS77 CB72/CB77

SHOP MANUAL

HONDA MOTOR CO., LTD.

HONDA 250 MODEL C72



HONDA 250 MODEL CS72

HONDA 250 MODEL CB72

PREFACE

This Shop Manual contains general data and information, and procedures relative to motorcycle maintenance, over-haul and repairs for the models covered by Honda 250 and Honda 300 equivalent to Model C72·C77, CB72·CB77, CS72·CS77.

Therefore, information in this manual will be suitable instruction for servicemen and mechanics of Honda to assist them to efficiently service and repair these machines.

Now, in this case, mechanical arrangement means to repair a motorcycle when it is out of order and restore ti to the ordinary state as well as to prevent it from any trouble by periodically inspecting the motorcycle.

The contains of this book are divided into five chapters, including main standards, disassembly-assembly, construction,wiring diagram and trouble shooting.

Each chapters are separated into sections. Disassembly-assembly (the 2nd chapter) is divided into 2 sections-Engine and Frame. The section of Engine is described both model C72·77, CB72·77, but that of Frame is done only model CB72·77.

In regard to the Frame of model C72·77, please refer to the previously published Shop Manual for Honda 125·150.

An effort has been made to produce a manual avoiding fundamental principle and theory by explaining the actual mechanism.

Special emphasis has been placed on illustrations and charts to make it easy for the service man to understand without reading every line. We hope this will be of some use to you.

This manual will be revised without notice.

January, 1960.

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MAINTENANCE STANDARDS,C72·77

For maintenance operation for HONDA 250·300, Maintenance Standards, specification and dimension are listed hereafter for reference.

EXPLANATION:

Maintenance Items Items to be inspected, service-wise.

Standard Value This indicates the manufacturer's standard size or the standard size after newly assembling or adjusting, and shows the size-limit of completed part in the permissible limit of adjustment.

Repairing Limit Unusable wear limit of parts requiring correction or replacement, function-wise.

Remarks Unmarked numbers are run unit and inch unit shown underneath, and others according to the unit indicated.

UNIT IN CHART:

Unmarked numbers are m/m unit and inch unit shown underneath, and others according to the unit indicated.

CONTENTS

MAINTENANCE STANDARDS (Model C72)

This maintenance standards is listed only about the data of Model C72. In this list, dimentions without units indicate "mm" (upper step) and "inch" (down step), and others according to the units indicated.

1. GENERAL PERFORMANCE

Item		Standard	Repairing Limit	Remarks
Compression pressure		8.5kg/cm² 120.87 lb/in²	7.0 99.54 lb/in²	Check with kick
Fuel consumption		42~45km/ℓ 26.04~27.90 mile/ℓ	29 17.98	35km/h(21.7mile/h)
Lubricant consumption		120cc/1000km or less 120cc/620mile	200/1000 more 200/620mile	
Max. speed		130km/h 80.60mile/h	90 less 55.80mile/h	The posture is leaning forward one thirds of the body

2. ENGINE

A. Cylinder, Cylinder Head

Item		Standard	Repairing Limit	Remarks
Cylinder	Inner dia.	53.99~54.00 2.1255~2.1259	54.1 more 2.129	
	Max. out of round	within 0.001	0.05 more 0.00019	
	Taper	within 0.001	0.05 more 0.00019	
Over size of cylinder	Over size	0.25 0.00984		3 category of 0.25 (0.0098) over size
Cylinder head valve sheet	Width	1.0~1.5 0.0393~0.0590	2.0 more 0.0787	
	Angle	45°		
Compression ratio		8.3 0.326		The capacity of the combustion chamber, 16.94cc
Cylinder head gasket surface	Flatness	within 0.03 0.0011	0.06 more 0.0023	
Cylinder head gasket	Thickness	1.0~1.1 0.039~0.043		In case of binding
Cylinder stut nut	Tightness	2.1 m-kg 15.189 ft-lb		

B. Crank Shaft (Piston, Connecting Rod)

Item		Standard	Repairing Limit	Remarks
Piston	Top diameter	53.55~53.60 2.108~2.110	53.5 less 2.106	The progressive direction of the lower parts of skirt
	Max. dia.	$54^{+0}_{-0.02}=D$	53.9 less 2.122	
	Out of round	D−(0.14~0.16)=d D−(0.005~0.006)=d		
Piston & cylinder	Min. clearance	0	0.1 more 0.0039	
Piston pin	Dia.	15.0~15.0006 0.59~0.5907	15.05 more 0.5925	
Piston over size	Over size	0.25 0.0098		3 category of 0.25 (0.0098) over size
	Taper	D−0.08d−0.08 D−0.0031d−0.003		
Top·2nd ring	Thickness	2.4~2.6 0.094~0.102	2.3 less 0.0905	
	Width	1.780~1.795 0.0700~0.0706	1.7 less 0.0669	
	Tension	0.75~1.05kg(top) 0.70~1.00kg(2nd)	0.6kg less	Tangential tension
		1.653~2.315 lb 1.543~2.205 lb	1.3230 less	In case of binding
	End gap	0.15~0.35 0.0059~0.0137	0.8 more 0.0314	
Top·2nd ring & ring groove	Clearance	0.01~0.04 0.0003~0.0015	0.1 more 0.0039	
Oil ring	Thickness	2.4~2.6 0.0944~0.1023	2.0 less 0.0787	
	Width	2.780~2.795 0.1094~0.1100	2.7 less 0.10629	
	Tension	0.7~0.9kg 1.5435~1.9845 lb	0.5 less 1.1025 lb	Tangential tension
	End gap	0.1~0.3 0.0039~0.0118	0.8 more 0.0314	In case of binding
Oil ring & ring groove	Clearance	0.01~0.04 0.0003~0.0015	0.1 more 0.0039	
Piston over size	Over size	0.25 0.0098		3 category of 0.25(0.0098) over size
Piston pin	Out. dia.	14.994~15.0 0.5903~0.5905	14.95 less 0.5885	
	Total length	45.5~45.7 1.7913~1.7992		

Item		Standard	Repairing Limit	Remarks
Piston pin & piston	Clearance	0~0.012 0~0.0004	0.05 more 0.00196	In cold, push in softly by fingers
Connecting rod small end	In. dia.	15.016~15.043 0.5911~0.5922	15.08 more 0.5936	
Con. rod small end & piston pin	Clearance	0.016~0.049 0.0006~0.0019	0.08 more 0.0031	
Con. rod small end	Swing		3.0 more 0.118	Max. amplitude to axial direction of crank pin
Lower end of con. rod	Axial clearance	0.07~0.33 0.0027~0.012	0.5 more 0.0196	
	Diagonal clearance	0.006~0.016 0.0002~0.0006	0.05 more 0.00196	
Big end·small end of con. rod	Amount of parallel	within 0.02 0.00078	over 0.1 0.0039	At length of 100mm (3.93in)
	Distortion	within 0.02 0.00078	over 0.1 0.0039	At length of 100mm(3.93in)
Baranser weight crankpin	Out. dia.	24.99~25.00 0.9838~0.9842	24.95 or less 0.9822	
R. L. crank shaft	Dia. of shaft	30.82~30.86 1.213~1.214	30.6 or less 1.204	
Crank shaft bearing	Axial clearance	0.005 0.00019	over 0.1 0.0039	Center bearing
	Radial clearance	0.014~0.016 0.0005~0.0006	over 0.05 0.0019	
Crank shaft combination	Max. swing	0.03 less 0.0011	over 0.1 0.0039	In case of supporting center bearing, the swing of both ends
Cam chain	Overall length	723.0~723.8 28.46~28.49	over 728 28.66	

C. Cam · Timing and Valve Mechanism

Item		Standard	Repairing Limit	Remarks
Ex. In. valve guide	In. dia.	7.0~7.01 0.2755~0.2759	over 7.05 0.2775	
Ex. valve	Overall length	88.65~88.85 3.490~3.498	88.2 or less 3.472	
	Out. dia. of stem	6.97~6.98 0.2744~0.2748	6.95 or less 0.273	
	Thickness of head	1.0 0.03937	0.5 or less 0.01968	
In. valve	Overall length	8.9.18~89.38 3.511~3.518	88.7 or less 3.492	
	Out. dia. of stem	6.97~6.98 0.2744~0.2748	6.95 or less 0.273	

Item		Standard	Repairing Limit	Remarks
	Thickness of head	1.0 0.03936	0.5 or less 0.019	
Ex. In. valve	Width	1.0~1.5 0.0393~0.059	over 20 0.787	
Ex. valve stem and guide	Clearance	0.02~0.04 0.0007~0.0015	over 0.08 0.0031	
In. valve stem and guide	Clearance	0.01~0.03 0.00039~0.0011	over 0.07 0.00275	
Valve spring outer	Free length	43.82 1.725	42.3 or less 1.665	
	Tension	11.6~12.4kg 24.2~25.8kg 25.57~27.3 lb 53.36~56.8 lb		At 34.5mm(1.35) of binding length At 27.5mm(1.08) of max. lift
Valve spring outer	Decline	within 1. 0.03937	1.5 more 0.059	
Valve spring inner	Free length	34.66 1.364	33.4 less 1.314	
	Tension	3.9~4.3kg 14.5~15.5kg 8.59~9.48 lb 31.97~34.17 lb		At 31.5mm(1.24) of binding length At 24.5mm(0.96) of max. lift
	Decline	within 1. 0.0393	1.5 more 0.059	
Cam shaft	Shaft dia.	19.98~19.99 0.786~0.787	19.95 less 0.785	
	Bend of shaft	within 0.01 0.0003	0.05 more 0.0019	
	Height of cam	26.98~27.02 1.062~1.063	26.7 less 1.051	
		(−) (+)		
Cam shaft and bearing of journal	Clearance	0.003~0.03 0.00011~0.0011	0.08 more 0.0031	
Valve timing Ex. (at 1.1mm (0.043) of Lift length)	Opening angle	before lower dead point 25°	±5°	P. 6 cam
	Closing angle	after upper dead point 10°	±5°	Non-clearance
Valve timing In. (at 1.1mm(0.043) of Lift length)	Opening angle	before upper dead point 10°	±5°	P. 6 cam
	Closing angle	after lower dead point 25°	±5°	Non-clearance
Cam sprocket	Bottom diameter	74.766 2.943	74.2 less 2.922	
Rocker arm	To fix steps on slipper face		0.3 more 0.0118	In case of having some trouble on slipper surface

Item		Standard	Repairing Limit	Remarks
	In. dia.	130~13.027 0.511~0.512	13.1 more 0.515	
Rocker arm crankpin	Out. dia.	12.966~12.984 0.510~0.511	12.9 less 0.5078	
	Clearance to rocker arm	0.16 ~0.61 29 0.006~0.024	0.1 more 0.0039	
Ex. In. valve adjust	Tappet clearance	0.09~0.11 0.0035~0.0043	out of standard	Cool state
Cam chain tensioner spring	Free length	73 2.874	70 less 2.755	
	Tension	16.0~16.2kg 35.28~35.71 lb	10 less 22.05	
Cam chain tensioner roller	Out. dia.	59.2~59.8 2.33~2.35	58.5 less 2.303	Without injury of rubber

D. Upper Crank Case

Item		Standard	Repairing Limit	Remarks
Hole, shift drum	In dia.	34.0~34.02 1.338~1.339	34.2 more 1.346	
	In dia. of axle	12.0~12.01 0.472~0.473	12.2 more 0.4803	
Cam chain guide roller pin	Out. dia.	13.966~13.984 0.549~0.550	13.9 less 0.547	
Chain guide roller	In. dia.	14.0~14.01 0.5511~0.5515	14.1 more 0.5551	

E. Clutch · L. Crank Case Cover

Item		Standard	Repairing Limit	Remarks
Clutch center	In. dia.	25.0~25.021 21.0~21.084	24.9 20.9 less	
		0.984~0.985 0.826~0.830	0.980 0.822	
	Out-round swing	within 0.1 0.0039	0.2 more 0.0078	
Primary drive sprocket	Bottom diameter	39.11~39.21 1.5397~1.5436	38.3 less 1.5078	
Clutch friction disc	Thickness	4.8~ 4.9 0.1889~0.1929	4.4 less 0.1732	
	Strain	within 0.2 0.0078	0.5 more 0.0196	

Item		Standard	Repairing Limit	Remarks
Clutch plate	Strain	within 0.2 0.0078	0.5 more 0.0196	
	Width of hook	13.7~13.8 0.5393~0.5433	13.0 less 0.5118	
Teeth and outer of clutch pressure plate	Rotary play	within 0.2 0.0078	0.8 more 0.0314	
Clutch spring	Free length	33.4 1.3149	32.4 less 1.2755	
	Tension	15.3~16.7kg 19.8kg 33.736~36.823 lb 43.659lb	15.0 less (23.075)	At 25mm (0.98) of binding length At 23mm (0.90) of max. lift

F. Transmission

Item		Standard	Repairing Limit	Remarks
Mission case lubricating oil	Capacity	1.5ℓ 0.396 gal U.S.	out of standard	In crank and mission
Main shaft	Out dia.	24.959~24.98 0.9826~0.9834	24.9 less 0.980	
Main shaft and M2 gear	Clearance	0.07~0.074	0.1 more 0.0039	
Axial direction of main shaft	Clearance	0.1~0.75 0.0039~0.0295	1.2 more 0.0472	
Turning direction of M3 gear	Clearance	0.03~0.078 0.0011~0.0030	0.1 more 0.0039	
Teeth surface of gear relating to mission	Axis play	0.089~0.178	0.2 more 0.0078	
Top gear bush 18ϕ	In. dia.	18.0~18.018 0.708~0.709	18.1 more 0.712	
Top gear bush 20.5ϕ	In. dia.	20.5~20.52 0.8070~0.8078	20.6 more 0.811	
Top gear bush & main shaft	Clearance	0.04~0.082 0.0016~0.0032	0.1 more 0.0039	
Drive sprocket	Bottom dia.	71.5~71.51 65.649~65.776 2.814~2.815 2.584~2.589	70.5 tess 64.7 less 2.77 2.54	
	Rotary play	0.03~0.078	0.5 more 0.019	Spline parts
Primary driven sprocket	Bottom dia.	136.06~136.16 5.356~5.360	135.3 less 5.326	
Main shaft & top gear bearing	Axis play	0.005	0.1 more 0.0039	

Item		Standard	Repairing Limit	Remarks
	Radius play	0.01～0.02	0.05 more	
Counter shaft	In. dia.	24.37～24.38 4	24.4 more 0.960	
	In. dia.	0.959～0.9598 17.084～17.134 0.672～0.674	17.2 more 0.677	
Bush	Out. dia.	17.094～17.112 0.672～0.673		
	In. dia.	14.413～14.431 0.567～0.568	14.45 more 0.5688	
Counter shaft & bush	Clearance	0.028～0.04 0.0011～0.0015	0.1 more 0.0039	
Counter shaft & C2 gear	Rotary play	0.01～0.098 0.00039～0.0038	0.5 more 0.0196	
Low gear bush	In. dia.	17.13～17.15 0.674～0.675	17.2 more 0.677	
Low gear bush & 14mm bush	Clearance	0.02～0.058 0.00078～0.0022	0.1 more 0.0039	
Kick starter spindle	Out. dia.	14.341～14.353 0.564～0.565	14.25 less 0.561	
Kick starter spindle & each bush	Clearance	0.06～0.09 0.0023～0.0035	0.15 more 0.0059	
Kick spindle pole	R-part		with step 0.3 more 0.0118	
Kick spindle pole spring	Free length	14 0.5511		
Primary chain	Loosing	5～10 0.1968～0.3937	2.0 less 0.787	

G. Magneto, Contact Point

Item		Standard	Repariring Limit	Remarks
Contact breaker arm spring	Tension	0.2～0.4 0.85～1.05kg 0.441～0.882 1.847～2.315		In case of 24.5..m (0.964) of binding length
Contact point	Gap	0.3～0.4 0.0118～0.0157	out of standard	In case of 25.9mm (1.019) of max. lift
Ignition timing	Crank angle	after upper dead point 5°		
Spark advancer ; beginning of advance angle	Rotary number	1100r.p.m.		
Spark advancer ; end of advance angle	Rotary number	3000r.p.m.	out of standard	

Item		Standard	Repairing Limit	Remarks
Spark advancer ; max. advance angle	Crank angle	40°	37° ~ 43°	
Magneto spark character	3 needle gap	8mm more 0.3149	7 less 0.2755	By kick
Magneto charging character	Charge current	2.0A ~ 3.0A	2A less	(500 ~ 800r.p.m.) At 3000r.p.m.
Dynamo starter & rotor	Gap	0.5 0.0196	0.8 more 0.0314	Air-gap (in radius)

H. Oil Pump · Oil Filter

Item		Standard	Reparing Limit	Remarks
Oil pump drive gear	Gearing eccentric	0.063 less	0.1 more 0.0039	
Oil pump drive gear & center crank gear	Back lash	0.01 less 0.0039	0.5 more 0.0196	Adjust by packing
Oil pump packing	Thickness	0.4 0.0157		In case of binding
Addendum and internal wall of oil pump gear	Clearance	0.025 ~ 0.05 0.00098 ~ 0.0019	0.1 more 0.0039	
Oil pump gear	Back lash	0.106 ~ 0.210 0.0041 ~ 0.0082	0.5 more 0.0196	
Side and side cover of oil pump gear	Clearance	0.089 ~ 0.04 0.00350 ~ 0.0330	0.15 more 0.0059	
Gear pin and gear	Clearance	0.05 ~ 0.13 0.0019 ~ 0.0051	0.1 more 0.0039	
Oil filter shaft and oil filter rotor	Clearance	0.012 ~ 0.048 0.000472 ~ 0.00188	0.1 more 0.0039	
Oil filter rotor	Out. dia.	57 2.244		
Oil filter chain	Loosing	5 ~ 10 0.196 ~ 3.937	15 more 5.905	

I. Kick · R. Crank Case Cover

Item		Standard	Repairing Limit	Remarks
Kick starter joint & hole of crank case cover	Clearance	0.08 ~ 0.205 0.00314 ~ 0.0080	0.5 more 0.0196	
Kick starter spring	Torque	47.6km-kg 344.290ft-lb	40 less 289.32	In case of use

J. Under Crank Case and Change

Item		Standard	Repairing Limit	Remarks
Shift drum	Out. dia.	33.95~33.97 1.336~1.337	33.9 less 1.334	
	Out. dia. of axial part	11.966~11.984 0.4722~0.4718	11.9 less 0.4685	
Shift drum & hole of crank case	Clearance	0.025~0.075 0.00098~0.0029	0.2 more 0.00787	
Shift drum	Groove width	8.50~8.515 0.334~0.335	9.0 more 0.354	
Shift fork	In. dia. of hole	34.0~34.02 1.338~1.339	34.1 more 1.34	
	Thickness at end	4.9~5.0 0.1929~0.1968	4.5 less 0.177	
Setting stud bolt of upper, under crank case	Bend at end	0.1 within 0.0039	0.8 more 0.031	
	Torque	0.5~0.7m-kg 3.616~5.063ft-lb	out of standard	D6×P1.0
Stud	Torque	1.7~2.0m-kg 12.29~14.46ft-lb		D8×P1.25

3. FRAME

A. Handle

Item		Standard	Repairing Limit	Remarks
Throttle grip	Play	2~4 0.0787~0.157	out of standard	Check by external periphery
Throttle wire difference between outer & inner	Length	61 2.4015		
Brake lever	Play	25~30 0.984~1.181	out of standard	Check by lever end
Clutch wire ditto	Length	118 4.645		Check by lever end
Clutch lever	Play	15~25 0.590~0.984	out of standard	

B. Front Cushion

Item		Standard	Repairing Limit	Remarks
Front cushion under bush	Out. dia.	26.04~26.07 1.025~1.026	out of standard	
Pivot bush & suspension arm	Clearance	0.037~0.08 0.1014~0.00314		
Pivot collar	Overall length	24.5~24.6 0.964~0.968		
Pivot bush & collar	Clearance	0.016~0.07 0.00062~0.0027	0.3 more 0.0118	
Front cushion	Stroke	60.3 2.374		
Front cushion damper	Damping force	38~45kg 83.79~99.22 lb	20 less 44.10	by 0.5m/sec (19.68in) of piston
	Oil capacity	39cc	25 less	White spindle oil #60
Front cushion spring	Free length	278.8 10.976	268 less 10.551	
	Tension	127.5kg 281.13 lb	110 less 242.55	
	Fall	1° within	out of standard	

C. Front Fork · Steering · Fuel Tank

Item		Standard	Repairing Limit	Remarks
Steering head stem nut	Torque	6.5~7.5m-kg 47.014~54.2ft-lb	out of standard	
Steering head	Angle	90°		Angle between trident and head pipe
Caster		60°		
Trail		75 2.952		
Fuel tank	Capacity	11.8ℓ 3.117 gal U.S.		

D. Frame Body

Item		Standard	Repairing Limit	Remarks
Steel ball	Out. dia.	1/4" 0.0098		
Rear fork pivot bolt	In. dia.	12.2~12.3	12.6 more	
bush		0.480~0.480	0.496	

E. Saddle · Stand

Item		Standard	Repairing Limit	Remarks
Side & main stand	Max. tension	38kg 83.790 lb		
spring				
Brake pedal	Food width	20~30 0.787~1.181	out of standard	

F. Rear Fork · Chain Case

Item		Standard	Repairing Limit	Remarks
Rear brake torque link	Hole	12.1~12.2 0.467~0.480	12.4 more 0.488	
end				
Rear fork pivot bush	Out. dia.	28.0~28.03 1.102~1.103		
Drive chain	Amount of sag	10~20 0.393~0.787	out of standard	95 teeth

G. Rear Cushion

Item		Standard	Repairing Limit	Remarks
Rear cushion	Stroke	61 2.401		
Rear cushion damper	Damping force	50~56kg 110.25~123.48 lb	30 less 60.15	At 0.5m/sec (19.68) of piston
	Oil capacity	39cc	30 less	White spindle oil #60
Rear cushion spring	Free length	218.4~218.9 8.598~8.618	207 less 8.149	
	Tension	150~166kg 330.75~366.03 lb	143kg less 315.315 lb	
	Tangential angle	1° within	out of standard	

H. Front Wheel

Item		Standard	Repairing Limit	Remarks
Front wheel hub ball bearing	Axial play	0.005 less	0.1 more 0.00393	
	Radial play	0.01 ~ 0.02	0.05 more	
Front brake panel spacer	Out. dia.	21.972 ~ 21.993 0.8650 ~ 0.8658	21.9 less 0.8622	
	Overall length	34.9 ~ 35.1 1.374 ~ 1.381		
Front axle distance collar	Overall length	49.8 ~ 50.2 1.960 ~ 1.976		
Brake cam	Thickness	11.9 ~ 12.1 0.468 ~ 0.476		
Front brake shoe	Out. dia.	174.1 ~ 174.4 6.854 ~ 6.866		Cutter out. dia.
Front brake lining	Thickness	3.5 ~ 4.5 0.137 ~ 0.177	2.5 less 0.0984	
Brake drum	In. dia.	174.8 ~ 175.2 6.881 ~ 6.897	176.0 more 6.929	
Brake shoe spring	Free length	55 2.165	58 more 2.283	
Front axle	Out. dia.	15.0 0.5905	14.9 less 0.586	
Front exle	Bend	0.05 within	0.2 more 0.0078	Both ends support on V block, measure bend at center part
Front wheel rim	Lateral deflection	1.0 within 0.0393	3.0 more 0.118	
Front tire	Air pressure	1.5kg/cm² 21.330 lb/in²	out of standard	

I. Rear Wheel

Item		Standard	Repairing Limit	Remarks
Final driven sprocket	Bottom dia.	145.76 5.738	144.7 less 5.696	
Rear wheel hub bearing	Axial play	0.005 within 0.000196	0.1 more 0.00393	
	Radial play	0.01～0.02	0.05 more	
Rear axle distance collar	Overall length	73.8～74.2 2.905～2.921		
Rear axle sleeve	Overall length	9.5～9.7 0.374～0.381		
Rear wheel axle	Out. dia.	16.9～17.0 0.665～0.669	16.85 less 0.663	
Rear brake shoe	Bend	0.05 within	0.2 more 0.0078	
	Out. dia.	174.1～174.3 6.854～6.862		Cutter out. dia.
Rear brake lining	Thickness	3.5～4.5 0.137～0.177	3.0 less 0.118	
Rear brake shoe spring	Free length	27.88 1.0976	32.0 more 1.259	
Rear brake cam	Thikness	11.9～12.1 0.468～0.476		
Rear brake pedal	Foot width	20～30 0.7874～1.1811	out of standard	
Rear wheel rim	Lateral deflection	1.0 within 0.0393	3.0 more 0.181	
Rear tire	Air pressure	2.0kg/cm² 28.44 lb/in²	out of standard	

MAINTENANCE STANDARDS,CB72·77

For maintenance operation for HONDA 250·300, Maintenance Standards, specification and dimension are listed hereafter for reference.

EXPLANATION:

Maintenance Items Items to be inspected, service-wise.

Standard Value This indicates the manufacturer's standard size or the standard size after newly assembling or adjusting, and shows the size-limit of completed part in the permissible limit of adjustment.

Repairing Limit Unusable wear limit of parts requiring correction or replacement, function-wise.

Remarks Unmarked numbers are run unit and inch unit shown underneath, and others according to the unit indicated.

UNIT IN CHART:

Unmarked numbers are m/m unit and inch unit shown underneath, and others according to the unit indicated.

CONTENTS

MAINTENANCE STANDARDS (Model CB72, CB77)

In this list, tne dimensions without units indicate "mm" (upper step) and "inch" (down step), and others according to the units indicated. Mark * is exclusively used only for model CB77 and others are common both model CB72 and CB77.

1. GENERAL PERFORMANCE

Item		Standard	Repairing Limit	Remarks
Compression pressure		10.5kg/cm²	8.0kg/cm less	Measure with kick
		149.31lb/in²	113.76 lb/in²	
Fuel Consumption		45km/ℓ	26km/ℓ less	Speed 40km/h
		127 Br m.p.g.	73 Br mpg	(24.8m.p.h.)
Compression ratio		9.3~9.7	out standard	
Lubricating oil consumption		120cc/1000km	200cc/	
		less	1000km more	
		120cc/620mile	200cc/	
			620 mile	
Lubricating oil capacity		1500cc	out stndard	Check with oil gauge
Rear wheel output		16PS more	12.5PS less	(Max. output)
		* 18PS more	14PS less	
Caster		62°	out standard	(Referential value)
Trail		85°	out standard	(Referential value)

2. ENGINE

A. Cylinder, Cylinder Head

Item		Standard	Repairing Limit	Remarks
Cylinder sleeve	Difference between max. in. dia. and min. in. dia.	within 0.01	0.05 more	After boring, honing
		0.0003	0.00196	should be enforced
Cylinder sleeve	In. dia.	54.00~54.01	54.10 more	After boring, honing
		2.1259~2.1263	2.129	should be enforced
		* 60.00~60.01	60.10 more	
		2.3622~2.3625	2.366	
Cylinder barrel	Height	83.45~93.5	out standard	
		3.285~3.681		
Cylinder sleeve	Out. dia.	62.02~62.03		(Referential value)
		2.441~2.442		
		67.02~67.03		
		2.638~2.6389		
	Inlaying space	0.02~0.05		Be pressed in at the
		0.00078~0.00196		normal temperature

Item		Standard	Repairing Limit	Remarks
Cylinder (oversize)	Over size	0.25 0.0098		3 category of 0.25
Cylinder head (Cam shaft bearing part)	In. dia.	41.994~42.01 1.653~1.653	42.06 more 1.655	
Cylinder head (rocker arm pin)	In. dia.	17.0~17.018 0.669~0.669	17.05 more 0.671	
Cylinder head (rocker arm pin)	Combustion chamber capacity	29.3~29.7cc		(Referential value)
Cylinder head (attaching force)	Bend	0.03 less 0.001	0.06 more 0.002	
Cylinder head (head cover attach-ing face)	Bend	0.03 less 0.001	0.06 more 0.002	
Cylinder head (inlet port)	In. dia.	25.5 1.003		
Carburettor insulator	Gap of the in. dia. of inlet port	0.5 less 0.0196	1.0 more 0.039	
Cylinder head gasket	Width	1.0~1.1 0.039~0.043		When tighting
Cylinder packing	Width	0.3~0.4 0.0118~0.0157		When tighting
Tachometer gear	In. dia. of Bush	7.0~7.015 0.275~0.276	7.2 more 0.283	
Tachometer gear	Out. dia. of Bush	13.982~14.0 0.550~0.551		
Tachometer gear "O" ring, 14m/m	Tightness	0.4 0.015		Unless omission, there are no troubles
Tachometer gear and bush	Clearance	0.028~0.043 0.0011~0.0016	0.2 more 0.0078	Unless omission, there are no troubles
Cylinder head cover	Flatness	0.03 less 0.001	0.06 more 0.002	
Breather sield plate	Thickness	1.0 0.0393		
Breather sield plate	Attaching direction	put forward an arrow		Be careful of the mark
Cylinder head cover	Tighting torque	1.9~2.3m-kg 13.74~16.63ft-lb	1.9m-kg less 13.74ft-lb	8 sports are equal
Cylinder head cap	Tighting torque	0.45m-kg 3.25ft-lb	0.35m-kg less 2.53 ft-lb	
Cylinder head cap "O" ring	Dia.	3.2 0.125	2.5 less 0.0984	

B. Crank Shaft, Connecting Rod, Piston

Item		Standard	Repairing Limit	Remarks
Crank shaft comp.	Crank angle (I B)	180°		
	Crank angle (II B)	360°		
Sprocket, center crank shaft	Tooth	16		
	Bottom dia.	36.285~36.286		
		1.42854~1.42857		
Gear, center crank shaft sprocket	NO. of tooth	22		
	Thickness of cross over teeth	15.295~15.337	15.1 less	NO. of cross teeth 3
		0.602~0.603	0.594	
	Out. dia.	47.9~48.0	47.7 less	
		1.885~1.889	1.877	
	Out. dia.	38.003~38.015	38.05 more	
		1.4961~1.4966	1.498	
	Radial clearance	0.006~0.014	0.05 more	
Center crank weight	Out. dia. of pin	25.991~25.999	25.95 less	
		1.0232~1.0235	1.021	
Center crank shaft, pressed part	in. dia.	25.0~25.02	0.00401	(Referential value)
		0.984~0.985		
R. crank shaft, bearing part	In. dia.	25.907~25.921		
		1.019~1.020		
R. crank shaft, bearing part	Out. dia.	29.983~29.993	29.95 less	
		1.1804~1.1808	1.179	
Crank shaft comp.	Max. swing	0.03 less	0.1 more	
		0.001	0.003	
R. Crank shaft key groove	Width	4.0~4.03	4.10 more	
		0.157~0.158	0.161	
	Thickness	4.0~4.1		(Referential value)
		0.157~0.161		
	Length	be processed with one cutter		(Referential value)
L. crank shaft pin, pressed part	In. dia.	25.907~25.921		
		1.019~1.020		
L. crank shaft pressed part	Out. dia.	30.002~30.015	25.95 less	
		1.181~1.186	1.021	
		* 30.004~30.009	* 29.97 less	
		1.1812~1.1814	1.179	
Primary drive sprocket	No. of tootn	15		
	Measuring bottom dia.	39.11~39.21	38.9 less	
		1.539~1.543	1.531	

Item		Standard	Repairing Limit	Remarks
Oil filter drive sprocket	NO. of tooth	24		
	In. dia.	25.0~ 25.01	26.0 more	
		0.9842 ~ 0.9846	1.023	
	Measuring bottom dia.	45.15~ 45.348	45.05 less	
		1.777~ 1.785	1.773	
Connecting rod small end	In. dia.	15.016~ 16.043	15.1 more	
		0.591~ 0.592	0.594	
	Twist	without0.02	0.1 more	
		0.0007	0.0039	
Connecting rod big end	Thickness	17.97~ 18.03	17.5 less	
		0.707~ 0.709	0.688	
	In. dia.	31.005~ 31.015	31.04 more	
		1.220~ 1.221	1.222	
	Axial clearance	0.07 ~ 0.33	0.5 more	
		0.002~ 0.012	0.0196	
	Diagonal clearance	0 ~ 0.008	0.05 more	
		0 ~ 0.0003	0.0019	
Needle roller	Out. dia.	2.502~ 2.51	2.5 less	
		0.0985~ 0.0988	0.098	
	Length	13.45~ 13.5		
		0.529~ 0.531		
	No. reqd.	48 pcs		
Piston pin	Out. dia.	14.994~ 15.0	14.95 less	
		0.590~ 0.5905	0.588	
	Overall length	45.9 ~ 46.1		(Referential value)
		1.807~ 1.814		
		51.9 ~ 52.1		
		2.043~ 2.051		
Piston head	Dia.	53.65~ 53.7	53.6 less	
		2.112~ 2.114	2.110	
		* 59.65~ 59.7	* 59.6 less	
		2.348~ 2.350	2.346	
Piston skirt	Dia.	53.98~ 54.0	53.9 less	At the pin boss diagonal direction
		2.125~ 2.126	2.122	
		* 59.98~ 60.0	* 59.9 less	
		2.361 ~ 2.362	2.358	
Piston	Taper	First step	out-standard	
		D— 0.06~ 0.07		
		D—0.0023~0.0027		
		Second step		Measure at the pin boss diagonal direction
		D— 0.12~ 0.14		
		D— 0.004~ 0.005		
	Ellipse	0.14 ~ 0.16	out-standard	Measure at 5 m/m (0.196) upper point from the foot of skirt
		0.005~ 0.006		

Item		Standard	Repairing Limit	Remarks
Piston ring groove (Top)	Groove width	1.505~ 1.52 0.0592~ 0.0598	1.55 more 0.061	
Piston ring groove (Second)	Groove width	1.505~ 1.52 0.0592~ 0.0598	1.55 more 0.061	
Piston ring groove (Oil)	Groove width	2.805~ 2.82 0.110~ 0.111	2.95 more 0.1161	
Piston ring groove	Out. dia.	48.1 ~ 48.2 1.893~ 1.897 * 53.3~ 53.4 2.098~ 2.102	47.9 less 1.885 * 53.1 less 2.090	
Piston & cylinder	Min. clearance		0.06 more 0.0023	
Piston over size	Over size	0.25 0.0098		3 category of 0.25 (0.0098) oversize
Piston ring (Top)	Width	1.45~ 1.46 0.057~ 0.0574 * 1.45~ 1.465 0.057~ 0.0576	1.4 less 0.0551 * 1.4 less * 0.0551	
Piston ring (Second)	Thickness	2.4~ 2.6 0.0944~ 0.102 * 2.6~ 2.8 0.102~ 0.110	2.2 less 0.0866 * 2.4 less 0.0944	
Piston ring (Top)	Tension	0.62 ~ 0.82kg 1.367~ 1.808 lbs 0.7~ 1.0kg 1.543 ~ 2.204 lbs	0.5kg less 1.102 lbs * 0.6kg less 1.323 lbs	
	End gap	0.15~ 0.35 0.0059~ 0.013 * 0.2~ 0.4 0.0078~ 0.0157	0.6 more 0.023 * 0.65 more 0.0255	Tangential tension
Piston ring (Second)	Width	1.48~ 1.495 0.0582~ 0.0588	1.43 less 0.0562	When attaching
	Thickness	2.4~ 2.6 0.0944~ 0.102 * 2.6~ 2.8 0.102~ 0.110	2.2 less 0.0866 * 2.4 less 0.0944	
	Tension	0.6~ 0.8kg 1.323~ 1.764 lbs * 0.7~ 1.0kg 1.543~ 2.204 lbs	0.5kg less 1.102 lbs * 0.6kg less 1.323 lbs	Tangential tension
	End gap	0.15~ 0.35 0.0059~ 0.013 * 0.2~ 0.4 0.0078~ 0.0157	0.6 more 0.023 * 0.65 more 0.0255	When attaching

Item		Standard	Repairing Limit	Remarks
Piston ring (Oil)	Width	2.4~ 2.6 0.0944~ 0.102 * 2.78~ 2.795 0.109~ 0.110	2.0 less (0.0787)	
	Thickness	2.78~ 2.795 0.109~ 0.110 * 2.6~ 2.8 0.0944~ 0.110	2.7 less 0.106 * 2.5 less 0.0984	Tangential tension
	Tension	0.7~ 0.9kg 1.543~ 1.984 lbs * 0.9~ 1.15kg 1.984~ 2.53 lbs	0.5kg less 1.102 lbs 0.7kg less 1.543 lbs	When attaching
	End gap	0.1~ 0.3 0.00393~ 0.0118	0.8 more 0.0314	
Piston ring & groove (Top)	Clearance	0.045~ 0.07 * 0.04~ 0.07	0.15 more 0.0059 * 0.15 more * 0.0059	
Piston ring & groove (Second)	Clearance	0.01 ~ 0.04	0.1 more 0.00393	
Piston ring & groove (Oil)	Clearance	0.01 ~ 0.04	0.1 more 0.00393	
Piston ring over size	Over size	0.25 0.00984		3 category of 0.25 (0.0098) oversize

C. Cam Shaft Valve Cam Chain

Item		Standard	Repairing Limit	Remarks
Cam shaft (Bearing part)	Out. dia.	19.996~ 20.009 0.787~ 0.787	19.95 less 0.785	
Cam (Bearing part)	Height	in 31.67~ 31.71 1.246~ 1.248 Ex. 30.54~ 30.58 1.202~ 1.203	31.4 1.236 30.2 less 1.188	
Cam shaft	Lift	in 5.69 0.118 Ex. 4.56 0.179		Max. lift
Cam sprocket complete	Nos. of teeth	32		
	Bottom dia.	74.766 2.943	74.2 less 2.921	

Item		Standard	Repairing Limit	Remarks
Cam chain	Type	DK-219		
	Length	723.0~ 723.8	728.0	
		28.464 ~ 28.496	28.661 more	
Ex. valve	Thickness	1.0	0.5 less	
		0.0393	0.0196	
Ex. valve (Stem)	Out. dia.	6.96 ~ 6.97	6.94 less	
		0.2740 ~ 0.2744	0.273	
Ex. valve (Seat face)	Angle	90~ 91°	out-standard	
Ex. valve	Overall length	88.74~ 88.76	89.4 less	
		3.493~ 3.494	3.519	
In. valve	Thickness	1.0	0.5 less	
		0.039	0.019	
In. valve (Stem)	Out. dia.	6.98 ~ 6.99	6.96 less	
	Angle	0.2748 ~ 0.2751	0.274	
In. valve (Seat)		90~ 91°	out-standard	
In. valve	Overall length	89.96~ 89.98	89.6 less	
		3.541 ~ 3.542	3.521	
Valve spring (Inner)	Free length	37.54	36.0 less	
		1.477	1.417	
	Diagonal degree	0.8 less	1.5 more	
	Tension	7.6~ 8.4 kg	60kg less	
		18.9 ~ 20.1kg	16.0kg less	
		16.758 ~ 18.522	13.230	
		41.674~ 44.320	35.280	
Valve spring (Outer)	Free length	43.36	42.0 less	
		1.707	1.653	
	Diagonal degree	0.8 less	1.5 more	
	Tension	16.9~ 18.1kg	15.0kg less	
		34.4~ 34.7kg	32.0kg less	
		37.264~ 29.910 lbs	33.075 lbs less	
		75.852~ 76.293 lbs	70.560 lbs less	
Ex. valve guide	In. dia.	7.0~ 7.01	7.05 more	
		0.275~ 0.2759	0.2775	
In. valve guide	In. dia.	7.0~ 7.01	7.05 more	
		0.275~ 0.2759	0.2775	
Valve seat	Touch width	1.0	20 more	Repair of cylinder head
		0.039	0.08	
Rocker arm	In. dia.	1.30 ~ 13.027	13.1 more	
		0.511~ 0.512	0.515	
Rocker arm shaft (Rocker arm part)	Out. dia.	12.966 ~ 12.984	12.9 less	
		0.510~ 0.511	0.507	
Rocker arm shaft (Inlay part of head)	Out. dia.	16.994 ~ 16.976	16.95 less	
		0.669~ 0.668	0.667	

Item		Standard	Repairing Limit	Remarks
Rocker arm shaft (Oil part)	In. dia.	2.5 0.0984		
Tappet clearance	In. Ex.	0.08 ~ 0.12 0.003~ 0.0047	out-standard	Cold type
Cam chain tensioner roller	Out. dia.	40 1.574	38. less 1.496	Aging and crank of rubber should not be.
Cam chain tensioner roller (Spring)	Free length	63.3 2.492	60.0 less 2.362	
	Tension	7kg 15.435 lbs	5.5kg less 12.127 lbs	Referential value-control by over all length
Valve timing ex.	Opening angle	before lower dead point 35°	out-standard ± 5°	Check at 1.1m/m 0.0452 (In case of lift)
	Closing angle	after upper dead point 10°	out-standard ± 5°	Check at 1.1m/m 0.0452 (In case of lift)
Valve timing In.	Opening angle	before upper dead point 5°	out-standard ± 5°	Check at 1.1m/m 0.0452 (In case of lift)
	Closing angle	after lower dead point 30°	out-standard ± 5°	Check at 1.1m/m 0.0452 (In case of lift)

D. Upper · Under Crank Case

Item		Standard	Repairing Limit	Remarks
Upper· under crank case (Part of center bearing)	In. dia.	65.97~ 65.987 2.597~ 2.597	66.04 more 2.59	Combined with upper and under and then measure
Upper· under crank case (Part of bearing L/H, R/H)	In. dia.	L/H76.97~ 76.987 R/H64.97~ 65.987 3.0303~ 3.0309 2.557 ~ 2.558	76.93 more 64.93 more 3.0287 2.5566	Combined with upper and under and then measure
Upper· under crank case (Part of mission shaft)	In. dia.	61.985~ 61.996 2.440~ 2.4407	2.04 more 2.442	Combined with upper and under and then measure
Upper· under crank case (Part of kick spindle)	In. dia.	25.0~ 25.021 0.984~ 0.985	25.1 more 0.988	Combined with upper and under and then measure
Upper· under crank case (Seam surface)	Flatness	within 0.03 0.001	0.06 more 0.002	
Cylinder attaching face of upper crank case	Flatness	within 0.03 0.001	0.06 more 0.002	

Item		Standard	Repairing Limit	Remarks
L/H cover attaching face of upper crank case	Flatness	within 0.03 0.001	0.06more 0.002	
Cam chain guide roller	Out. dia.	59.5 2.342	59.0 less 2.28	Aging and crank of rubber should not remain
	In. dia.	14.0~14.018 0.551~0.5518	14.1more 0.555	
Cam chain guide roller pin	Out. dia.	13.966~13.984 0.549~0.550	13.9 less 0.547	
Oil level gauge	Dia.	2.9~3.1 0.114~0.122	2.8 less 0.110	
"O" ring 22 mm	Tightness	2.0 0.078	0.5 less 0.019	
Under crank case attaching face of cover L/H	Flatness	within 0.03 0.001	0.06more 0.002	
Under crank case (Seam surface of upper· under)	Flatness	within 0.03 0.0011	0.06more 0.0023	
Under crank case seam surface	Slip out of L/H or R/H	within 0.05 0.0019	0.1more 0.0030	

E. Clutch · Crank Cace Cover L/H

Item		Standard	Repairing Limit	Remarks
Clutch friction disc	Thickness	2.9~3.0 0.114~0.1181	2.5 less 0.984	One set is 6 sheets
	In. dia.	112 4.409		
	Flatness	within 0.2 0.0078	0.4more 0.015	
Clutch plate	Thickness	2.0 0.078	1.6 less 0.0629	Use 5 sheets
	Flatness	within 0.2 0.0078	0.4more 0.015	
	Out dia.	135 5.314		
Clutch center and clutch plate	Clearance of rotary direction	within 0.3 0.0118	0.3more 0.0118	Clearance at out. dia. of plate
Clutch center and mission shaft	Clearance of rotary direction	within 0.1 0.0039	0.3 more 0.0118	

Item		Standard	Repairing Limit	Remarks
Clutch outer comp. (with sprocket)	Teeth	47 (1.85)		
	Bottom dia.	136.15~ 136.16 5.3602~ 5.3606	135.5 less 5.334	Measure bottom dia. roller dia. 0.35 0.013 Referential value
	In. dia.	88.0~ 88.035 3.464~ 3.465		
Clutch center and mission shaft	Axial clearance	0.027~ 0.067 0.001~ 0.0026	0.2more 0.0078more	
Clutch pressure plate	Flatness	within 0.1 0.0039	0.3more 0.0118	
	In. dia	112 4.409		
Clutch spring	Free length	33.4 1.314	32.4 less 1.275	
	Diagonal degree	1.0 less 0.0393	2.0more 0.0787	
	Load	15.3~ 15.7kg 33.73~ 34.61lbs	13.6kgless 29.988 lbs	
Crank case cover L/H	Flatness	within 0.01 0.0003	0.06 more 0.0023	
Crank case cover L/H (Part of oil filter)	In. dia.	58.0~ 58.046 2.283~ 2.285		
Crank case cover L/H ("O" ring)	Tightness	0.5more 0.0197	out-standard	
Crank case cover L/H (Part of shift spindle)	In. dia.	14.0~ 14.018 0.551~ 0.5518	14.1 more 0.555	
Crank case cover L/H (Packing)	Thickness	0.3~ 0.4 0.0118~ 0.0157		When disassembly and maintenance, exchange should be done each time

F. Transmission

Item		Standard	Repairing Limit	Remarks
Transmission	Type	Four speed Constant mesh gear		
Main shaft	Out. dia.	24.959~ 24.98 0.982~ 0.983	24.9 less 0.980	
Main shaft and M² gear	Clearance	0.02~ 0.074 0.007~ 0.00291	0.1more 0.0039	
Main shaft	Axial Clearance	0.1~ 0.75 0.0039~ 0.0295	1.2more 0.0472	

Item		Standard	Repairing Limit	Remarks
Main shaft and M3 gear	Clearance of rotary direction	0.03~0.078	0.1more	
		0.00118~0.00307	0.0039	
Mission gear	Back rush	0.089~0.178	0.2more	
		0.0035~0.0070	0.0078	
Top gear	In. dia.	18.0~18.018	18.2more	
		0.708~0.709	0.716	
Top gear (lifter rod part)	In. dia.	8.0~8.015	8.06more	
		0.314~0.315	0.317	
Top gear (Bush)	In. dia.	20.5~20.521	20.6more	
		0.807~0.8079	0.811	
Top gear bush and mission shaft	Clearance	0.081	0.1more	(Part of 20.5φ)
		0.00318	0.0039	
Drive sprocket	Bottom dia.	65.649~65.776	64.7 less	
		2.584~2.589	2.547	
Drive sprocket (Rotary direction)	Clearance	0.03~0.078	0.25more	
		0.00118~0.00307	0.00984	
Counter shaft (gear side)	In. dia.	24.37~24.385	24.4more	
		0.959~0.960	0.9606	
Counter shaft	Out. dia.	24.96~24.939	24.9 less	
		0.982~0.981	0.980	
Bush 14mm	In. dia.	14.375~14.393	15.2more	
		0.565~0.566	0.598	
	Out. dia.	24.98~25.013		
		0.983~0.984		
Counter shaft and C2 gear	Clearance of rotary direction	0.01~0.098	0.2more	
		0.00039~0.0038	0.0078	
Low gear	Crossover thickness	21.667~21.714	21.6 less	
		0.853~0.854	0.850	
Kick startor spindle and bush 14mm	Clearance	0.022~0.052	0.15more	
		0.00086~0.00204	0.0059	
Bush C 14mm	Out. dia.	17.094~17.112	17.05 less	
		0.672~0.673	0.671	
	In. dia.	14.413~14.431	14.53more	
		0.567~0.568	0.572	
Mission gear retio	First	3.12		
	2nd	1.74		
	3rd	1.27		
	Top	1.00		
Kick spindle pole spring	Free length	14	13.5 less	
		0.551	0.531	

Item		Standard	Repairing Limit	Remarks
Kick spindle pole bush pin	Out. dia.	5 0.196	4.5 less 0.177	
	Overall length	13 0.511	12.5 less 0.492	
Primary chain	Deflection	5~10 0.196~0.393	20 more 0.7874	Show by max. swing of loosing
Roller 5×6.25	No. Reqd.	12 pieces		

G. Gear Change

Item		Standard	Repairing Limit	Remarks
Gear shift fork	In. dia.	34.0~34.025 1.338~1.339	34.2 more 1.346	
Gear shift durm	Out. dia.	33.95~33.975 1.336~1.337	33.9 less 1.334	
Drum and shift fork	Clearance	0.025~0.075 0.00098~0.00295	0.25 more 0.0098	
Gear change pedal	In. dia.	17.0~17.027 0.669~0.670	17.3 more 0.681	

H. Kick, Crank Case Cover R/H

Item		Standard	Repairing Limit	Remarks
Kick startor gear	Shaft Out. dia.	14.341~14.353 0.564~0.565	14.25 less 0.561	
Kick startor gear and cover R/H	Clearance	0.016~0.104 0.00062~0.00409	0.3 more 0.0118	
Cover R/H	Flatness	within 0.05 0.00196	0.1 more 0.0039	

I. Oil Pump, Oil Filter

Item		Standard	Repairing Limit	Remarks
Oil pump drive gear	Teeth width	4 0.157		
	Bend	0.05 0.00196	0.1 more 0.00393	
Oil pump drive gear and M. crank gear	Back rush	0.085~0.127 0.00334~0.050	0.15 more 0.059	Adjust by packing
Oil pump gear top and inside wall	Clearance	0.025~0.05 0.0098~0.0019	0.1 more 0.00393	

Item		Standard	Repairing Limit	Remarks
Oil pump gear	Back rush	0.106~0.21 0.00417~0.0082	0.4 more 0.015	
Oil pump gear side face and side cover	Clearance	0.04~0.089 0.0015~0.0035	0.1 more 0.0039	
Oil pump gear and pin	Clearance	0.013~0.05 0.000511~0.0019	0.3 more 0.00118	
Oil filter shaft and oil filter rotor	Clearance	0.012~0.048 0.000472~0.00188	0.1 more 0.0039	
Oil filter rotor	Out. dia.	57 2.244		
Oil filter chain	Loosing	5~10 0.196~0.3937	15 more 0.5905	Measure the amplitude at the center

J. A. C. Dynamo Starting Motor

Item		Standard	Repairing Limit	Remarks
Spark performance on ignition	3 Needle gap	8 more 300 r.p.m. 0.314	7 less 0.275	3 Needle gap
Charging performance on dynamo	Charging current	2.0~3.0A	out-standard	Start of charging, at 1700r.p.m., after that, at 500 r.p.m.
Dynamo starter and rotor	Clearance	0.5 0.0196	0.8 more 0.0314	
Starting clutch outer and dynamo	Out. dia. gap	0~0.06 0.~0.00236	0.1 more 0.0039	
Cross screw 6×24	Tighting torque	0.5 m-kg 3.615ft-lb	out-standard	When tighting, screw rock should be needed
Clutch roller spring	Free length	25~31 0.984~1.220	24 less 0.944	
Clutch roller spring (Cap)	In. dia.	4.1~4.25 0.161~0.167	4.3 more 0.169	
	Out. dia.	5.2~5.3 0.2047~0.2086	5.0 less 0.196	
Starting sprocket of clutch outer journal	Out. dia.	37.175~37.2 1.463~1.464	37.1 less 1.460	
Starting motor	Voltage	12V		
	Horse power	0.4kw	out-standard	
	Rating	30 sec	out-standard	

Item		Standard	Repairing Limit	Remarks
Contact point	Max. gap	0.35 0.01377	out-standard	
Ignition timing	Crank angle	before upper dead point 5°	3° less 7° more	
Spark advancer advanced beginning	R.P.M.	1100 r.p.m. (5°)	out-standard	
Spark advancer advanced finish	R.P.M.	3300 r.p.m. (45°)	out-standard	
Spark advancer advanced max. advanced angle	Crank angle	40°	37° ~ 43° out-range	

L. Carburetter

Item		Standard	Repairing Limit	Remarks
Carburetter	Type	PW22H $^{R}_{L}$ A4a		
	Main jet	* PW 26 # 100 * # 135		
	Air jet	# 150		
	Air bleed	AB 1 1.0φ × 2 * 1.8φ × 4 AB 2 0.7φ × 2 * 0.8φ × 2 AB 3 0.7φ × 4		
	Needle jet	* 0.7φ × 2		
	Jet needle	2.6φ 22402 – 2 step		
	Cutter way	* 24231 – 3 step # 3 width 1.2 cutting depth 0.05		
	Air screw	* # 2 nothing 1 ~ 1½ return * 1¼ return		
	Slow	# 35 (0.8φ × 4pieces × 2step) * # 42 (0.8φ × 2pieces × 4step)		

K. Contact Breaker

Item		Standard	Repairing Limit	Remarks
Carburetter	Valve seat	2.5φ		
		* 2.0φ		
	Pilot outlet	1.2φ		
	Power jet	# 160		
	Power air jet	# 90		

3. FRAME BLOCK

A. Handle

Item		Standard	Repairing Limit	Remarks
Circumference direction of throttle grip	Play	4~8 0.157~0.314	out-standard	Measure at out circumference
Difference between outer and inner of throttle wire	Length	55 2.165	out-standard	
Clutch wire difference between outer and inner	Length	133 5.236	out-standard	
Clutch lever	Play	25~30 0.984~1.181	out-standard	Check by lever end
Brake lever	Play	15~25 0.590~0.984	out-standard	
Front fork cover cushion	Thickness	6.5 0.255	6.0 less 0.236	
	Out. dia.	39 1.535		

B. Front Cushion

Item		Standard	Repairing Limit	Remarks
Front cushion	Type	Telescope type	out-standard	
	Stroke	80 3.149	out-standard	
	Oil capacity	both of R. and L. 250cc	out-standard	
Front cushion spring	Free length (One step)	185.5 7.303	180 less 7.086	Reference value

Item		Standard	Repairing Limit	Remarks
Front cushion spring	Free length (Two step)	221.5 8.720	216.5 less 8.523	Reference value
	Overall length	407.0 16.024	396.0 less 15.590	
	Available winding Nos. (First step)	32		
	Available winding Nos. (Secondary step)	30		Reference value
	Height in case of bind	374 14.724		Reference value
	Torque in case of bind	24.1kg 53.14 lbs		Reference value
	Overall winding Nos.	62	out-standard	
	Dia. of coil	4.5 0.177		Reference value
	Coil out. dia.	25.0~25.5 0.984~1.003		
Front fork pipe comp.	Bend.	within 0.1 0.0039	0.15 more 0.0059	The bend of pipe nut, when made the planting part a fulcrum
Front fork pipe piston	Out. dia.	37.45~37.475 1.474~1.475	37.4 less 1.472	
Front fork valve	In. dia.	32.98~33.019 1.298~1.299	33.019 1.303	33.1 more
Front fork pipe piston valve	Space between fork pipe	0.055~0.109 0.0021~0.0042	0.2 more 0.0078	
	Foot face flat degree	0.02 0.00078	out-standard	
Front fork bottom case	In. dia.	37.5~37.539 1.476~1.4779	37.65 more 1.482	
	Out. dia.	41.236~41.275 1.623~1.625	41.15 1.620 less	
Front fork bottom piece axis part (R)	In. dia.	15.0~15.043 0.590~0592	15.1 more 0.594	
Front fork bottom piece axis part (L)	In. dia.	20.0~20.52 0.7874~0.807	20.2 more 0.795	
Seal housing bottom case inlaying space	In. dia.	41.3~41.362 1.625~1.628	41.5 more 1.633	

Item		Standard	Repairing Limit	Remarks
Seal housing and oil seal	In. dia.	46.0~46.039 1.811~1.812	out-standard	
	Inlaying space	0.06 ~0.3 0.0023~0.011		
Fork pipe guide	Overall length	36 1.417	out-standard	
	In. dia.	33.0~33.039 1.299~1.300	33.1 more 1.303	
	Out. dia.	37.466~37.491 1.475~1.476	out-standard	
Front fork upper	Overall length	173.8~174.2 6.842~6.858	out-standard	
Front fork upper (Upper part)	Out. dia.	42 1.654		
Front fork upper (Cover cushion inlaying part)	Out. dia.	34.4~34.6 1.354~1.362	out-standard	
	In. dia.	33.2~33.4 1.307~1.314	out-standard	
Front fork under cover	Overall length	175 6.889		
Front fork under cover (Upper part)	Out. dia.	54 2.125		
	In. dia.	38.5 1.515		
Fork rib upper cover inlaying part	In. dia.	54.5~54.7 2.145~2.153	out-standard	
Fork rib under cover inlaying part	Out. dia.	55 2.165		
	In. dia.	38.1~38.3 1.499~1.507		

C. Steering Stem, Front Fender

Item		Standard	Repairing Limit	Remarks
Stem and bottom cone race	Binding space	0.007~0.041	0.004 less	
Steering head stem nut	Binding torque	6.5~7.5m-kg 47.01~54.24ft-lb	5m-kg less 36.16ft-lb	
Steering stem top cone race inlaying part	Out. dia.	25.979~26.0 1.022~1.023		
Steering stem front fork pipe inlaying part	In. dia.	38 ~38.062 1.496~1.498	38.25 more 1.505	

Item		Standard	Repairing Limit	Remarks
Steering stem bottom bridge	Stopper angle	76° (double, side ± 5mm)	out-standard	Measured by jig (referential value)
Steering top cone race	In. dia.	26.0~26.021 1.023~1.024	out-standard	
Front fender	Plank	0.8 0.031		
	Material	SPC-1		

D. Fuel Tank

Item		Standard	Repairing Limit	Remarks
Fuel tank	Volume	14 ℓ 3.698 galus		
	Reserve	1.2~1.5 ℓ 0.317~0.396galus		

E. Frame Body

Item		Standard	Repairing Limit	Remarks
Head pipe comp. top ball race	Binding space	0.051~0.0575 0.002~0.0022	out-standard	
Head pipe comp. bottom race		0.001~0.051	out-standard	
Steel ball	Out. dia.	¼" 0.009		
Steel ball top	No. Reqd.	18pcs	out-standard	
Steel ball bottom	No. Reqd.	19pcs	aut-standard	
Rear fork center bush	In. dia.	14.01~14.02 0.551~0.551	14.1 more 0.555	
	Binding space	0.03~0.08 0.001~0.003		

F. Stand

Item		Standard	Repairing Limit	Remarks
Step arm comp.	In. dia.	12.2 0.480	12.7 more 0.499	
Step arm fixing bolt	Out. dia.	16.957~16.984 0.667~0.668	16.7 less 0.657	
Main stand pipe	Thickness	2.3 0.090		
Main stand the hole of binding part	In. dia.	14.0~14.027 0.551~0.552	14.3 more 0.562	
Main stand setting bolt	Out. dia.	13.9~13.968 0.547~0.549	13.5 less 0.531	
Main stand setting spring	Free length	86 3.385	83 less 3.26	
	Load	87.5kg 192.937 lbs	86.2kg less 190.071 lbs	In case of binding, max. stretch and load (referential value)
Brake pedal	In. dia.	17.0~17.027 0.669~0.670	17.2 more 0.677	
	Clearance	20~30 0.787~1.18	out-standard	

G. Rear Fork, Rear Fender

Item		Standard	Repairing Limit	Remarks
Rear fork pivot	In. dia.	26.0~26.021 1.023~1.024		
Rear fork pivot bush	Out. dia.	26.04~26.08 1.025~1.026		After pressed in give a finishing touch to the in. dia.
	In. dia.	20.05~20.08 0.789~0.790	20.5 more 0.807	
	Pressed space	0.019~0.08 0.0007~0.003	Clearance	
Rear fork pivot bolt	Out. dia.	13.925~13.968 0.548~0.549	13.8 less 0.543	
	Overall length	301 11.850		
Drive chain	Type	DK 530		
	Teeth	94 teeth		
	Slack	9~13 0.354~0.511	out-standard	

Item		Standard	Repairing Limit	Remarks
Rear brake stopper arm	In. dia.	10.0~10.2 0.397~0.401	0.7 more	
	Thickness	9 0.354	out-standard	
	Overall length	385 15.1571		

H. Rear Cushion

Item		Standard	Repairing Limit	Remarks
Rear cushion	Stroke	60 2.362	out-standard	
	Oil capacity	52 cc	out-standard	# 60 spindle oil
	Declined tension	60~67kg/0.5m/s 132.27~147.70 lbs/0.5m/s	out-standard	
Rear cushion spring	Free lengte	210 8.267	207 less 8.149	In case of 185mm (binding hight)
	Load	37.5kg 82.687 lbs	33kg less 72.76 lbs	7.283

I. Front Wheel

Item		Standard	Repairing Limit	Remarks
Front axle distance collar	Overall length	49.9~50.1 1.964~1.972		
Front brake cam	Thickness	10 0.393	8 less 0.314	
Front brake shoe	Out. dia.	199.8~200 7.866~7.874		Shave out. dia.
Front brake lining	Thickness	5 0.196	2.5 less 0.098	
Brake drum	In. dia.	199.85~200.15 7.868~7.879	201 more 7.913	
Brake shoe spring	Free length	63.0~63.5 2.480~2.499	66.5 more 2.618	
	Load	5 kg 11.025 lbs	3.5kg les 7.717 lbs	In case of 67.5 mm (setting length)
Frot axle	Out. dia.	14.966~14.984 0.589~0.589	14.9 less 0.586	2.657

Item		Standard	Repairing Limit	Remarks
Front axle	Overall length	238 9.370		
	Bend	0.05 0.00019	0.2 more 0.007	
Front wheel rim	Swing	1.0 0.0393	3.0 more 0.118	
Front tire	Dimension	2.75~18 0.108~0.708		4PR
	Air pressure	1.7kg/cm² 24.174 lb/in²	out-standard	
Front panel axle	In. dia.	15.0~15.018 0.590~0.591	15.1 more 0.594	

J. Rear Wheel

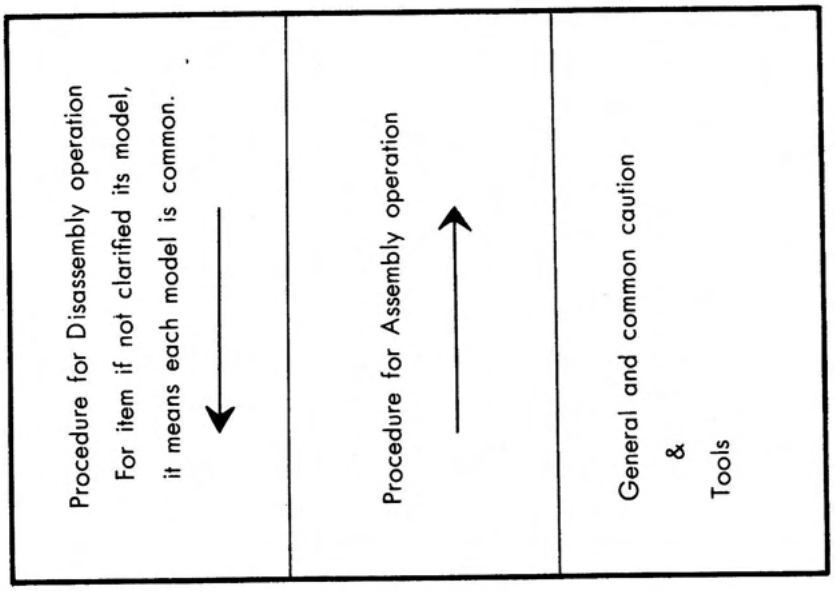
Item		Standard	Repairing Limit	Remarks
Final driven sprocket	Bottom dia.	151.8 5.975	150.8 less 5.936	
Rear axle distance collar	Overall length	100~100.2 3.937~3.944	out-standard	
Rear wheel axle	Out. dia.	19.947~19.98 0.785~0.787	19.8 less 0.780	
	Bend	0.05	0.2 more	
	Overall length	280 11.024		
Rear brake shoe	Out. dia.	199.8~200 7.866~7.874		Shave out. dia.
Rear brake lining	Thickness	5 0.197	2.5 less 0.0984	
Rear wheel rim	Swing	1.0 0.0394	3.0 more 0.118	
Rear wheel tire	Air pressure	2.2kg/cm² 31.284 lb/in		
	Dimension	3.00~18 0.118~0.708		4PR
Rear brake panel axle	In. dia.	20.0~20.033 0.787~0.789	20.1 0.791	
Rear brake panel torqe	In. dia.	10.1~10.2 0.398~0.402	10.5 0.41	
Brake cam	In. dia.	15.0~15.043 0.591~0.592	15.3 0.602	

K. Electric Equipments

Item		Standard	Repairing Limit	Remarks
Head light bulb	Electric current	35/30W 2.67A		12V
Stop lamp	Electric current	7.5W 0.58A		
Tail lamp	Electric current	4W 0.28A		
Serenium rectifire	Output volt	DC 30V		
	Input power	AC 40V		
Phon	Phon	95~105 phon	95 phon less	Adjust by screw
Fuse	Capacity	15A		
Battery	Electrolyte capacity	0.7ℓ	out-standard	
		0.184galus		
	Capacity	10AH		
	Volt	12V	when 1A is charging, 10.6V less	
	Specific gravity of electrolyte	1.260~1.280	1.18 less	
Stop switch	Mox. ampere	PC 2A		
	Stroke	6~8		
Combination switch	Max. ampere	6A		
	Max. ampere	4A		
	Insulasion	50 MΩ	1MΩ less	
	Resistance	10 MΩ	0.1MΩ less	
Speedometer	Error	−0+5%	out-standard	
Tachometer	4000 r.p.m. less	±200 r.p.m.	out-standard	
	4000~6000	±235	out-standard	
	6000~8000	±270	out-standard	
	8000~10000	±300	out-standard	
	10000~12000	±400	out-standard	

DISASSEMBLY AND ASSEMBLY

In this chapter, mainly Disassembly operation was explained, and for assembly special attention was only called for where needed, as both operation are similar.



CONTENTS

DISASSEMBLY AND ASSEMBLY

1. ENGINE (C72·77)

A. Engine Replacement (L. side)

Disassembly	Assembly	Precaution Tools
1. L. Exhaust pipe joint nut	Tighten not to leak exhaust gas.	10m/m socket wrench
2. L. Exhaust pipe muffler		14m/m socket wrench 17m/m spanner
3. L. step bar	Be cautious of the position of seration in case of fitting. Assemble with putting in position at the punch mark. Tightening torque 2.1kgm (15ft-lb)	14m/m spanner
4. Gear change pedal	Fitting angle, one seration foreward inclined from horizontal position.	10m/m spanner

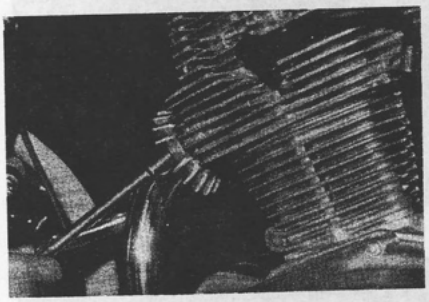


Fig. 1

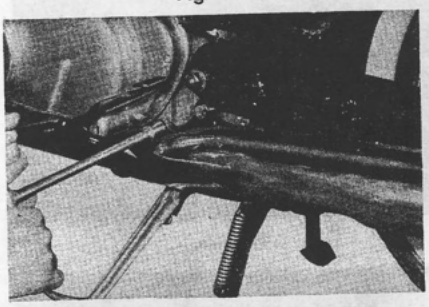


Fig. 2

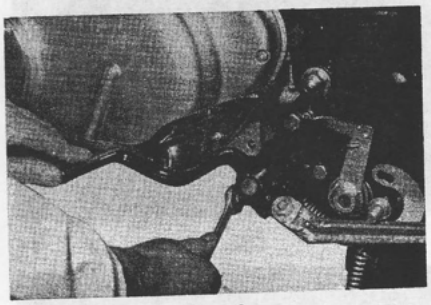


Fig. 3

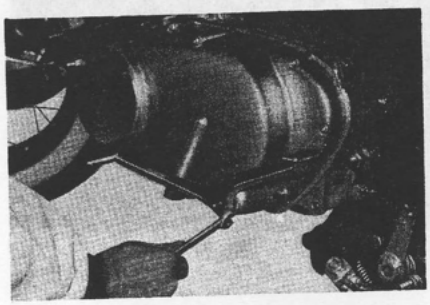


Fig. 4

	Disassembly	Assembly	Precaution Tools

Fig. 5

5.

L. frame dust shield

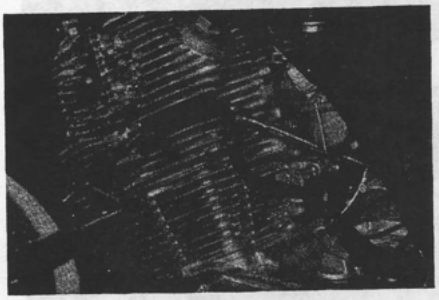


Fig. 6

6.

Plug cap

Air vent tube

Fig. 7

7.

Carburetter setting nut	Fit securely	10m/m spanner

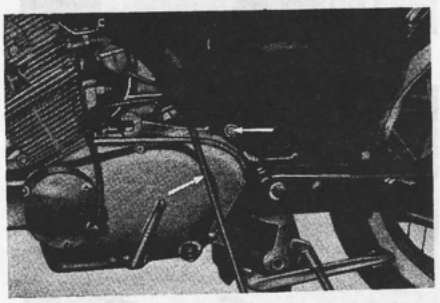


Fig. 8

8.

Breather pipe	Tightening torque 2.1kgm (15ft. lb)	17m/m socket wrench
Engine hanger bolt	Tightening torque 4.4kgm (32ft-lb)	17m/m spanner

Disassembly	Assembly	Precaution Tools
9. (R.-side) R. exhaust pipe joint joint nut	Tighten not to leak exhaust gas.	Refer to L. side
10. R. exhaust pipe muffler		Refer to L. side
11. R. step bar	Assemble with nutting in position at the punch mark, tightening torque. 2.1kgm (15ft-lb)	Refer to L. side
		10m/m spanner

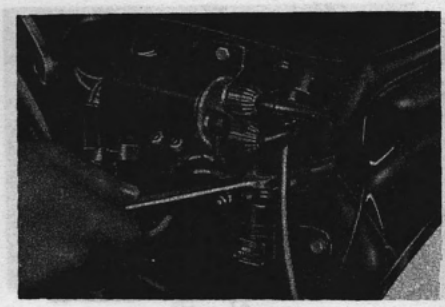


Fig. 9

Disassembly	Assembly	Precaution Tools
13. R. dust shield		Refer to L. side T-Handle forehead driver (# 3)
14. R. crank case cover		T-Handle forehead driver (# 3) 10m/m socket wrench
15. Clutch wire		Fore driver
16. Drive chain joint Drive sprocket cover		Pliers

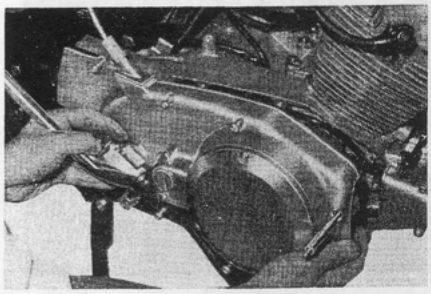


Fig. 10

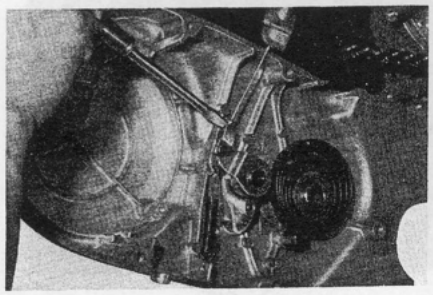


Fig. 11

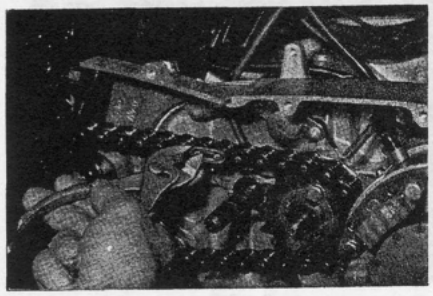


Fig. 12

Disassembly	Assembly	Precaution Tools

17.

Chain joint clip

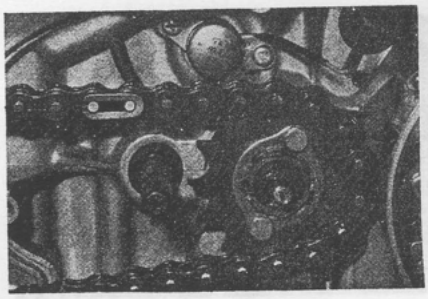


Fig. 13

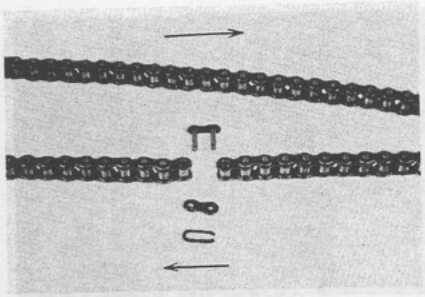


Fig. 14

18.

Engine wiring

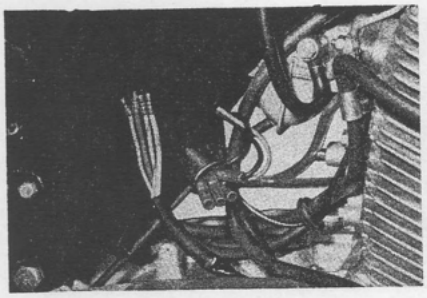


Fig. 15

19.

plug cap

Air vent tube

Refer to L. side

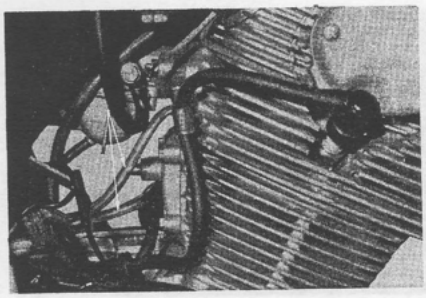
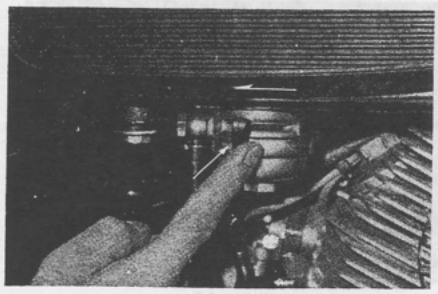
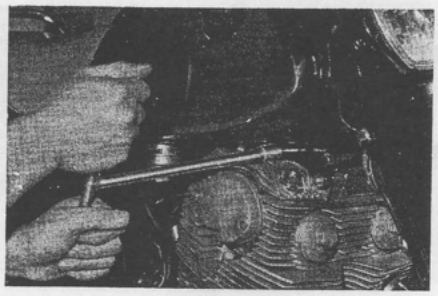
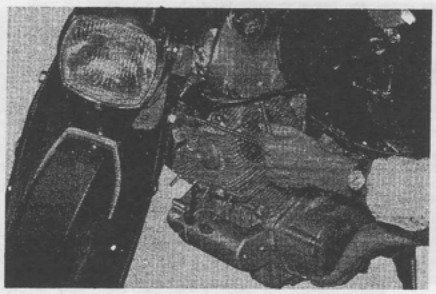


Fig. 16

	Disassembly	Assembly	Precaution Tools
 Fig. 17	20. Carburetter setting nut		Set lever of fuel cup stop. 10m/m spanner
 Fig. 18	21. Engine hanger bolt		17m/m socket wrench 17m/m spanner
	22. Engine setting bolt		14m/m socket wrench
 Fig. 19	23. The point of taking down engine	In case of fitting, be cautious not to damage on the front fender.	

B. Cylinder

Disassembly	Assembly	Precaution Tools
1. Condenser		9m/m socket wrench
2. Head cover	To tighten setting nuts on the head cover, follow order as shown here and repeat 2 to 3 times to tighten securely. ①②③④→white nut ⑤⑥⑦⑧→yellow nut	Pay attention to the color of nuts. 14m/m socket wrench
3. Cam chain tensioner		10m/m socket wrench
4. Sparking plug		Plug socket wrench

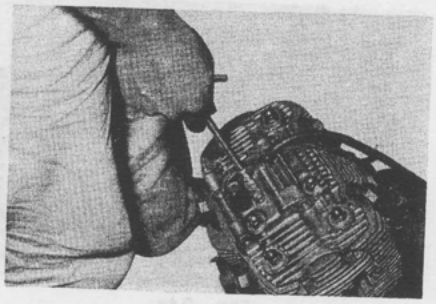


Fig. 20

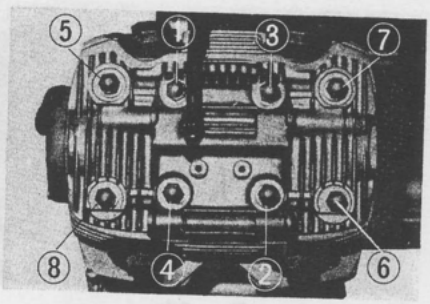


Fig. 21

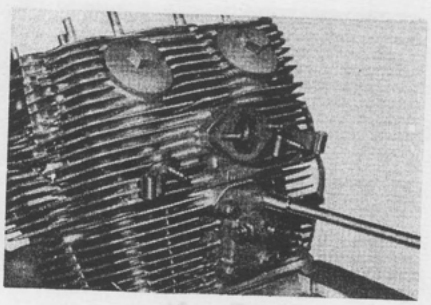


Fig. 22

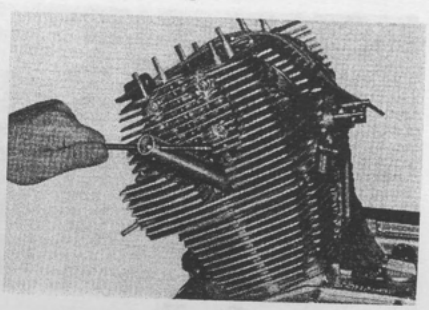
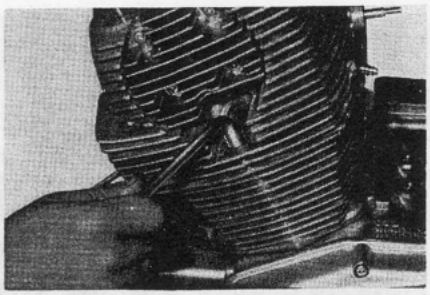
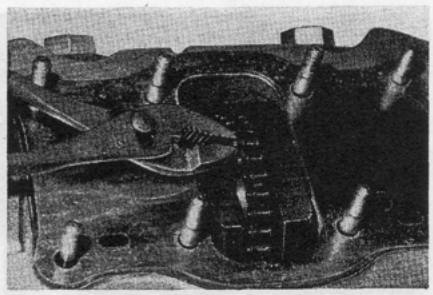
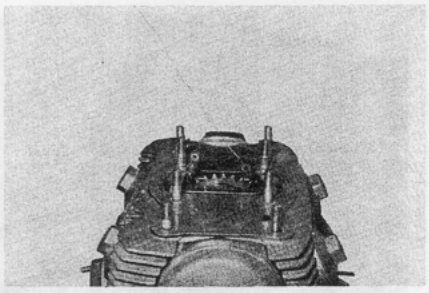
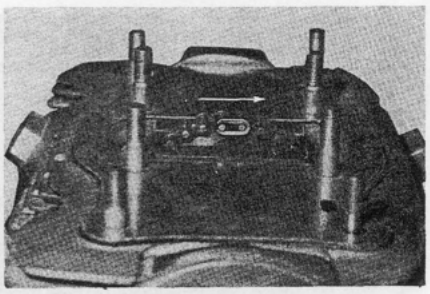


Fig. 23

	Disassembly	Assembly	Precaution Tools
 Fig. 24	$6^{m}/_{m}$ nut		steering top cone race box wrench
 Fig. 25	5. Cam chain	Tightening torque 2.1kgm (15ft. lb)	In case of disassembly and fitting of the cam chain, be careful not to drop clip into the cylinder head. Pliers
 Fig. 26			Tie a wire at the end of chain to prevent chain from dropping into the cylinder.
 Fig. 27		Fitting direction of clip; fit the joint to the direction of revolution of the crank (↪)	

Disassembly	Assembly	Precaution Tools
	Combination process ① Coincide "T" punch mark on the dynamo rotor with the arrow mark on the starter.	14m/m spanner

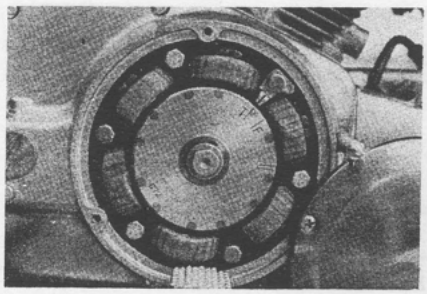


Fig. 28

	② Coincide punch mark on the right tooth surface of the cam sprocket complete with the center line of the cylinder head, and combine sprocket of crank shaft by chain.	

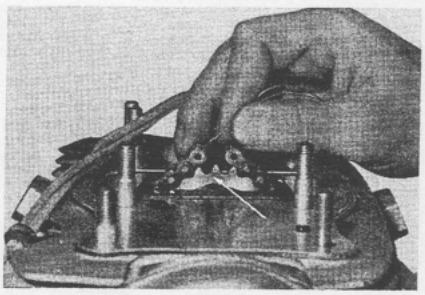


Fig. 29

6. Cylinder head	Beforehand, valve rocker arm, cam shaft and valve should be subassembled.	Plastic hammer

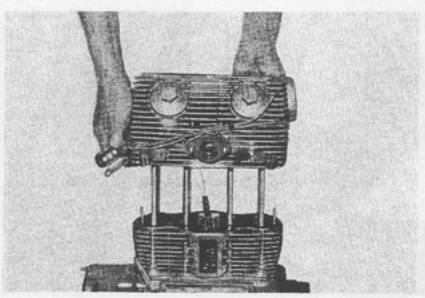


Fig. 30

	Pay attention to "O" ring and gasket.	

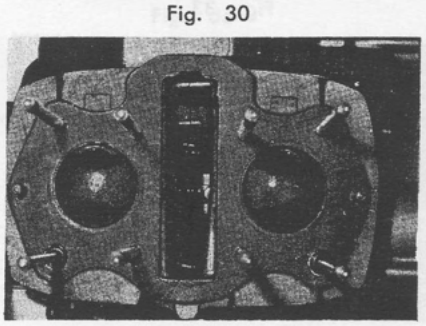
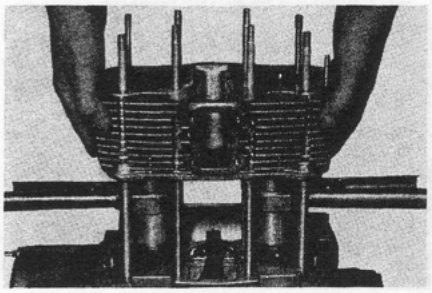
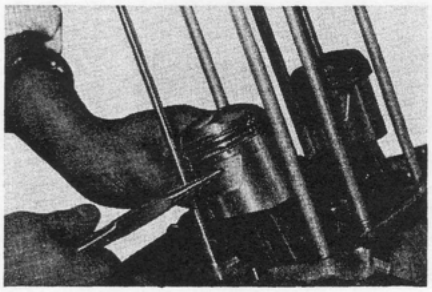
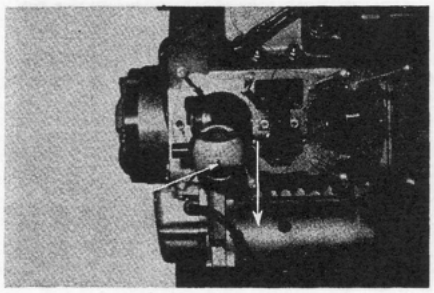


Fig. 31

	Disassembly	Assembly	Precaution Tools
 Fig. 32	7. Cylinder	In setting the cylinder on the piston, divide piston rings in 3 parts separately and put the ring retainer on the piston and push in the cylinder laying the stopper between piston and case.	Plastic hammer
	Cylinder	Put in knock pin and packing securely.	
 Fig. 33	8. Piston	Use new piston pin clips, avoiding such clips lost elasticity.	Thin nose pliers
 Fig. 34		In assemblying piston, put the punch mark on the head of piston to the fore-ward direction.	

Disassembly	Assembly	Precaution Tools
	In fitting the piston, be careful on selection of clearance with cylinder previously. If the cylinder is over-sized, select piston fittable to this cylinder and assemble.	
9. Piston ring	After setting rings on the piston, check to avoid any hooking between ring and piston.	
	In fitting rings, be careful upper and lower surface of the rings. (Generally on the upper surface maker's punch mark is shown.)	
	In case of using over sized cylinder, use a ring fittable with the cylinder.	

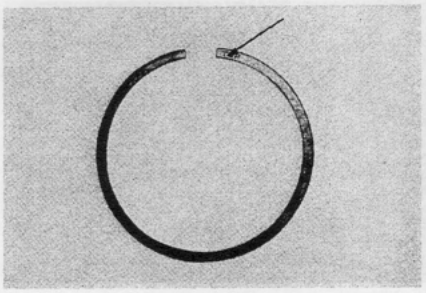
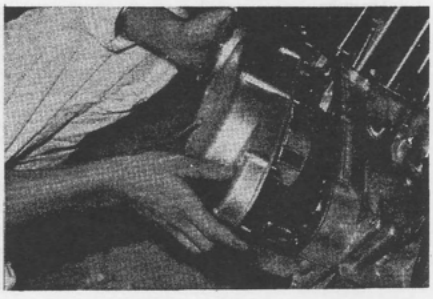
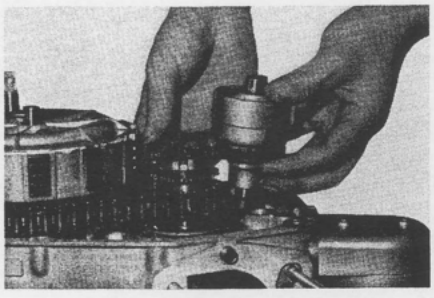
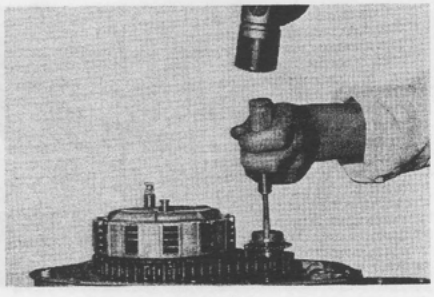
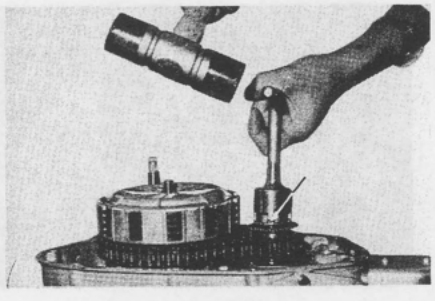


Fig. 35

C. L. Cover

	Disassembly	Assembly	Precaution Tools
 Fig. 36	1. L. cover Packing Dowel pin	In fitting L. cover, be careful the oil filter cover not to bite on a dowel pin of the oil filter shaft.	T-Handle forehead driver (# 3) 10m/m socket wrench Plastic hammer
 Fig. 37	2. Oil filter	Set oil filter drive sprocket pin facing R. outward.	
 Fig. 38	3. Lock washer		Forehead driver Plastic hammer
 Fig. 39	4. Lock nut	After tightening perfectly, turn up the torque of lock washer. If not torque and nut coincided, nut should be locked after turning to the tightening direction without loosing it.	

Disassembly	Assembly	Precaution Tools
5. Clutch pressure plate	To tighten plate setting bolts, tighten them evenly, diagonally as shown in the picture. Check existence of spring.	10m/m socket wrench

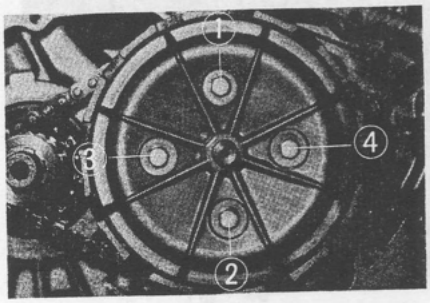


Fig. 40

6. Clutch lifter joint piece	In assembly, check operation of oil metal guide.	

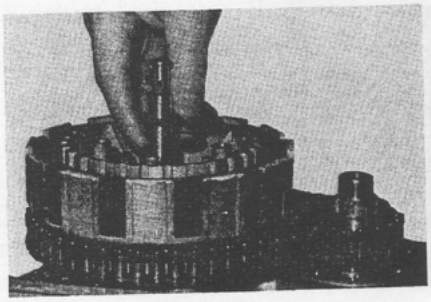


Fig. 41

7. 25m/m set ring	Be careful about cripple	snap ring remover

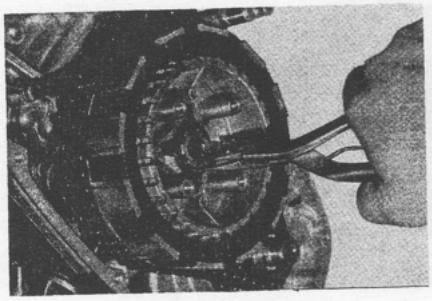


Fig. 42

8. Clutch center		

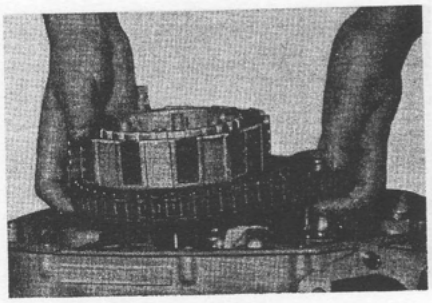
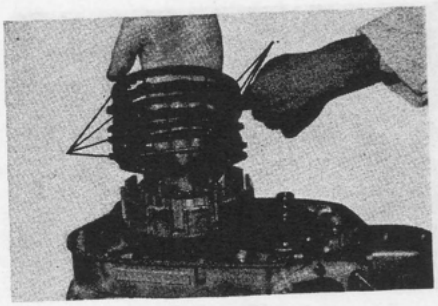
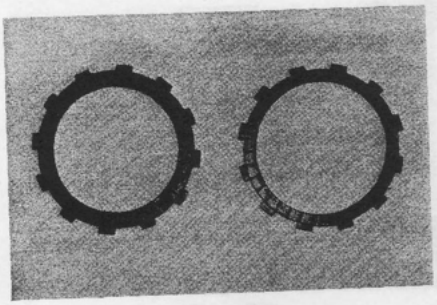
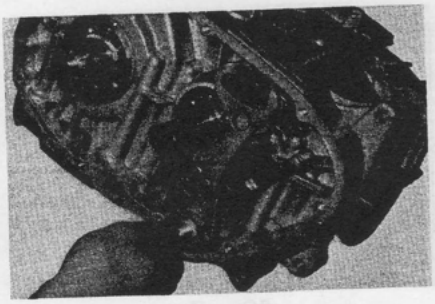
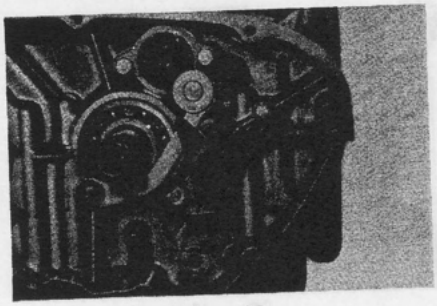


Fig. 43

	Disassembly	Assembly	Precaution Tools
 Fig. 44	9. Clutch plate Clutch friction disc	Pay attention for order of fitting.	In disassembly and assembly, do it perpendicularly to the crank shaft and trans mission main shaft.
 Fig. 45		Be careful about size.	
 Fig. 46	10. Shift spindle		
 Fig. 47	11. Shift drum stopper Shift drum stopper guide		10m/m socket wrench 17m/m socket wrench

In tightening stopper bolt of kick starter, the mark on the end of kick starter spindle should be seen through the hole.

Fig. 48

D. R. Cover

Disassembly	Assembly	Precaution Tools

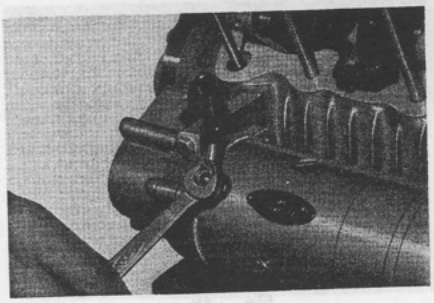


Fig. 49

1. Starting moter cable

10m/m spanner

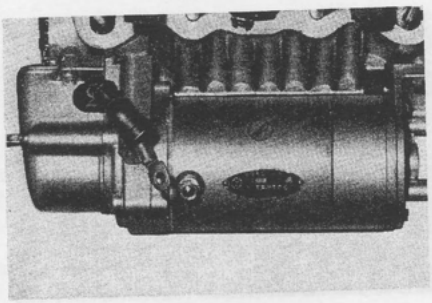


Fig. 50

2. Starting motor
   R. L. side cover

T-Handle forehead driver (# 2)

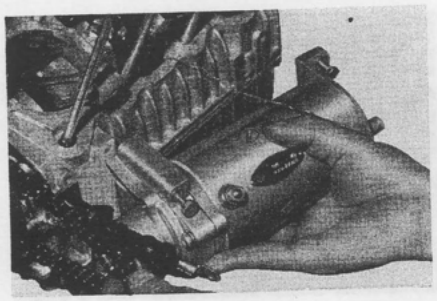


Fig. 51

3. Starting motor

10m/m socket wrench

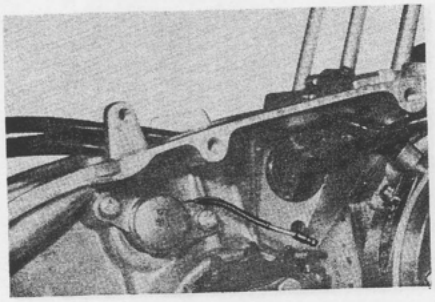


Fig. 52

4. Neutral switch

Disassembly	Assembly	Precaution Tools
5. A.C. dynamo starter	After starter assembled, check rotation of the starter sprocket.	10m/m socket wrench

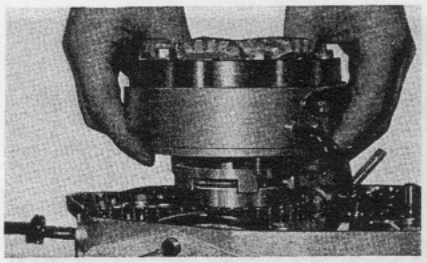


Fig. 53

6. A.C. dynamo Rotor		14m/m socket wrench Plastic hammer Dynamo rotor puller 17m/m spanner

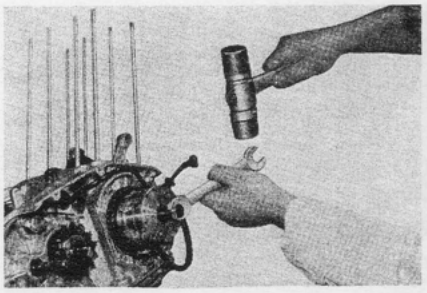


Fig. 54

7. Starting sprocket stopper		10m/m socket wrench Plastic hammer Forehead driver

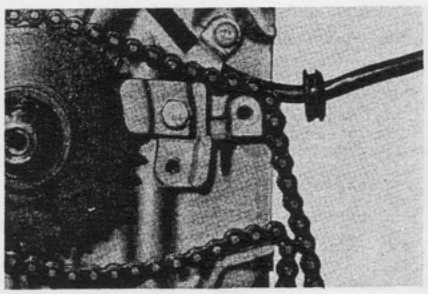


Fig. 55

8. Starter sprocket		

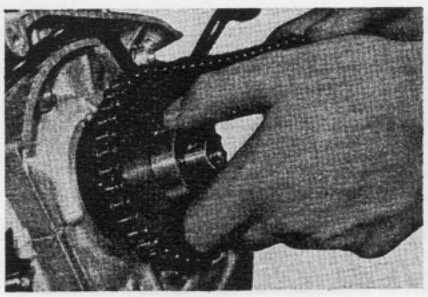
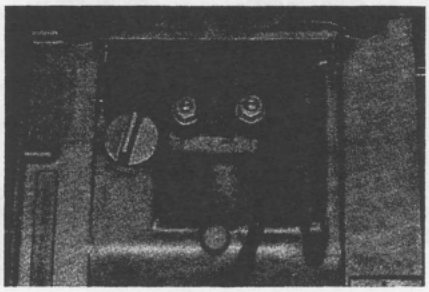
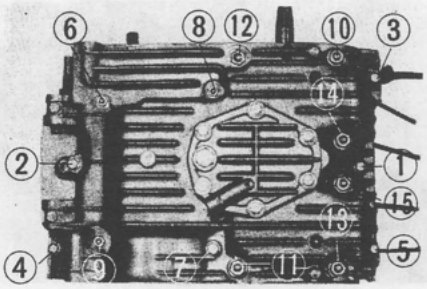
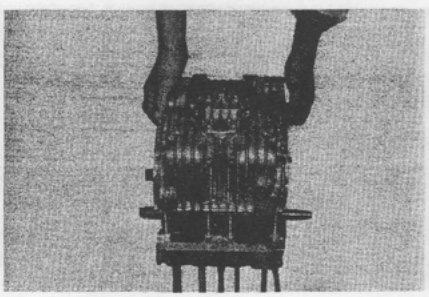
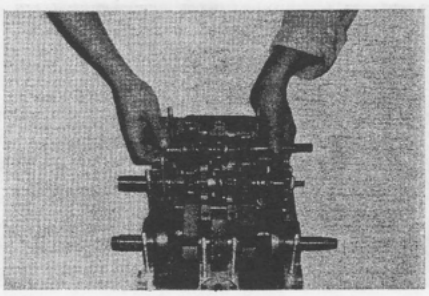


Fig. 56

E. Mission (Crank)

	Disassembly	Assembly	Precaution Tools
 Fig. 57	1. Upper crank case setting nut		14 m/m socket wrench
 Fig. 58	2. Under crank case setting nut & bolt	In tightening nut and bolt. follow order as shown in figure starting temporary tightening and then actual tightening.	10 m/m socket wrench 14 m/m socket wrench Plastic hammer
 Fig. 59	3. Under crank case		
 Fig. 60	4. Main shaft		

Disassembly	Assembly	Precaution Tools

5.

Counter shaft

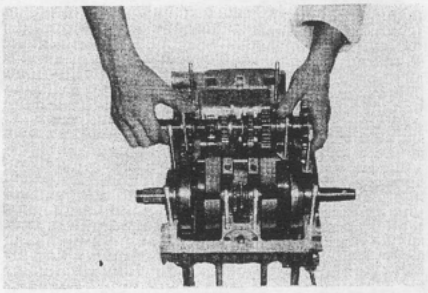


Fig. 61

To set bearing oil seal do it securely.

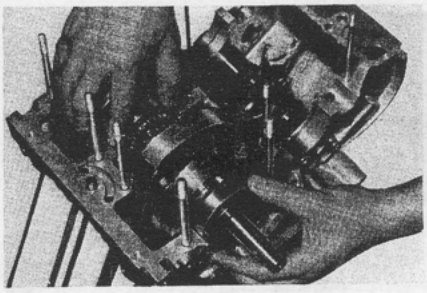


Fig. 62

Paint liquid packing on the case.

Note ; lease the surface of packing be fore painting. Don't use with attaching cleansing oil or oil. Paint without choking oil holes.

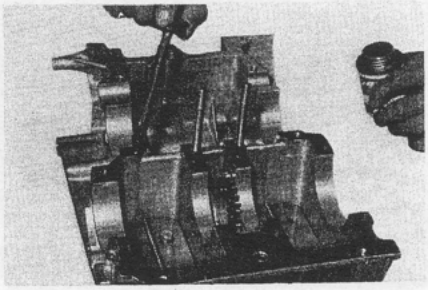
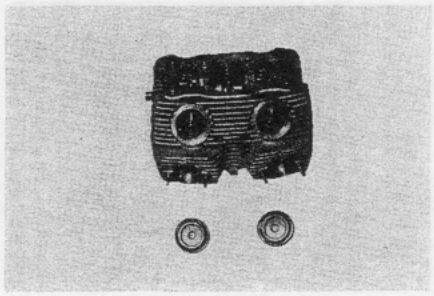
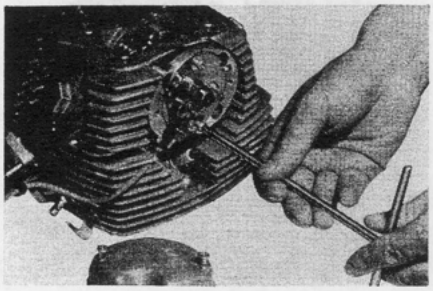
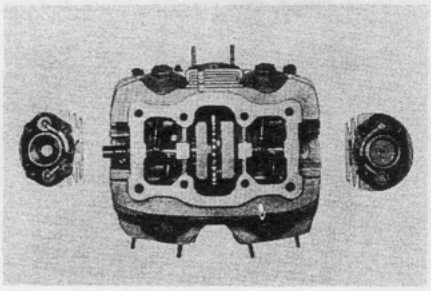
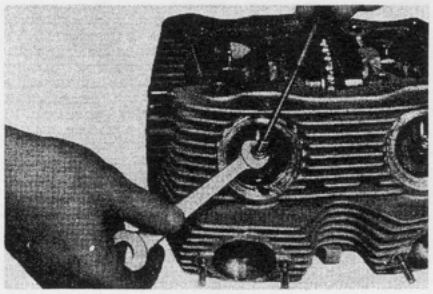


Fig. 63

F. Cylinder Head

	Disassembly	Assembly	Precaution Tools
 Fig. 64	1. Cylinder head cap		23m/m spanner
 Fig. 65	2. Contact breaker		T-Handle forehead driver (# 2)
 Fig. 66	3. R.L. cylinder head side cover		T-Handle forehead driver (# 3)
 Fig. 67	4. Tappet adjusting screw		10m/m spanner Tappet adjusting socket wrench

Disassembly	Assembly	Precaution Tools
5. Valve		Attach tag on L and R. valves not to be mixed each other. Valve lifter Thin nose pliers
6. Rocker arm crank pin Rocker arm	In assembly rock arm crank pin, pay attention to outer diameter of inlet rocker arm crank pin and of exhaust rocker arm pin to insert inside the cylinder head. Former pin is larger than diameter of that of the latter. Cutting-grooves on the rocker arm crank pin at two places are set for oil passage and retreat for stud bolt. So need special attention to allocate pin to assemble.	Rocker arm crank pin extrator
7. Cam shaft lock nut		Forehead driver Plastic hammer

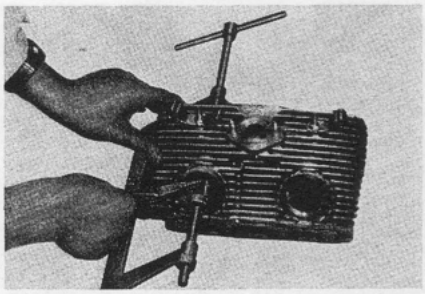


Fig. 68

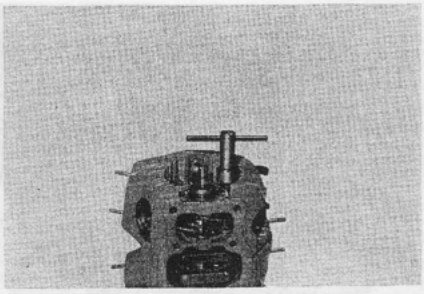


Fig. 69

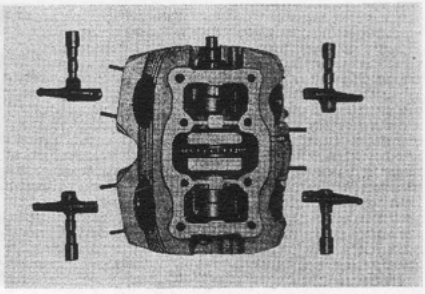


Fig. 70

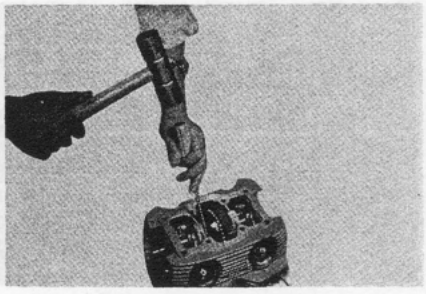
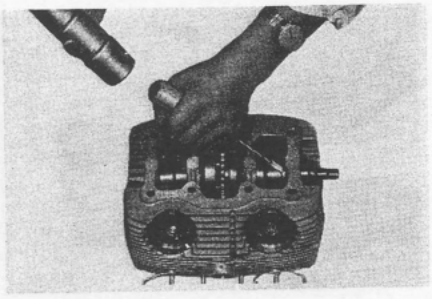
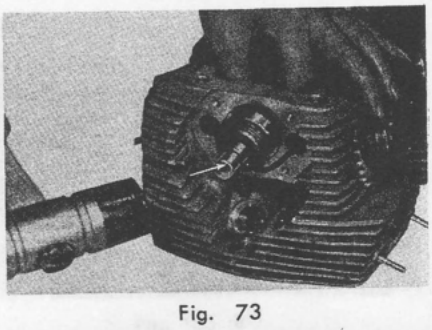
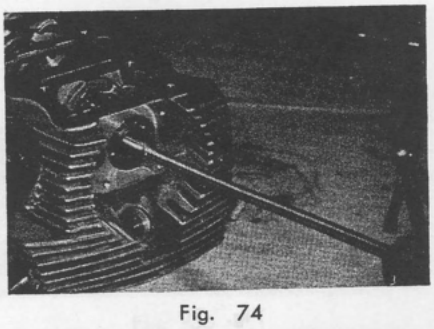
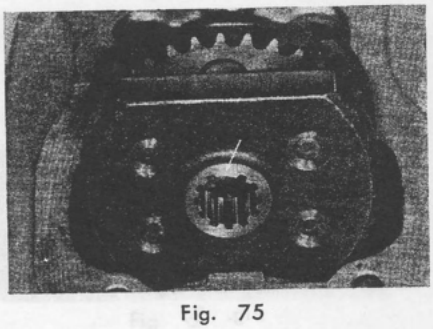


Fig. 71

	Disassembly	Assembly	Precaution Tools
 Fig. 72	8. R. cam shaft		Forehead driver Plastic hammer
 Fig. 73		Assembly process of L. cam shaft. After coinciding spline, put the red line of the point shaft cam on the punched mark of the cam sprocket (facing upward) then insert.	Plastic hammer
 Fig. 74	9. Cam shaft lock nut R. cam shaft		10m/m socket wrench
 Fig. 75	10.	In assembly the cam shaft, coincide the spot where a tooth of spline of the cam sprocket complete is lacking with the corresponding spot on the cam shaft and then insert.	

Disassembly	Assembly	Precaution Tools
11. Cam sprocket comp.	Put the punched mark upward and cam shaft racker nut to the right side.	

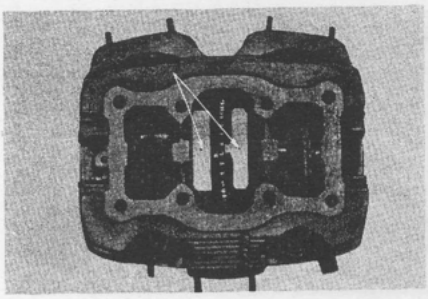


Fig. 76

Valve seat cutter

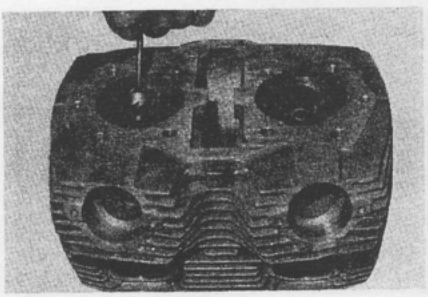


Fig. 77

G. Oil Pump

	Disassembly	Assembly	Precaution Tools

Fig. 78

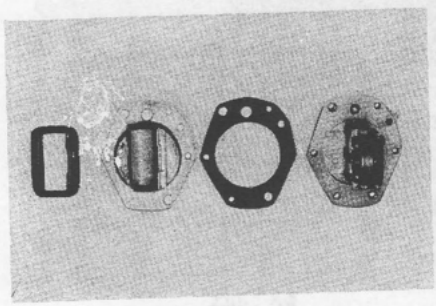


Fig. 79

1.
Oil pump strainer
Oil pump packing B
Oil receiver
Oil pump body

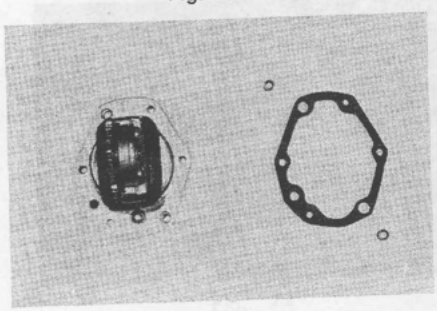


Fig. 80

2.
Oil pump packing A
Dowel pin

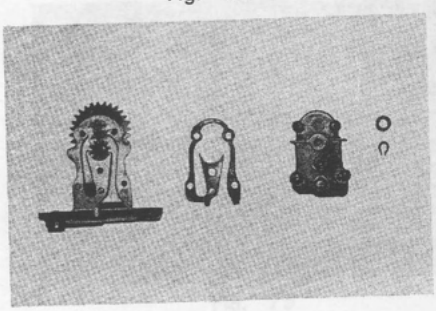


Fig. 81

3.
Snap ring

Check smooth running of the drive gear.

Snap ring remover

Disassembly	Assembly	Precaution Tools
4. Side cover		Refer to the engine minor overhaul and assembly. T-Handle forehead driver (# 3)
5. Oil pump side cover dowel pin Oil pump gear A Oil pump gear B Oil pump drive gear		

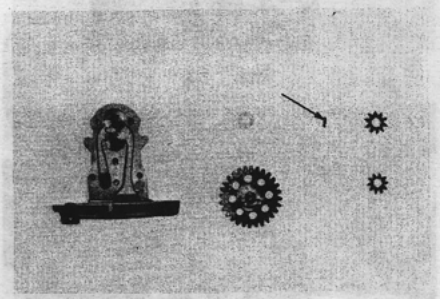
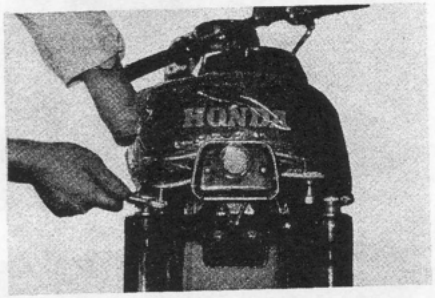
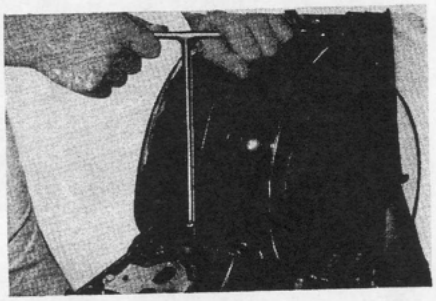
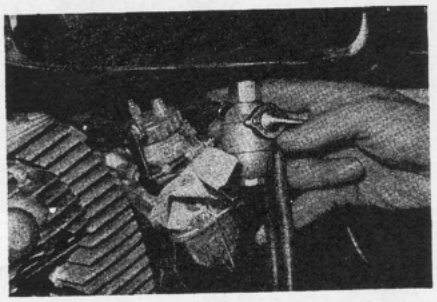
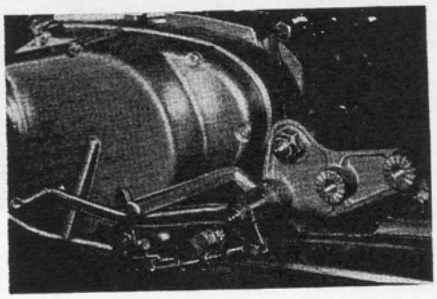


Fig. 82

2. ENGINE (CB72·77)

A. Engine replacemet

	Disassembly	Assembly	Precaution Tools
 Fig. 83	1. (L-side) Dual seat		14m/m spanner
 Fig. 84	2. Fuel tank setting bolt		10m/m socket wrench
 Fig. 85	3. Gear change pedal Step bar	In assembly the step bar, coincide the punched mark with line of the bracket.	Take out tubes A and B stopping choke. 14m/m socket wrench 10m/m spanner
 Fig. 86			

Disassembly	Assembly	Precaution Tools

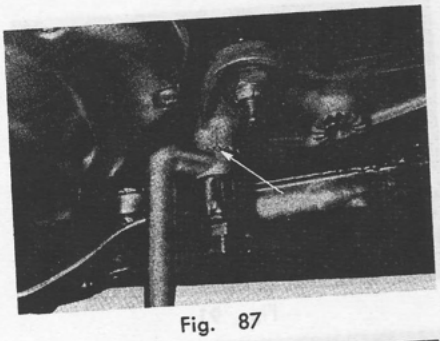


Fig. 87

4.

L. exhaust pipe joint nut

L. exhaust muffler

10m/m socket wrench

14m/m socket wrench

14m/m spanner (2)

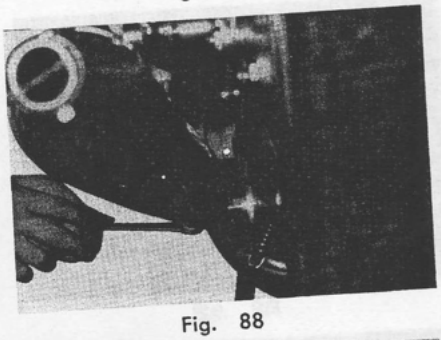


Fig. 88

5.

Dust cover

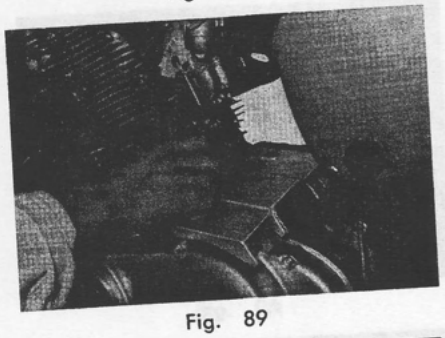


Fig. 89

6.

Speed-tachometer cable

17m/m spanner

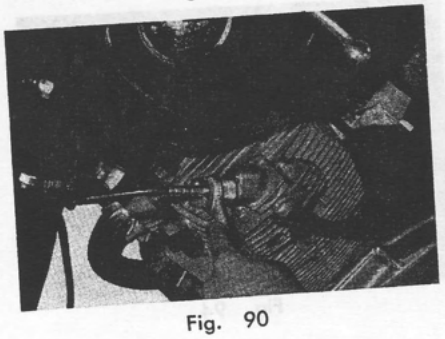


Fig. 90

Disassembly	Assembly	Precaution Tools

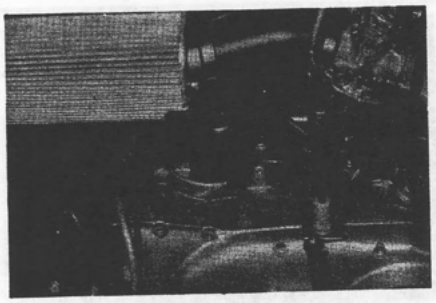


Fig. 91

7.

L. air cleaner cover

Starting motor cable

10m/m spanner

Fig. 92

8.

Air cleaner connecting tube

Throttle wire

(refer to L. side)

T-Handle forehead driver (# 2)

Fig. 93

9.

Engine setting bolt

17m/m socket wrench

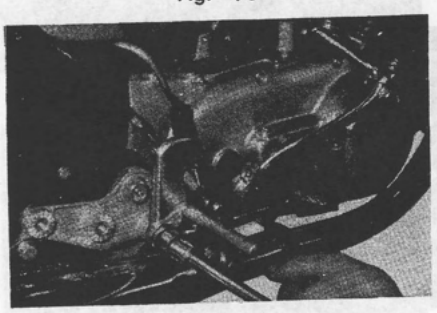


Fig. 94

10.

(R. side)

Brake pedal

Step bar

Stop switch

14m/m socket wrench

Refer to L. side

Disassembly	Assembly	Precaution Tools
11. R.exhaust pipe joint nut R. exhaust muffler		10m/m socket wrench 14m/m socket wrench 14m/m spanner Refer to L. side
12. Dynamo cover		T-Handle forehead driver (# 2)
13. R. crank case cover Clutch wire Drive sprocket cover		T-Handle forehead driver (# 3) Forehead driver
14. Drive chain		Pliers Refer to the item of frame.

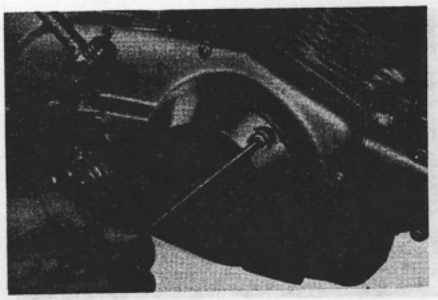


Fig. 95

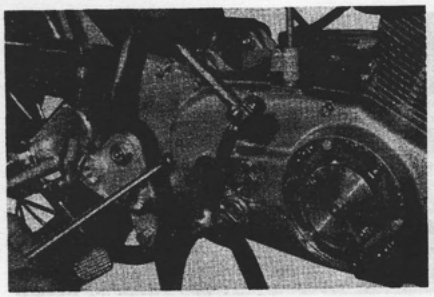
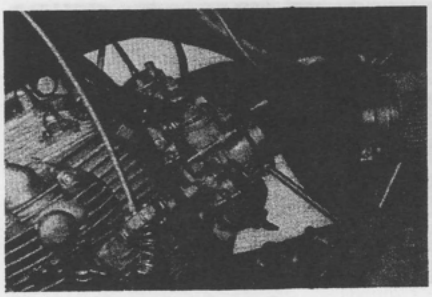
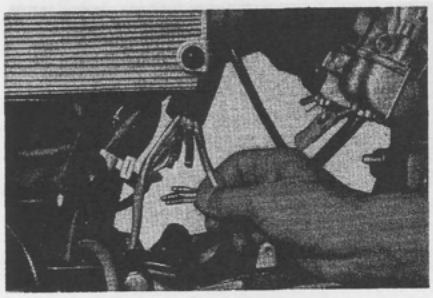


Fig. 96

	Disassembly	Assembly	Precaution Tools
	15. Air cleaner case		
 Fig. 97	16. Throttle wire		
 Fig. 98	17. Aircleaner connecting tube		About throttle wire refer to the item of Engine Replacement for Model CB 72, 77 T-Handle forehead driver (# 2)
 Fig. 99	18. Engine wiring		

Disassembly	Assembly	Precaution Tools

19.

Contact breaker cover

Contact breaker

T-Handle forehead driver (# 2)

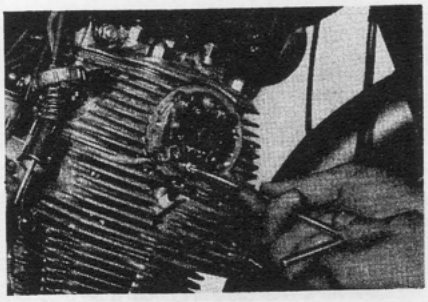


Fig. 100

20.

Engine hanger bolt

17m/m socket wrench

17m/m spanner

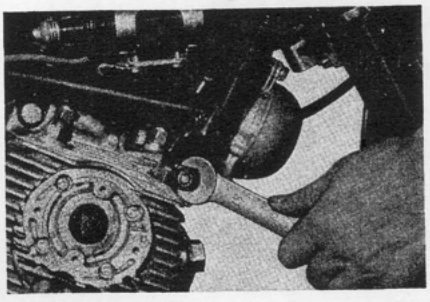


Fig. 101

21.

Engine setting bolt

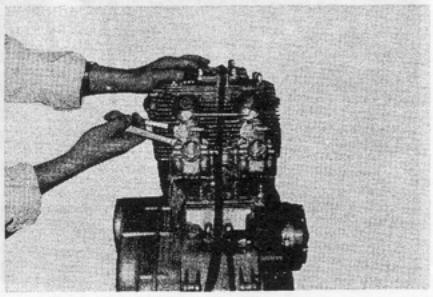
Insert T-Handle forehead driver. Take out the former driver and lay down engine to take out the latter driver.

14m/m spanner

14m/m socket wrench

17m/m spanner

B. Cylinder

	Disassembly	Assembly	Precaution Tools
 Fig. 102	1. Carburetter		10m/m spanner
	2. Cylinder head cover Cam chain tensioner		Refer to Model C72. 77 Engine Replacement.

C. Engine minor overhaul and assembly

Disassembly	Assembly	Precaution Tools
1. R. L. Cylinder head side cover		T-Handle forehead driver (# 3)

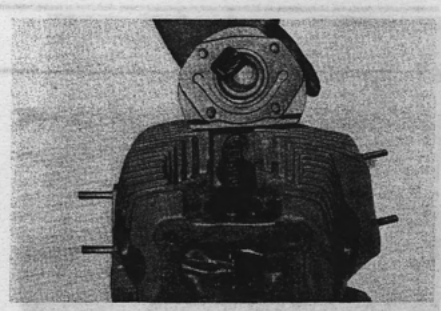
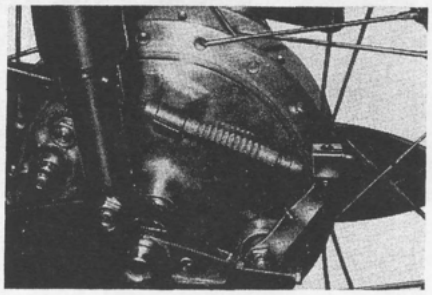
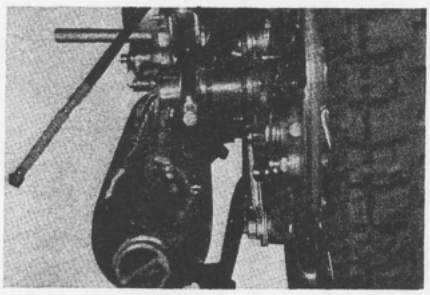
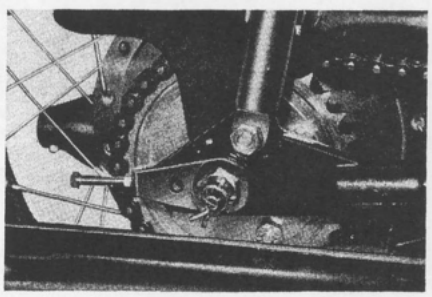
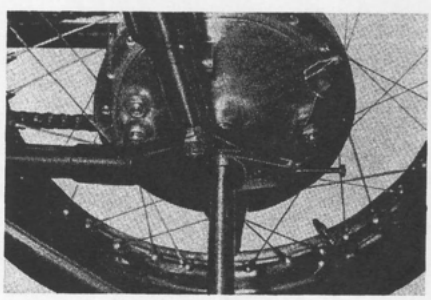


Fig. 103

3. FRAME (CB72·77)

A. Rear Fork

	Disassembly	Assembly	Precaution Tools
 Fig. 104	1. Rear brake wire comp.		14m/m spanner
 Fig. 105	2. Rear brake stopper arm		Pliers. 14m/m spanner
 Fig. 106	3. Cotter Pin Axle nut		Pliers
 Fig. 107	4. Rear wheel axle		Plastic hammer

Disassembly	Assembly	Precaution Tools	

5.
Drive chain

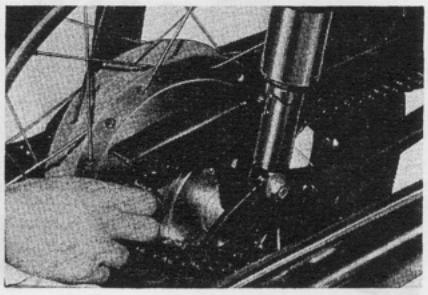


Fig. 108

6.
Rear wheel

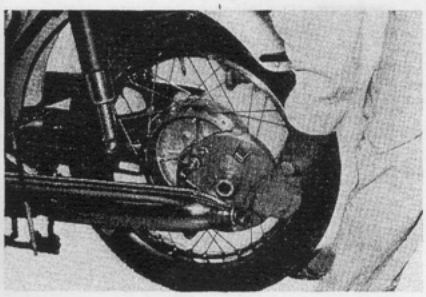


Fig. 109

7.
Chain case

10m/m spanner
10m/m socket wrench

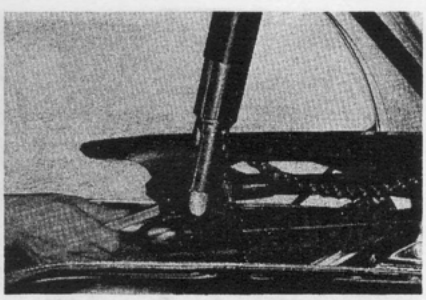


Fig. 110

8.
R. rear cushion

17m/m socket wrench
17m/m spanner

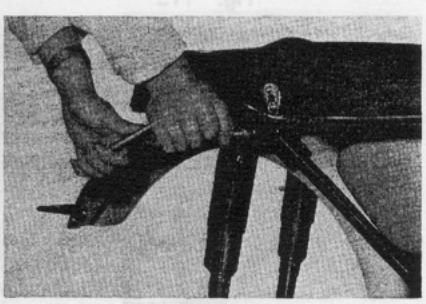
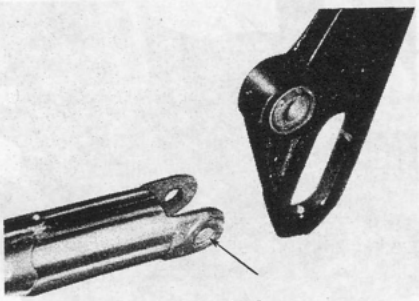
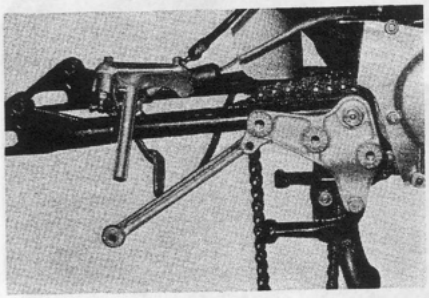
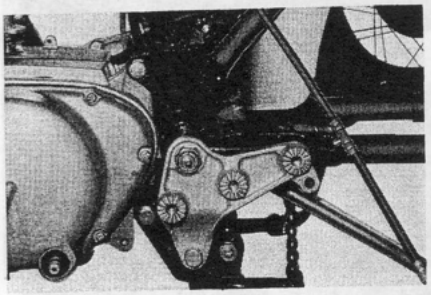


Fig. 111

	Disassembly	Assembly	Precaution Tools
 Fig. 112		In assembly, put the screwed side of the rear cushion under bolt hole to face outward.	
	9. Exhaust muffler Change pedal Barke pedal Step bar	Refer to the previously mentioned items of Engine Replacement.	
 Fig. 113	10. R. step bar bracket		17m/m socket wrench
 Fig. 114	11. L. step bar bracket		17m/m socket wrench Plastic hammer

B. Front fork

Disassembly	Assembly	Precaution Tools

1. Head light

T-Handle forehead driver (# 2)

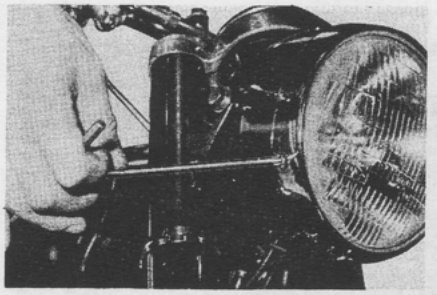


Fig. 115

2. Wiring

Draw out only white, red and blue wires.

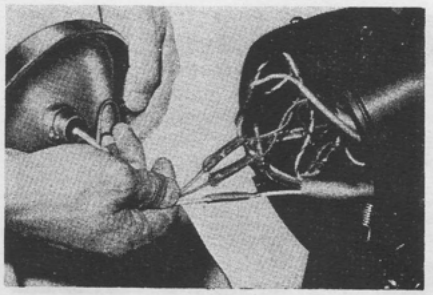


Fig. 116

3. Wire Harness terminal

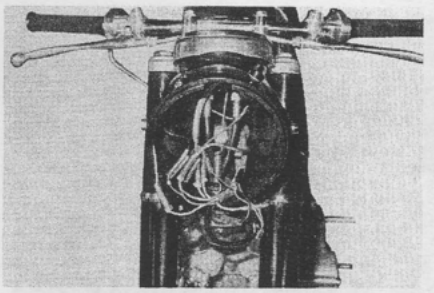


Fig. 117

4. Speedometer cable
Tachometer cable

Pliers

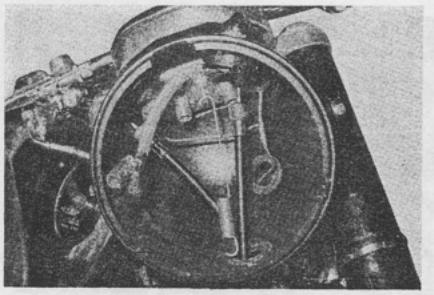


Fig. 118

	Disassembly	Assembly	Precaution Tools

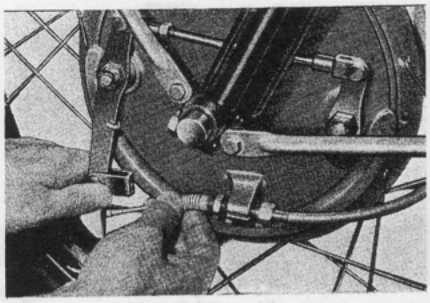


Fig. 119

5.

Brake wire

14m/m spanner

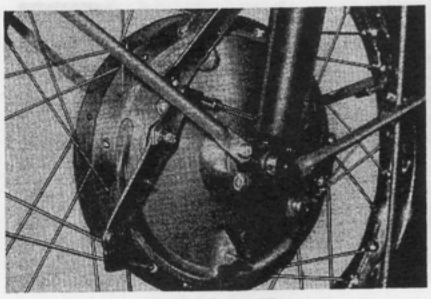


Fig. 120

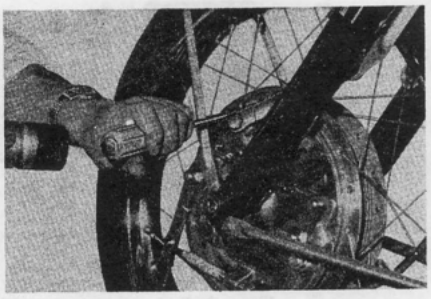


Fig. 121

6.

Front brake stopper arm

Plastic hammer

Forehead drive.

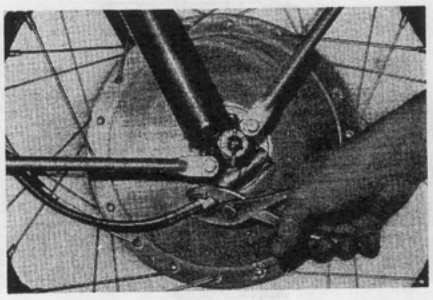


Fig. 122

7.

Speedometer cable ass'y

Pliers

Disassembly	Assembly	Precaution Tools

8.

Cotter pin (3×28)

Front wheel axle nut

Pliers

23m/m socket wrench

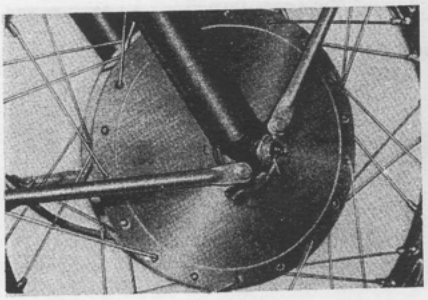


Fig. 123

9.

Front wheel axle

14m/m spanner

Plastic hammer

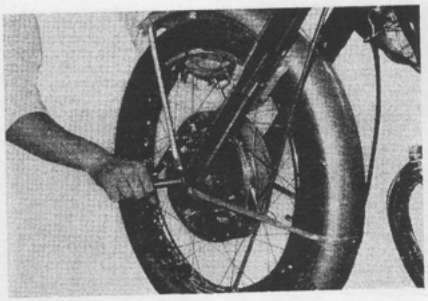


Fig. 124

10.

Front fork comp.

Front fender

10m/m spanner

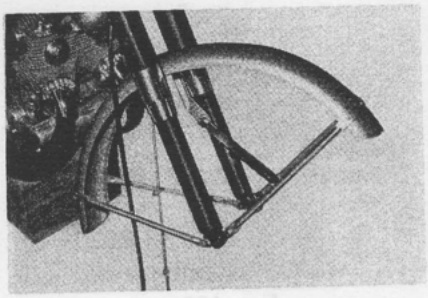


Fig. 125

11.

Starter switch ass'y

H-handle

forehead driver (# 2)

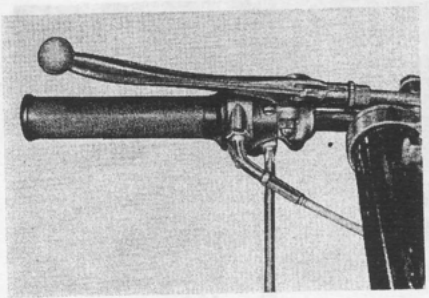


Fig. 126

	Disassembly	Assembly	Precaution Tools

Fig. 127

12.

Throttle grip pipe

T-Handle forehead driver (# 2)

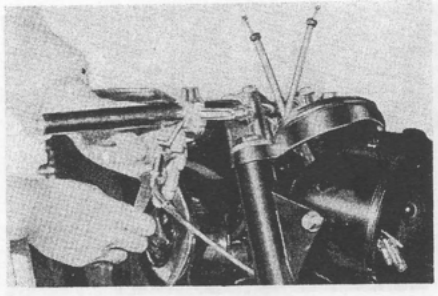


Fig. 128

13.

Throttle wire comp.

14mm spanner

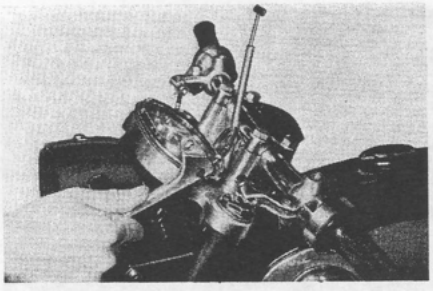


Fig. 129

14.

Clutch wire comp.

Front brake wire comp.

Clutch wire adjust bolt.

Fixing nut

Pliers

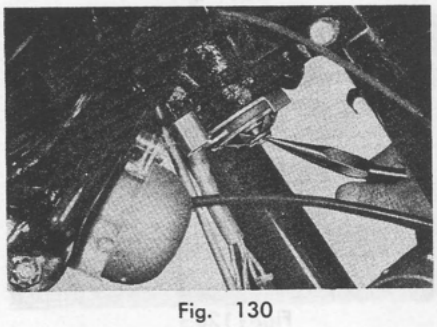


Fig. 130

15.

Snap pin 6mm

Steering damper

- lock spring nut
- spring
- Plate
- Friction disk

Pliers

Disassembly	Assembly	Precaution Tools

16.

Hex. bolt 8×30
Steering handle pipe comp.

In assembly, pay attention on punched mark.

14m/m socket wrench

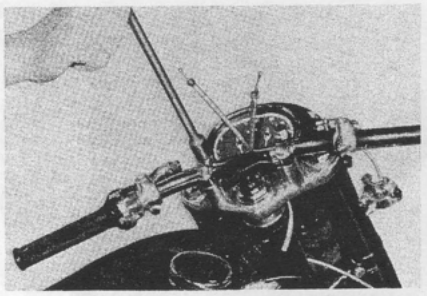


Fig. 131

17.

Steering damper
{ knob comp.
{ lock spring

Damper lock spring set bolt.

17m/m socket wrench

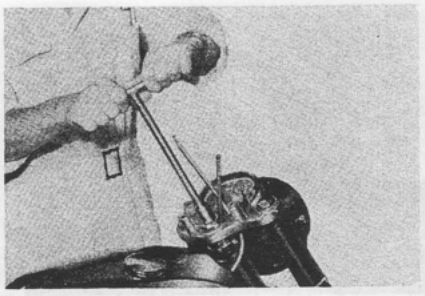


Fig. 132

18.

Speedometer ass'y

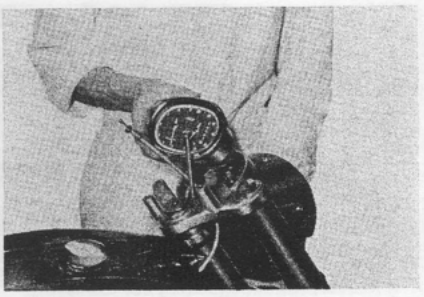


Fig. 133

19.

Front fork bolt
Steering head stem nut.
Stem nut

26m/m spanner
35m/m spanner

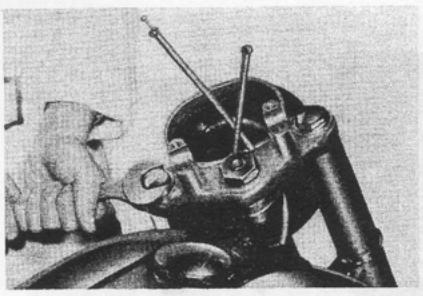


Fig. 134

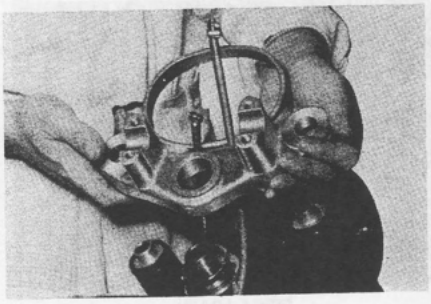


Fig. 135

Fork top bridge

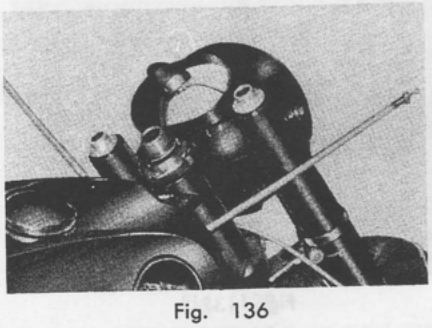


Fig. 136

21.

Steeering head thread comp.

Steering top corn race

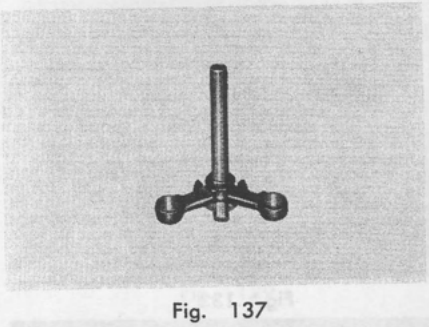


Fig. 137

22.

Steering stem comp.

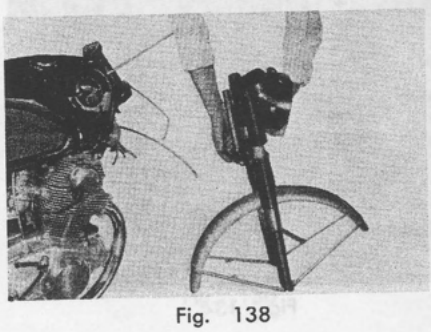


Fig. 138

Disassembly	Assembly	Precaution Tools

23.

Front fender

Take out an arrow marked bolt.

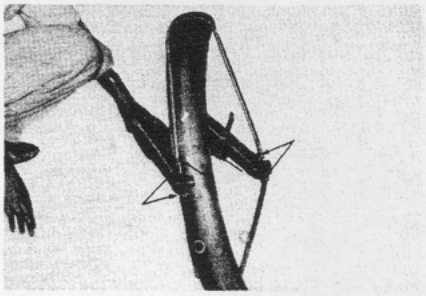


Fig. 139

24.

Front fork comp.

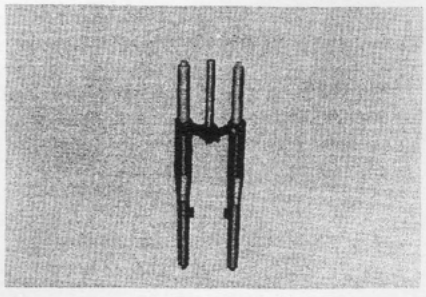


Fig. 140

Put the front fork under cover with welded clip as the R side.

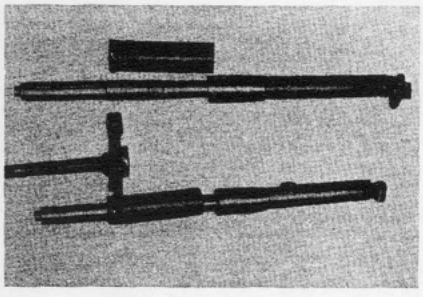


Fig. 141

CONSTRUCTION

CONTENTS

CONSTRUCTION

1. POINTS OF CONSTRUCTIONAL DIFFERENCE BETWEEN HONDA 250, 300 MODEL C72, 77 AND CB72, 77

Honda 250, 300 Super Sport Model CB72, 77 has a newly designed chassis equipped with engine which partly reconstructed from those of Model C72, 77 and aimed mainly to be used as sports car maintaining availability as racer interchanging some of its parts. As this engine is high rotation, high power type and chassis is light weight, high rigidity type, the special constructional featurer comparing with Model C72,77 could be cited as follow.

A. Engine

1. **Twin carburettor**
   To raise horse power adopted Twin carburettor system removing junction of suction manifold.
2. **Reciprocating change**
   Change control system suitable for high speed running and racing.
3. **Kick of forward step**
   Considering relation with frame, direction of step of kick arm was set forward.
4. **180 degree (I-Type) crank angle**
   To get stability at high speed reducing vibration left and right crank arm angle was set as 180 degrees.

B. Frame

1. **Frame and rear fork of steel tubing**
   To attain light weight and raise rigidity main constructional member is constructed by high carbon steel pipes.
2. **Telescopic type fork**
   To raise stability at high speed running on rough road maintaining rigidity, telescopic type fork was adopted on the front wheel suspension.
3. **Rear cushion of three step adjustment**
   Rear cushion is adjustable according to load and road condition.
4. **18 inch type**
   To enlarge bank angle and to help pleasant feeling on rough road, equipped with front wheel 2.75-18, and rear wheel 3.00-18.

5. **Speed Tachometer**
   Speedometer and Tachometer were set in the same case.

6. **Step and handle easy to move or interchange**
   To make easy riding posture suitable for general, high speed or race riding.

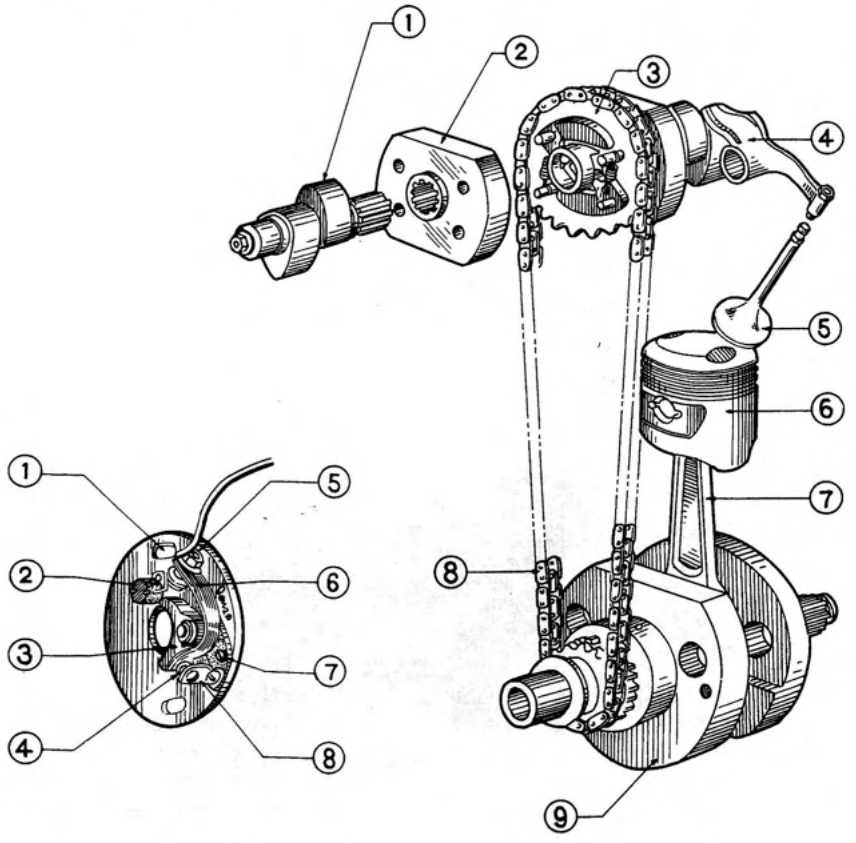
MEMO

2. ENGINE

A. Main parts of engine

Cylinder and Cylinder Head are the most important parts of engine and its construction, material and its machining rate of precision affect engine performance.

This type of engine adopted most suitable O.H.V. type valve arrangement to attain efficient combustion chamber from. On the other hand the cam shaft is set in the cylinder head and the valves are actuated by locker arm (O.H.C.), accordingly, reciprocating parts are reduced very much comparing with other types.



① Contact breaker fitting hole
② Oil felt
③ Breaker arm
④ Points
⑤ Terminal
⑥ Spring
⑦ Screw to fix contact point
⑧ Contact point

① Cam shaft
② Cam shaft fly-wheel
③ Cam sprocket
④ Valve rocker arm
⑤ Valve
⑥ Piston
⑦ Connecting rod
⑧ Cam chain
⑨ Crankshaft

Fig. 2-1.

The cam shaft is driven by chain through the timing gear reductioned 1/2. As the cylinder head is made of light alloy, not only it is light but cooling efficiency is excellent as heat conductivity is good, and shape of combustion chamber is ideal semi-spherical one to get efficient combustion of mixture and also to attain larger compression ratio. As the cylinder is machined with high rate of precision cooling efficiency and lubrication are favorable, accordingly wearing effect is very small. Single row W-type needle bearing is used at the big end of the connecting rod to get ample loading capacity at the bearing.

On the other hand single row ball bearings are used on the crankshaft, where W-type middle parts at 2 stations single row the needle bearing are used to get larger loading capacity.

As crankshaft has an important function to convert reciprocating motion to rotation, inertia force due to reciprocating motion of piston and connecting rod should be reduced by putting balance weight to get smooth revolution. The crankshaft can rotate smooth running as it is balanced by dynamic balance on the balancing machine after complete machining.

To reduce vibration at high speed revolution ond to get stability at hight speed running the right and left crank arm angle of Model CB72, CB77-1 crankshaft is set 180 degree. (For Model C72, C77 type angle is 360 degree)

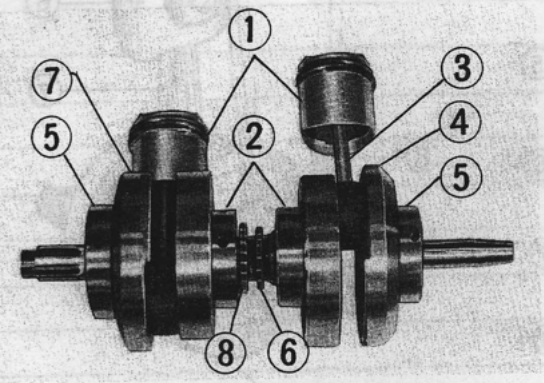


Fig. 2-2. Type-1 crankshaft

① Piston
② Roller bearing
③ Connecting rod
④ R. crankshaft
⑤ 6205 Z special ball bearing
⑥ Cam chain sprocket
⑦ L. crankshaft
⑧ Oil pump drive gear

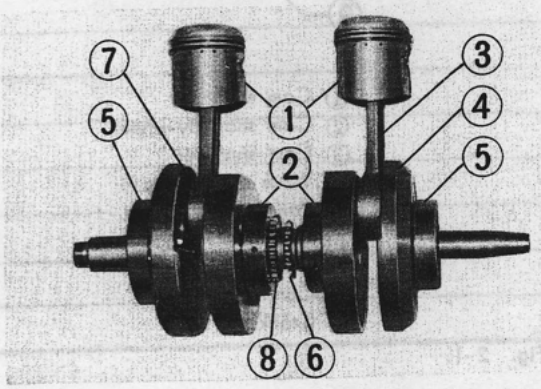


Fig. 2-3. Type-11 crankshaft

B. Lubricating system

Construction and operation

For Honda 250, 300 oil is supplied under pressure by gear pump and wet-sump system is applied. The oil pump is attached under crankcase by 6 bolts. The oil pump is shown in Fig. 2-5 and (1) is driving gear and (2) driven gear. Power is transmitted by driving gear (3) meshing with crankshaft gear. As for operation of gear pump, the driving gear (1) rotates to the arrow direction and the driven gear (2) rotates counterwise, then degree of vacuum increases on the right side sucking oil from this side to feed the left side.

Therefore each part of the pump should be carefully inspected to avoid engine burning or other troubles due to mal-lubrication. Such troubles after occur due to oil leakage through inadequate gap between gear teeth and pump main body, or between gear face and pump body or pump side cover causing drop of degree of vacuum.

Lubricating oil sumped in the crankcase is sucked by oil pamp to pass through the

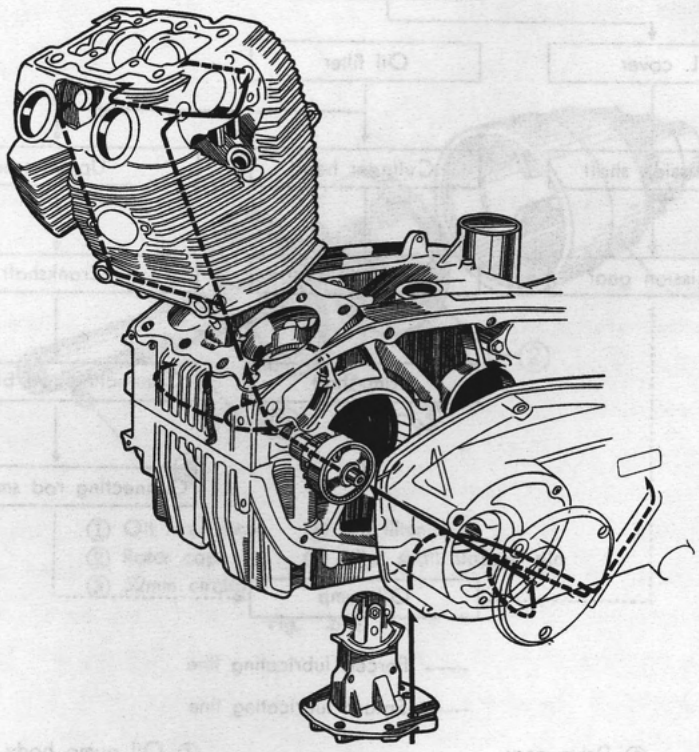
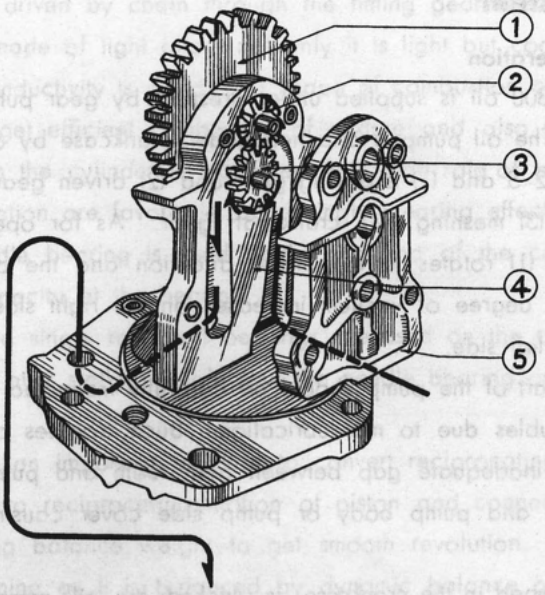
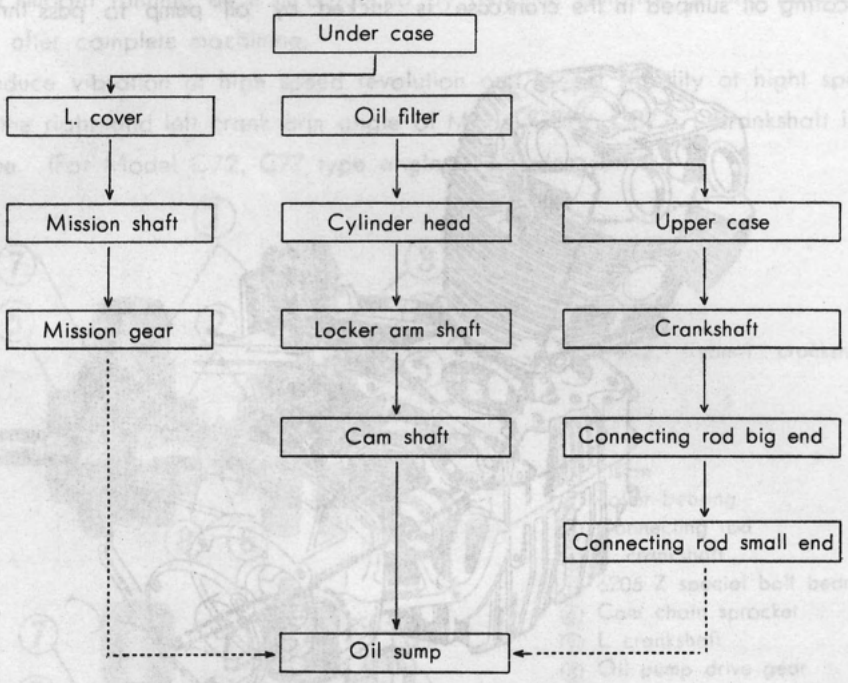


Fig. 2-4. Lubricating circulation





⟶ Forced lubricating line

⇢ Splash lubricating line

① Drive gear
② Oil pump gear (driving gear) ①
③ Oil pump gear (driving gear) ②
④ Oil pump body
⑤ Oil pump side cover

Fig. 2-5.

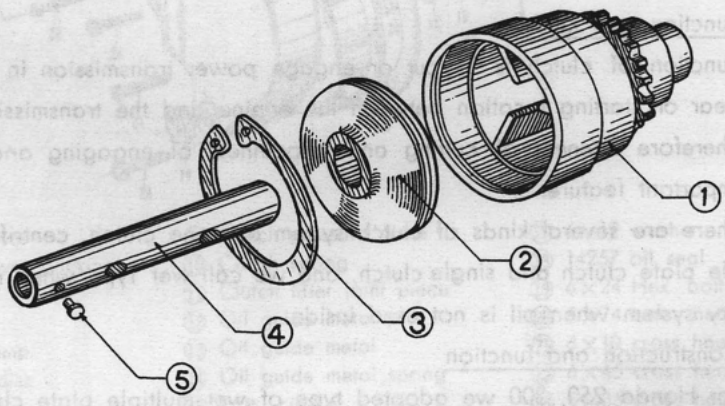
under crankcase and L. crankcase cover then the pipe line in splitted to 2-ways, one to the oil filter.

Oil cleaned in the oil filter is feeded to the crankcase where the line is splitted again to 2-ways, one is guided to the crankshaft through the center bearing and lubricate the big end of connecting rod and also the small end by splashing, and another line is guided up to the cylinder head along the cylinder stud bolts from the upper crankcase to lubricate cam shaft and locker arm separately in the front and rear rocker arm in the head then drop in the crankcase through the space around the cam chain.

On the other hand, one line splitted in the L. crankcase cover is guided into the transmission mainshaft through the oil guide metal which is fixed on the L. crankcase cover by spring, and then drop in the crankcase lubricating mission gear through oil hole bored in the shaft.

C. Centrifugal oil filter

Oil filter is located on the front side of L. crankcase cover and oil is cleaned and separated by centrifual force driven by the drive sprocket of the crankshaft and chain.



① Oil filter rotor
② Rotor cap
③ 52mm circlip
④ Oil filter shaft
⑤ Filter shaft stopper pin

Fig. 2-6.

3. POWER TRANSMISSION

Power transmission is defined such mechanism as rotation of crankshaft is transmitted to rear wheel. The first step of transmission from crankshaft to clutch is done by chain. This clutch is wet multiple plate type, so there is no heat generated by friction and also no noise perfectly.

As this transmission is such type of advance 4-step and constant meshing. there is no gear sound while in gear changing, and consequently made it possible to widen rear wheel driving power of powerful engine.

Further power is transmitted to the rear wheel sprocket by chain drive from the mission, and through rear wheel damper of rubber made to the rear wheel sprocket and the rear wheel torque is transmitted between the final driven flange.

So that torque is transmitted very smoothly without chain knock getting smooth running. Especially as clutch is locatcd on the mission shaft, made it possible to minimize deflection of crankshaft and also to stabilize clutch function reducing clutch inertia.

A. Clutch and primary chain

Clutch

(1) Function and kinds

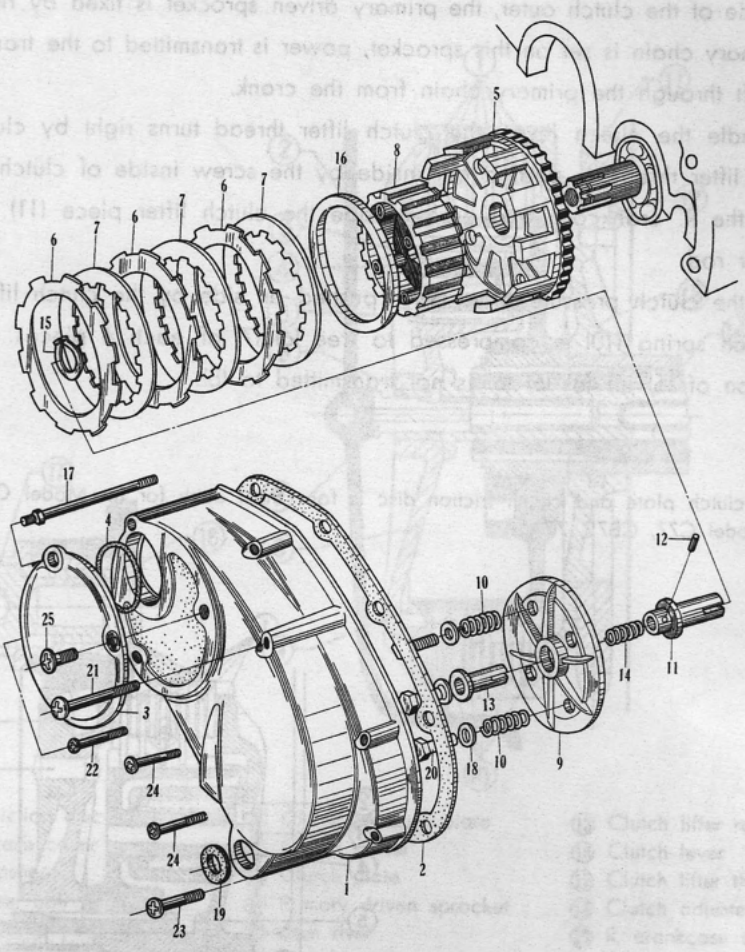
Function of clutch is to cut or engage power transmission in case of changing gear or starting location between the engine and the transmission mechanism. Therefore fineness of cutting and smoothness of engaging and disengaging are important feature.

There are several kinds of clutch system as cone clutch, centrifugal clutch, multiple plate clutch and single clutch, and we call wet type when merged in oil and dry system when oil is not used inside.

(2) Construction and function

For Honda 250, 300 we adopted type of wet multiple plate clutch.

As shown in Fig. 3-1 (disassembled figure) and Fig. 3-2 (cross sectional figure), there is clutch outer complete when crankcase cover is taken out. In the clutch outer complete, clutch sprig (10) in set by 4 of 6×24 hexagonal bolts pressing clutch pressure plate (9) and sandwitching clutch friction disc (6) by clutch plate (7). Inside of the clutch plate teeth are cut which mesh with that of outer part of clutch center (8), and the clutch center is connected with the transmission mainshaft by spline and rotates with (7), (8) and (9) as a whole with the transmission mainshaft.



① L. crankcase cover
② L. crankcase cover packing
③ Oil filter cover
④ 57×3 O-ring
⑤ Clutch outer comp.
⑥ Clutch friction disc
⑦ Clutch plate
⑧ Clutch center
⑨ Clutch pressure plate
⑩ Clutch spring
⑪ Clutch lifter joint piece
⑫ Oil guide metal pin
⑬ Oil guide metal
⑭ Oil guide metal spring
⑮ 25㎜ circlip
⑯ L. leg sealed lower bolt
⑰ 6×19 washer
⑱ 14257 oil seal
⑲ 6×24 Hex. bolt
⑳ 6×74 cross head screw
㉑ 6×10 cross head screw
㉒ 6×45 cross head screw
㉓ 6×35 cross head screw
㉔ 6×16 cross head screw

Fig. 3-1. Disassembled picture of clutch

On the other hand, with the groove cut along the outer perimeter of clutch outer, the clutch friction disc is connected through flange mating with said groove, and the transmission mainshaft can rotate freely.

Therefore in case of disengaging clutch, (9) (6) (7) (6) (7) (6) (7) (6) (7) (8) and (5) are pressed by clutch springs, rotating power of crank is transmitted to the mission as a whole by friction.

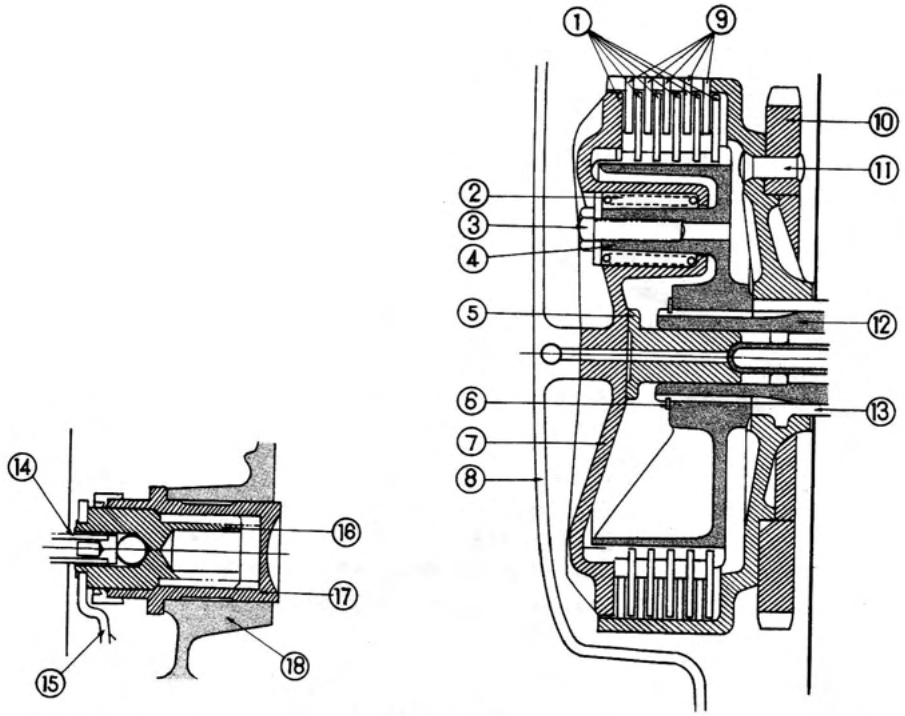
Inside of the clutch outer, the primary driven sprocket is fixed by rivetting and as primary chain is set on this sprocket, power is transmitted to the transmission main shaft through the primary chain from the crank.

Handle the clutch lever, the clutch lifter thread turns right by clutch wire, and the lifter thread is pushed out inside by the screw inside of clutch adjuster fixed on the R. crankcase and push outside the clutch lifter piece (11) through clutch lifter rod.

As the clutch pressure plate (9) is pushed on side by the clutch lifter joint piece. clutch spring (10) is compressed to free (6) (7) of each 4 pieces. Therefore rotation of (5) (6) (6) (6) (6) is not transmitted to (8).

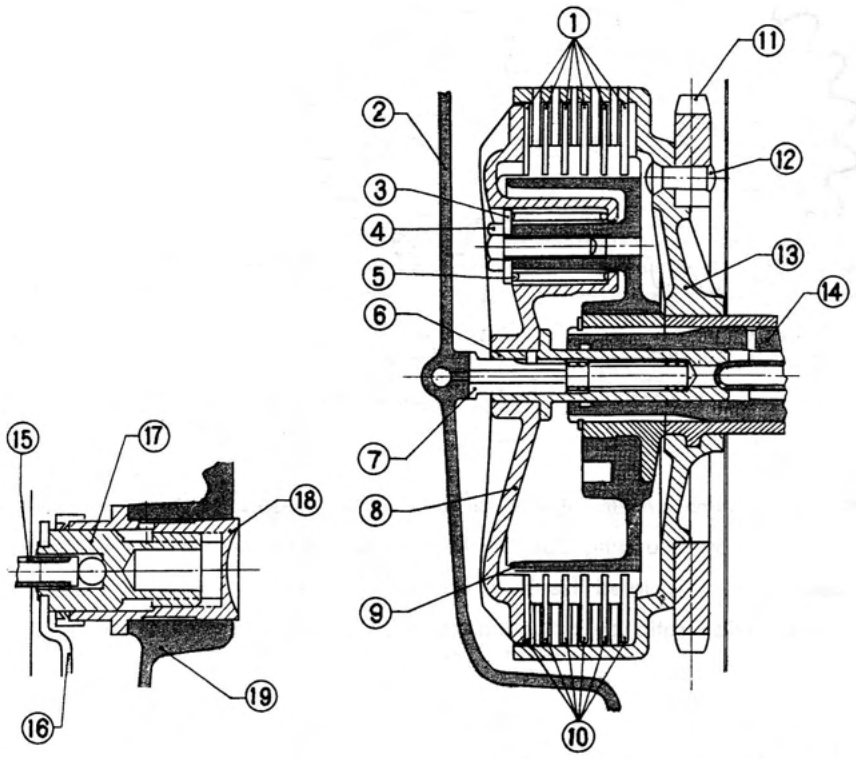
Note :

Number of clutch plate and clutch friction disc is four sheet each for for Model C72 and 5 sheets each for Model C77, CB72, 77.



① Clutch plate
② Clutch spring
③ 6mm bolt
④ Clutch center
⑤ Clutch lifter joint piece
⑥ 25mm circlip
⑦ Pressure plate
⑧ L. crankcase cover
⑨ Clutch friction disc
⑩ Primary driven sprocket
⑪ 6mm rivet
⑫ Mission shaft
⑬ Clutch outer boss
⑭ Clutch lifter rod
⑮ Clutch lever
⑯ Clutch lifter thread
⑰ Clutch adjuster
⑱ R. crankcase cover

Fig. 3-2. Cross section of clutch for Model C72



① Clutch friction disc
② L. crankcase cover
③ 6×19 washer
④ 6×24 Hex. bolt
⑤ Clutch spring
⑥ Clutch lifter joint piece
⑦ Oil guide metal
⑧ Clutch pressure plate
⑨ Clutch center
⑩ Clutch plate
⑪ Primary driven sprocket
⑫ 6mm rivet
⑬ Clutch outer
⑭ Mission shaft
⑮ Clutch lifter rod
⑯ Clutch lever
⑰ Clutch lifter thread
⑱ Clutch adjuster
⑲ R. crankcase cover

Fig. 3-3. Cross-section of clutch for Model C77, CB72, 77

B. Transmission system

1. Function and kinds

Following clutch, function of transmission is to convey power transmission, and convert torque by means of meshing gears of different number of teeth. As shown in Fig. 3-4 if driving gear is smaller than driven gear, No. of rotation of the driven side will be smaller transmitting large torque. Here it is called reduction ratio showing the ratio of each gear numbers.

There are two systems of gear meshing for transmission of auto-bicycle i.e. selective sliding system and constant meshing.

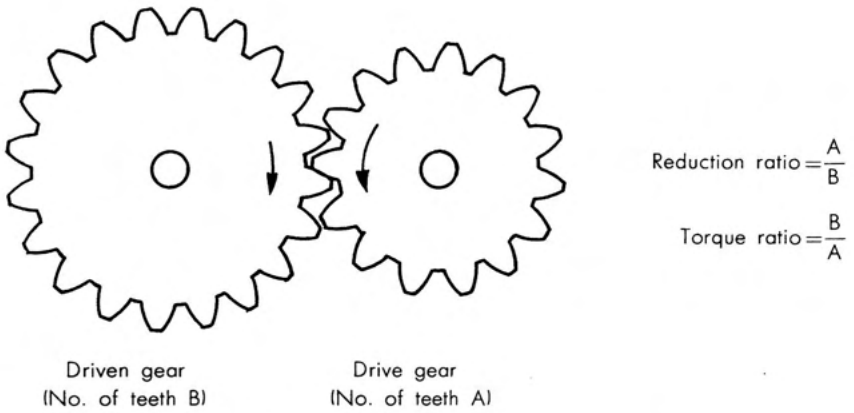


Fig. 3-4. Relation between reduction ratio and torque ratio

By selective sliding system, shift gear is slided by gear shift fork to get adequate reduction ratio by changing gear to be meshed, and by constant meshing system each gear can be rotated freely always each gear in meshing state, and can be changed reduction ratio by actuating optional gear by means of special clutch.

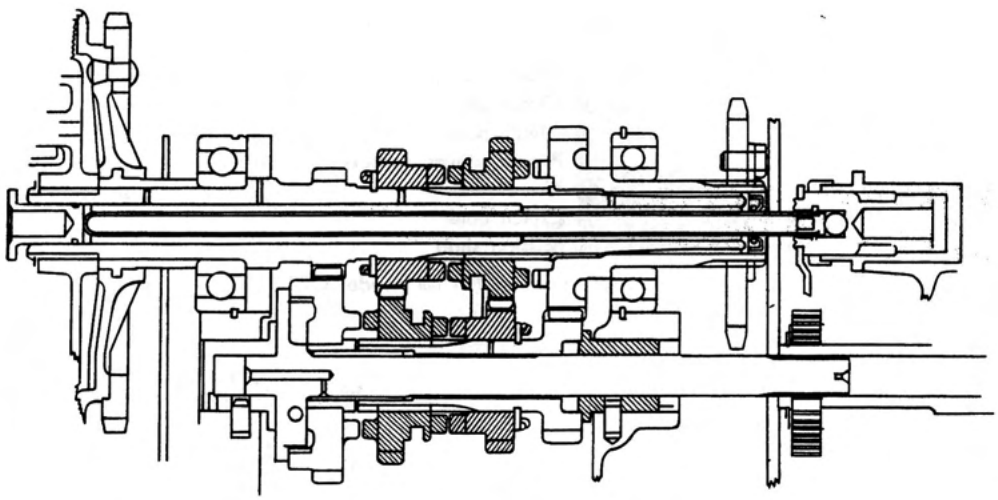


Fig. 3-5. Cross-sectional figure of transmission gear

2. Construction and function

The transmission system of Honda 250 · 300 is constant mesh and advance 4 stage rotary type. In Fig. 3-5 to Fig. 3-9, neutral, first, second, third and to stage are shown. Function of transmission as shown in Fig. 3-5 and Fig. 3-10 is as follows,

that is power is transmitted from crankshaft to primary drive chain, clutch outer, clutch center and transmission.

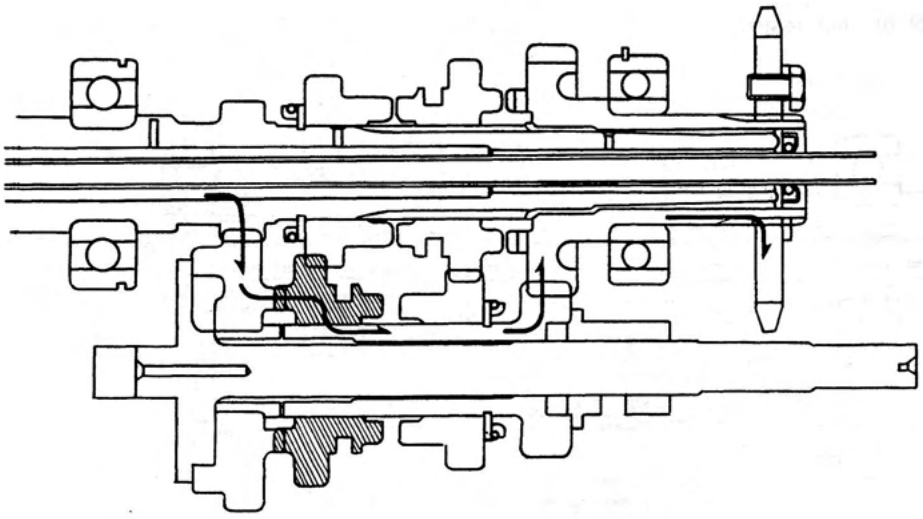


Fig. 3-6. The first

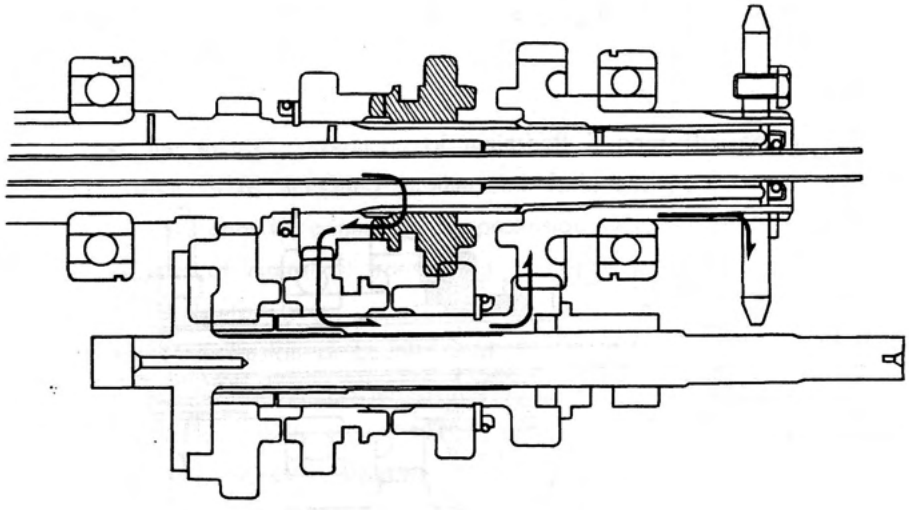


Fig. 3-7. The second

Explaining in order, from the crank rotation is transmitted to the clutch, and the transmission shaft is rotated to turn the low gear (7). The low gear turns sliding over the kick-starter spindle (19). As the counter shaft 2 gear (9) which is connected with the

spline on the counter shaft complete can move freely axially, move this to the left side by gear shift fork to mate with low gear (Fig. 3-6) then the low gear combines with the counter shaft as one body to transmit power to the top gear (12). Here the axial movement of mainshaft gear is restricted by the gear cotter (14) and the set ring (15) but not restricted rotationally. (Similarly counter shaft 3 gear (11).

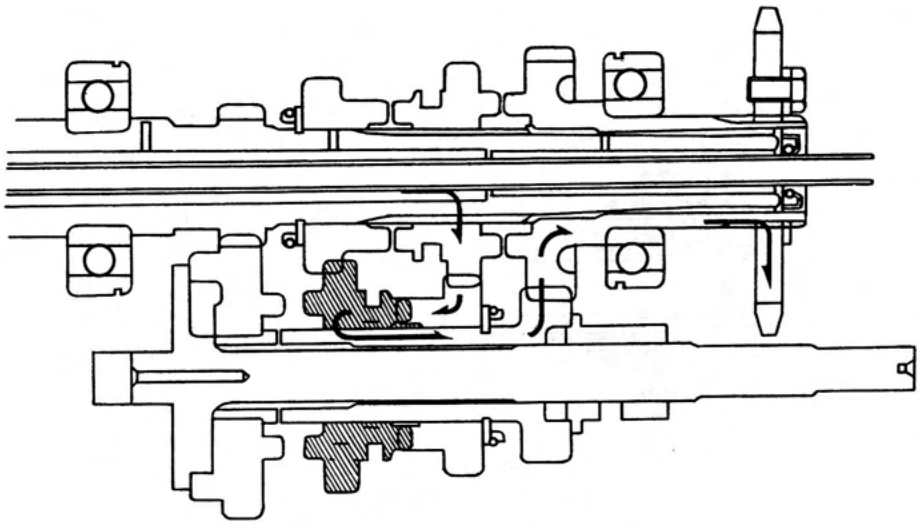


Fig. 3-8. The third

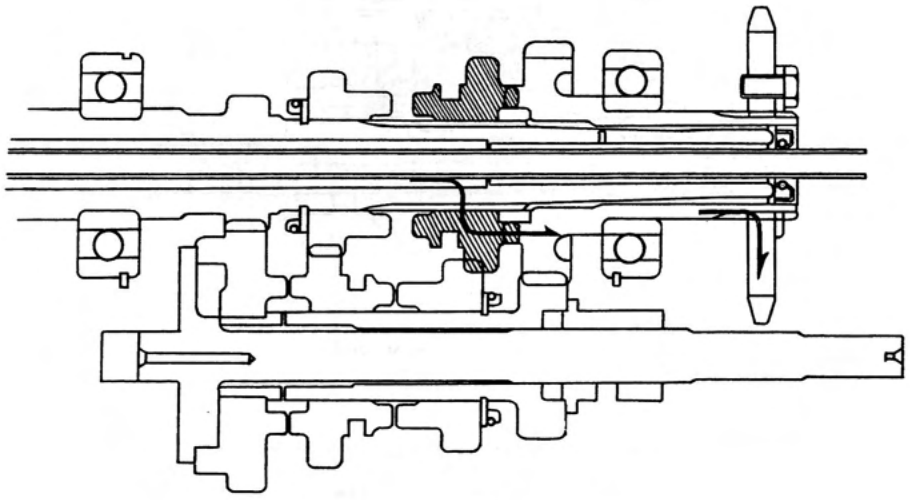
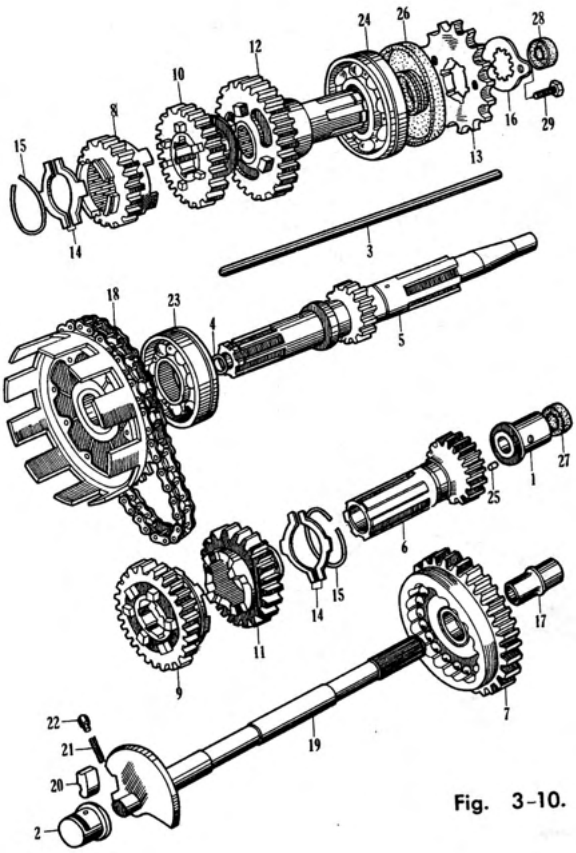


Fig. 3-9. The fourth (Top)



① 14mm bush
② Kick spindle metal bush
③ Clutch lifter rod complete
④ 12.8×2.2 "O" ring
⑤ Transmission mainshaft
⑥ Counter shaft (20T)
⑦ Low gear complete
⑧ Mainshaft 2-gear
⑨ Counter shaft 2-gear
⑩ Main shaft 3-gear
⑪ Counter shaft 3-gear
⑫ Top gear complete
⑬ Drive sprocket 15T
⑭ Gear cotter
⑮ 33mm set ring
⑯ Drive sprocket fixing plate
⑰ 14mm bush C
⑱ Primary drive chain (DK328.56L)
⑲ Kick starter spindle
⑳ Kick spindle pawl
㉑ Kick spindle spring
㉒ Kick spindle push pin
㉓ Ball bearing 6305 HS
㉔ Ball bearing 6206 HS
㉕ Roller 5×6.25
㉖ Oil seal 30628
㉗ Oil seal 14257
㉘ Oil seal 8216 TC
㉙ Hex. bolt 6×12

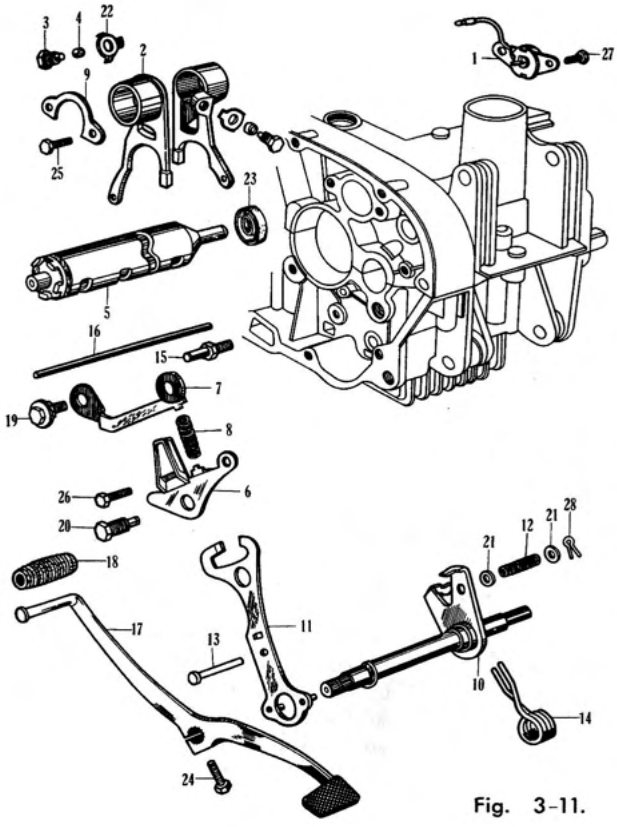
Fig. 3-10.

Similarly for the second, protrusion of mainshaft 3 gear (10) combine with that of mainshaft 2 gear (8) by actuating another shift fork, and power is transmitted by rotating mainshaft 2 gear (8) connected by protrusion with mainshaft 3 gear (10) mounted on the spline of mainshaft transmitting to counter gear (3) and by spline from counter shaft to the top gear.

As for the third, protrusion of counter shaft 2 gear (9) combine with that of counter shaft 3 gear (11) to transmit power to the top gear (12) through counter shaft (6).

And for the top, mainshaft 3 gear (10) combine with the protrusion of the top gear and rotation of mainshaft is transmitted straightly to the drive sprocket to drive the drive chain. As for the neutral, each protrusion is not combined so power is not transfer to the top gear.

Other parts of the kick starter system are kick spindle pawl (20) and kick spindle pawl spring (21). This pawl mates with the inside groove of the low gear to ratote low gear. When not kicked, the head part of this pawl is pushed by protruded part inside crankcase, and pawl is pulled in to free the gear.



① Neutral switch assembly
② Gear shift fork
③ Gear shift fork guide pin
④ Gear shift fork roller
⑤ Gear shift drum
⑥ Shift drum stopper guide complete
⑦ Shift drum stopper complete
⑧ Shift drum stopper spring
⑨ Shift drum setting plate
⑩ Gear shift spindle complete
⑪ Gear shift arm complete
⑫ Shift arm spring
⑬ Shift arm spring pin
⑭ Gear shift return spring
⑮ Shift return spring pin
⑯ Shift fork rod
⑰ Gear change pedal
⑱ Change pedal rubber
⑲ Stopper arm setting bolt
⑳ Kick starter stopper bolt
㉑ Shift arm spring washer
㉒ Shift fork pin lock washer
㉓ 12254.5V oil seal
㉔ 6×24 Hex. bolt
㉕ 6×16 Hex. bolt
㉖ 6×12 Hex. bolt
㉗ 6×12 Plus screw
㉘ 6×12 Cotter pin

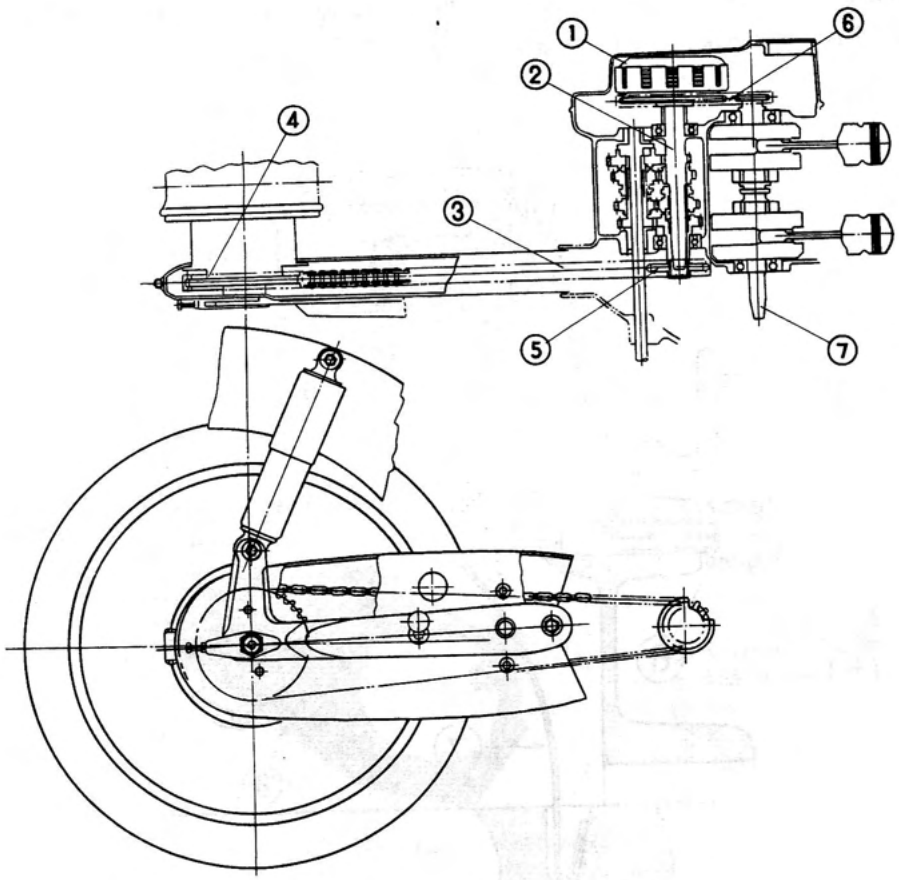
Fig. 3-11.

Besides, there is equipped a switch to indicate neutral state, which put light on a indicator lamp when the rotary switch combined on the shift drum is in neutral state. The shift mechanism to actuate the above mentioned counter shaft 2 gear and the mainshaft 3 gear is explained as follows. In Fig. 3-11 when the gear change pedal (17) is pushed down, the gear shift spindle (10) is turned, and consequently the gear shift arm (11) will turn the drum (5) being pushed by the protrusion on the left end of this gear shift drum.

As there are shift fork guide pin (3) and guide pin roller (4) which fitted on the gear shift fork (2) in the groove on the center part of the shift drum, rotation of drum actuates gear shift fork to move along the form of the groove from side to side to side and the shift gear is actuated. Here gear shift return spring (14) is fitted to return the change pedal to original position and prepare next action and shift drum stopper (6) is guide (7) for it.

C. Final drive mechanism

The drive mechanism from crank to the rear wheel is called final drive mechanism. The main parts are as shown in figure, primary reduction (intermediate reduction), clutch, mission, final drive (propeller shaft, final reduction) wheel and type.



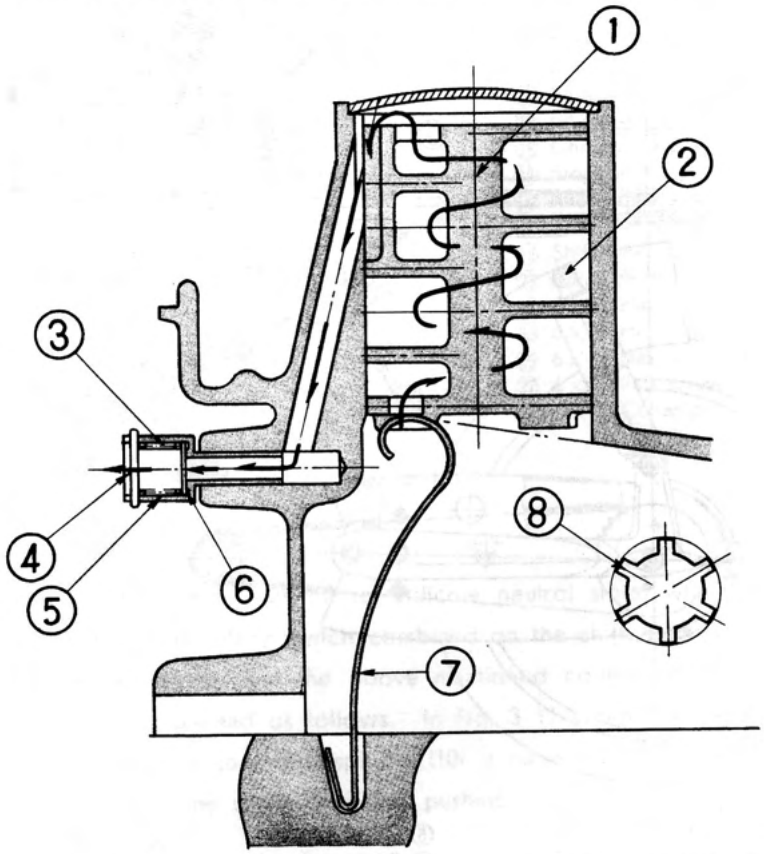
① Clutch
② Transmission shaft
③ Drive chain
④ Final driven sprocket
⑤ Drive sprocket
⑥ Primary chain
⑦ Crankshaft

Fig. 3-12.

4. AUXILIARY PARTS

A. Funnel type breather

Breather chamber of funnel type is located on the rear upper side of the upper crankcace. Inside the chamber breather body is supported by a spring and back pressure is guided along the direction as shown in the figure separating oil to outside of crankcase. Here a check valve is fitted to avoid outside vapour to be sucked.

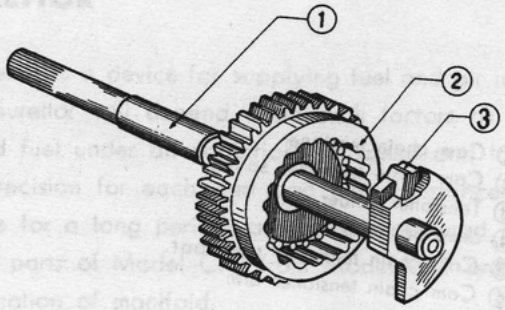


① Breather body
② Breather chamber
③ Breather valve spring
④ Cotter pin
⑤ Breather valve body
⑥ Breather valve
⑦ Breather support spring
⑧ Breather valve (plain view)

Fig. 4-1.

B. Kick starter mechanism

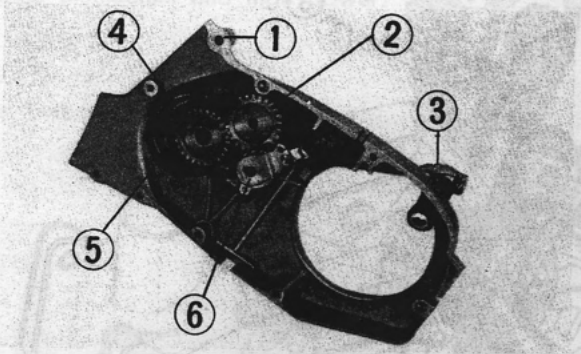
Kick spindle pawl for Model C72, 77 mates with the inside groove of low gear by pawl spring to rotate low gear. When not in kick, the head of pawl is pressed down by kick spindle metal bush so that low gear attains free state.



① Kick starter spindle
② Low gear complete
③ Kick spindle panel

Fig. 4-2.

For Model CB72, 77 considering relation with the chassis, advance step kick system was applied. A piece of gear was set inside the R. crankcase cover to reverse direction of rotation and can start engine transmitting rotational power to the kick spindle pawl (Fig. 3-3)

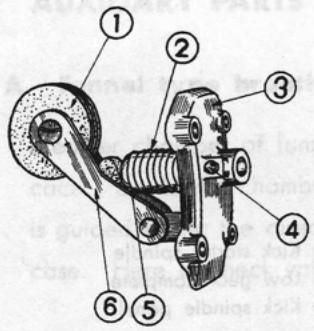


① R. crankcase cover comp.
② Kick starter gear
③ Kick arm
④ Kick starter pinion
⑤ Kick starter spring
⑥ Clutch lifter thread comp.

Fig. 4-3. Crankcase cover

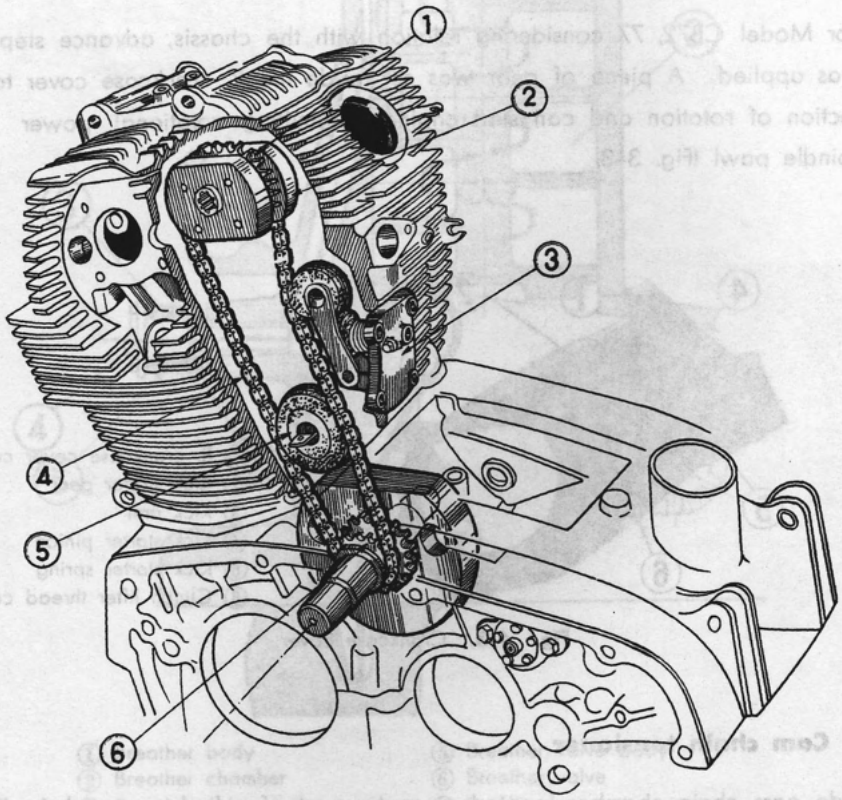
C. Cam chain tensioner

Inside cam chain chamber located at center part of cylinder cam chain (DK219-94L) is set to transmit rotational motion of crank to cam shaft, and cam chain tension is applied to make high speed motion of cam chain correctly and smootlyh. Here the cam chain tension works to suppress waving of chain by pressing cam chain. In Fig. 4-4, 6mm bolt fitted on the tensioner push bar be loosen, the roller will be pushed out by a spring to give a adequate tension on the chain. According to slackness of chain adjustment can be done by this set screw. To make sure tightness of chain, it is favorable to adjust putting the crankshaft at the bottom dead center.



① Cam chain tensioner
② Cam chain tensioner spring
③ Tensioner holder
④ 6mm bolt
⑤ Cam chain tensioner push bar
⑥ Cam chain tensioner arm

Fig. 4-4.



① Cam sprocket
② R. cam shaft flywheel
③ Cam chain tensioner
④ Cam chain
⑤ Cam chain guide roller
⑥ Center crankshaft

Fig. 4-5.

5. CARBURETTOR

The carburettor is a device for supplying fuel and air into the engine. The performance of the carburettor will depend upon such factors as most suitable mixture proportion of atomized fuel under all conditions of speed and load of the engine. Therefore it must has precision for each part and high resistance for wear to assure the reliable performance for a long period, and so it is required inspection and maintenance.

The revised parts of Model C72 from Model C71 are as follow.

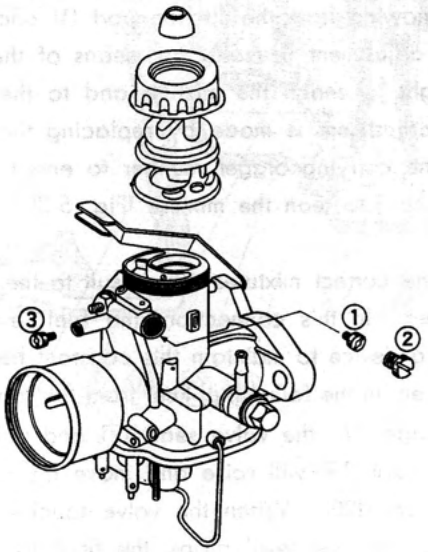
(1) Elimination of manifold.

(2) Fitting type down draft type.

(3) Addition of power jet.

Comparing Model CB72, 77 with Model C72, 77 2-carburettor system was adopted to increase horse power by eliminating branch to suction post. Concerning the power jet mentioned above, when MJA is set, the best condition is at 4000 r.p.m., and at 8000 r.p.m. mixture becomes lean, but when MJB is set as 8000 r.p.m. the best and at 4000 r.p.m. becomes rich.

Therefore to get favorable condition between 4000 r.p.m. and 8000 r.p.m., MJA was selected to apply the power jet from 6000 r.p.m. to meet high rotation developing performance at medium and high power.



① Power jet
② Blind plug
③ Power air jet

Fig. 5-1. Power jet system

Construction

(1) Air from the air cleaner passes through the suction port (1), lower side of the throttle valve (6), main bore (8) and into the cylinders.

This air stream produces a partial vacuum in the area around the power nozzle (24), by which fuel in the float chamber (2) flows through power jet fuel pipe (23), power jet (22) to the power nozzle (24). At this area, fuel is mixed with air introduced through the power air jet (21). Then they are mixed with air flowing from the suction port, vaporized and drawn into the cylinder (Fig. 5-2).

(2) Main fuel system

Air from the air cleaner passes through the suction port (1), lower side of the throttle valve (6) main bore (8) and into the cylinders. This air stream produces a partial vacuum in the area around the needle jet (4), by which fuel in the float chamber (2) flows through the main jet (10) into the needle jet holder (3). As this area, fuel is mixed with air (bleed air) introduced through the air jet (5) and the holes (9) provided around the needle jet holder (3). Then fuel and air travel the gap between the needle jet (4) and the jet needle (7), and discharge to the lower side of the throttle valve. Then they are mixed with air flowing from the suction port, vaporized and drawn into the cylinder (Fig. 5-2).

(3) Slow speed fuel system (pilot system)

Air from the suction port (1) passes through the outside (12) of the air screw (11) which regulates the rate of air flow. Then air passes through the bleed holes (14) of the slow speed jet (13) to the slow speed jet (13) where introduced into fuel stream from the orifice (15) provided with the bottom of the slow speed jet (13). The rich mixture produced at this area discharges to the lower side of the throttle valve and is mixed with air flowing from the suction port (1) and drawn into the cylinder. The minor mixture adjustment is made by means of the air screw (11). Turn the air screw to the right to enrich the mixture and to the left to lean the mixture. The major mixture adjustment is made by replacing the slow speed jet (13). Replace the jet with one carrying bigger munber to enrich the mixture and with one carrying smaller number to lean the mixture (Fig. 5-2).

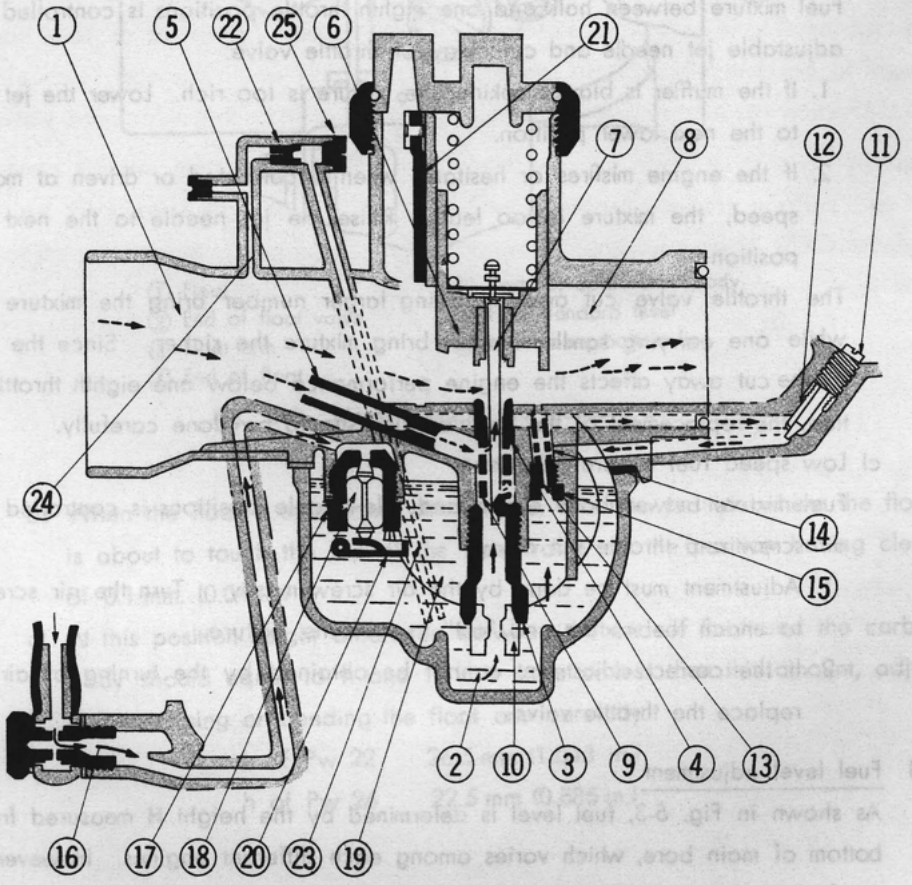
(4) Float chamber

The carburettor must supply the correct mixtures which suit to the throttle opening and the engine running speed. In this connection, the fuel level must be held constant. The float system is a device to maintain this constant height. The operation of the float system is given in the following. Fuel from the tank enters the float chamber (2) through the passage (16), the valve seat (17) and valve (18). As fuel enters the float chamber, the float (19) will raise and move the valve (18) upward by means of the float arm (20). When the valve touches the valve seat, flow of fuel will be restricted. As fuel level drops, the float lowers, opening the valve to allow fuel to enter the float chamber. Thus, any change in the fuel level

causes a corresponding movement of the float, opening or closing the valve to maintain the fuel level constant. There is a spring installed, against vibration, between the needle valve and its body at the location where the valve contracts the float arm (20). (Fig. 5-2)

(5) Choke system

The choke valve (21) must be in a closed position with the choke lever moved upwards, and in a open position with the choke lever moved downward, as shown in Fig. 5-2.



(6) Adjustment

a) High speed fuel mixture adjustment

Fuel mixture between full and half open throttle positions is controlled by the main jet. To determine whether the main jet is correct, slightly close the choke valve with the engine running at full throttle.

1. If the engine speed increases, the fuel mixture is too lean.
2. If the engine speed decreases, the main jet is correct or too big.

Replace the main jet as necessary in such cases.

b) Moderate speed fuel mixture adjustment

Fuel mixture between half and one eighth throttle positions is controlled by the adjustable jet needle and cut away of throttle valve.

1. If the muffler is black smoking, the mixture is too rich. Lower the jet needle to the next lower position.
2. If the engine misfires or hesitates when accelerated or driven at moderate speed, the mixture is too lean. Raise the jet needle to the next upper position.

The throttle valve cut away carrying larger number bring the mixture leaner while one carrying samller number bring mixture the richer. Since the change on the cut away affects the engine performance below one eighth throttle position, the replacement of the throttle valve should be done carefully.

c) Low speed fuel mixture adjustment

Fuel mixture between one eighth and idle throttle positions is controlled by the air screw and throttle cut away.

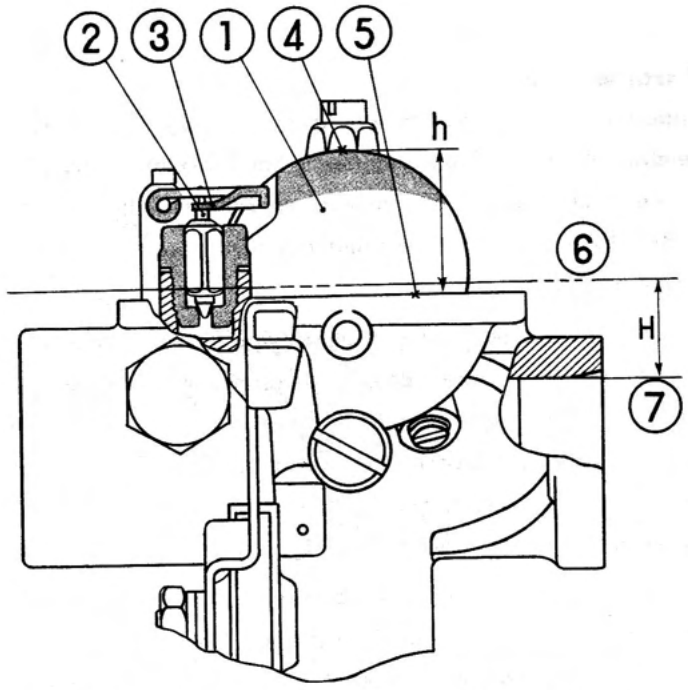
1. Adjustment must be done by the air screw mostly. Turn the air screw "in" to enrich the mixture and "out" to lean the mixture.
2. If the correct adjustment cannot be obtained by the turning of air screw, replace the throttle valve.

(7) Fuel level adjustment

As shown in Fig. 5-3, fuel level is determined by the height **H** measured from the bottom of main bore, which varies among each different engines. However, since the fuel level cannot be measured easily, it is recommended to determine by height **h**, of the float.

Float adjustment

a) Place the carburettor upside down.



① Float
② End of float valve
③ Float arm
④ End of float
⑤ Parts of carburettor body
⑥ Fuel standard level
⑦ Main bore bottom line

Fig. 5-3. Measurement of fuel standard level

b) When the float is supported with fingers, find the position where the float arm is about to touch the top of the float valve or the position having clearance of 0.1 mm. (0.04 in.)

c) At this position height difference between the end of float and the carburettor body should equal to h and if it is more or less than this amount, adjust the height, raising or bending the float arm carefully.

h of Pw 22 26.5 mm (1.043 in.)

h of Pw 26 22.5 mm (0.885 in.)

Note :

At the tip of the float valve there is inserted a spring which creeps inside when pushed. As it prevent to show the actual position where the valve is to be closed, it is necessary to be cautious to see the contact point between the float arm and float valve.

6. FRAME

Construction of frame body

The frame supporting engine contacts with ground through the front and rear wheels and is the skeleton of whole chassis. Further it has important feature affecting its form and design. The main function of frame is to maintain chassis strength, supporting engine, rider, and load on the carrier, and has to endure shock due to roughness of road through tyre and shock absorber.

On the other hand it requires rigidity from viewpoints of control ability, and further requires lightweight to attain better running performance. The frame body of Honda 250.300 Model C72, 77 is, made of steel of stress skin construction and adopted such cross sectional form as refregerator having round corner. The type of form has high strenght to bending moment and torsion. Therefore this would be most favorable form of construction for motor cycle frame having high rigidity from manufacturing viewpoints.

Especially welding is done by new type of seam welder to attain reliable connection and also uniform products having beautiful outlook. On the other hand for the frame of Model CB72,77,as main strength members,high carbon steel tubings were adopted to attain light weight and to increase rigidity.

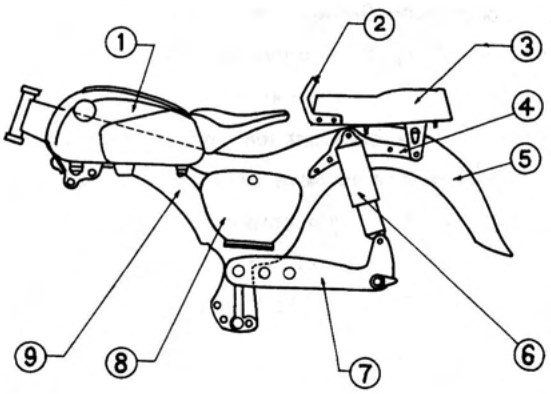
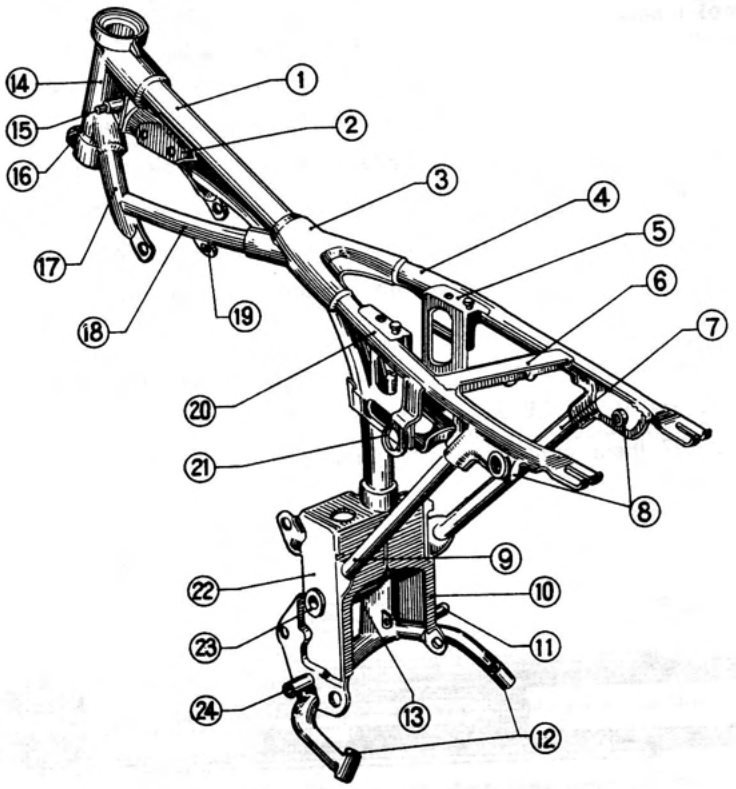


Fig. 6-1. Frame body for Model C72, 77



① Main pipe
② Coil setting plate
③ Tube holder
④ R. sub-tube
⑤ Battery support stay
⑥ Sub-tube cross-member
⑦ R. sub-tube holder
⑧ R. L. rear cushion npper brackets
⑨ L. sub-tube holder
⑩ R. bottom plate
⑪ R. step holder piece
⑫ Muffler setting pipe
⑬ Center pipe
⑭ Steering head pipe
⑮ Fuel tank holder
⑯ Key hole
⑰ Front down tube
⑱ Driver's tube
⑲ Engine hanger plate
⑳ L. sub-tube
㉑ Main switch bracket
㉒ L. bottom plate
㉓ Center pipe bushing
㉔ L. Step holder piece

Fig. 6-2. Frame body for CB72, 77

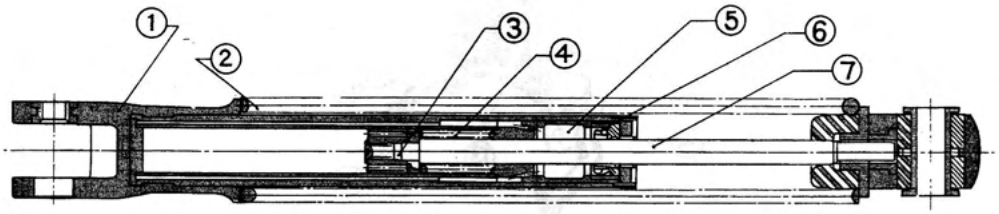
7. SUSPENSION

A. Front wheel suspension

The front fork of Model C72, 77 is made of pressed steel and for Model CB72, 77 telescopic fork was adopted to increase rigidity and to attain better running stability on rough road. As the cushion, the link system made it possible to reduce wheel base variation and to attain better feeling on riding and better controllability.

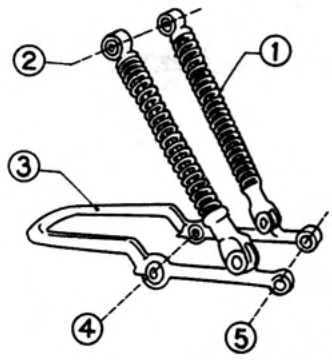
As shown in the figure of shock absorber, it consists of the main spring and double cylindrical oil damper. The spring takes up compression load and the damper takes up recoiling force.

For Model C72, 77, left and right front cushions are combined by the suspension arm as one body, but for Model CB72, 77 there is no suspension arm. In the oil damper of Model CB72, 77 there contains white spindle oil 220cc, and maximum stroke is 80 mm (3.1496 in.).



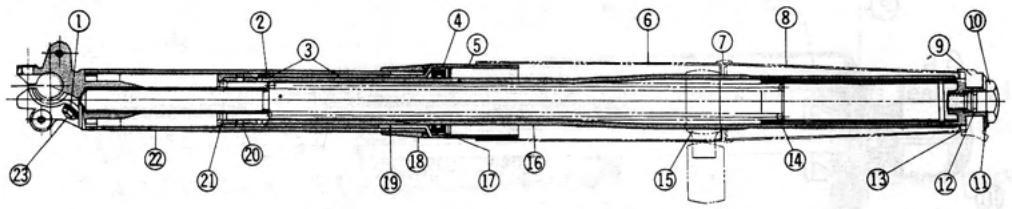
① Front cushion bottom metal comp.
② Front cushion spring front damper inner pipe
③ Front damper piston
④ Front cushion rebound stopper spring
⑤ Front damper collar
⑥ Front damper oil seal
⑦ Front damper rod

Fig. 7-1. Cross-section of front cushion for Model C72, 77



① Front cushion
② Hinge
③ Suspension arm
④ Supporting hinge
⑤ Wheel axis

Fig. 7-2.



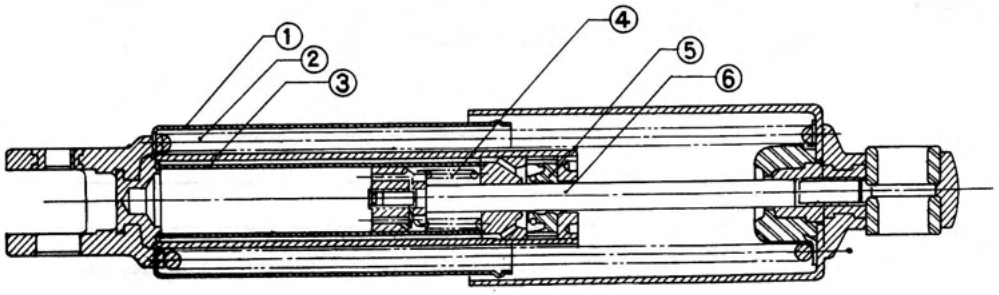
① Fork drain cock packing
② Front damper valve
③ Fork pipe stopper ring
④ 334610, oil seal
⑤ Front fork seal housing
⑥ Front fork upper cover
⑦ Front fork rib
⑧ Front fork upper cover
⑨ Fork top bridge
⑩ Front fork bolt
⑪ Front fork washer
⑫ "O" ring, 9.4×2.4
⑬ Front fork cover packing
⑭ Front cushion spring
⑮ Fork bottom bridge
⑯ Front fork pipe comp.
⑰ Front fork oil seal retainer
⑱ Ring, 40.5×3.0
⑲ Front fork pipe guide
⑳ Fork piston knock pin
㉑ Front fork piston
㉒ Front fork bottom case
㉓ Front fork drain cock bolt

Fig. 7-3. Cross-section of front cushion of Model CB72, 77

B. Rear wheel suspension

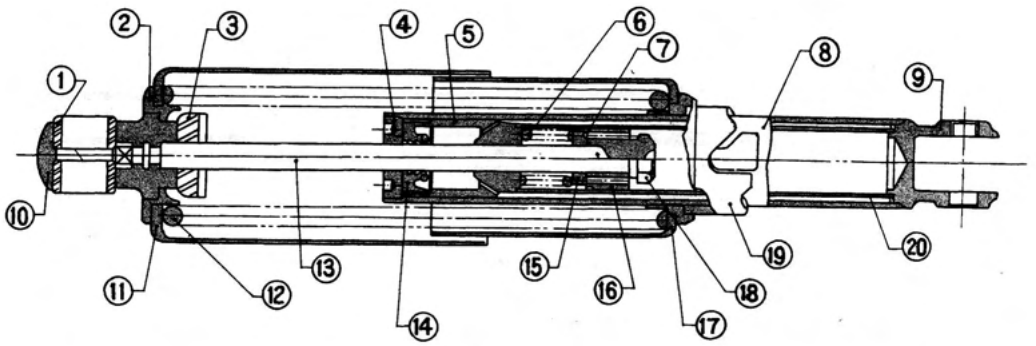
The rear wheel is pivot type construction equipped with also shock absorber. The principle of construction of the shock absorber is alike that of the front wheel excepting such point as side pressure don't act on the sliding part and construction of orifice on the absorber is different. Special attention was paid on the suspension system on the pivot side as performance of shock absorber, manufacturing around the pivot and rigidity of rear fork affect on feeling of riding greatly.

As the rear fork of Model CB72, 77, main strength members were made of high carbon steel tubing to attain light weight and to raise rigidity.



① Rear cushion metal comp.
② Rear cushion spring
③ Rear damper inner-pipe
④ Rear rebound stopper spring
⑤ Rear damper oil seal
⑥ Rear damper rod.

Fig. 7-4. Cross-section of rear cushion of Model C72



① Rear cushion rubber bushing
② Rear cushion spring seat
③ Rear cushion stopper
④ Rear damper nut
⑤ Rear damper rod guide
⑥ Rear cushion rebound stopper spring
⑦ Rear damper valve
⑧ Rear damper case comp.
⑨ Rear damper under joint
⑩ Rear cushion upper joint
⑪ Rear cushion upper case
⑫ Rear cushion spring
⑬ Rear damper rod
⑭ Rear damper oil seat
⑮ Rear damper valve stopper
⑯ Rear damper piston
⑰ Rear cushion bottom case
⑱ Rear damper piston nut
⑲ Rear cushion spring adjuster
⑳ Rear damper inner-pipe

Fig. 7-5. Cross-section of rear cushon of Model CB72, 77

In the cylinder of the rear cushion there contains 60# spindle oil 37cc for Model C-72, 77 and 47cc for Model CB72, 77. When the rear wheel got shock rear cushion spring is compressed to absorb it and rebounding force is rectricted by the oil damper to give adequate cushioning.

If the amount of oil contained in the damper is not suitable, effective stroke of cushion becomes to short or leaks oil or sometimes become origin of shock sound. The rear cushion of Model CB72, 77 is designed to enable three steps of adjustment according to road condition and running state.

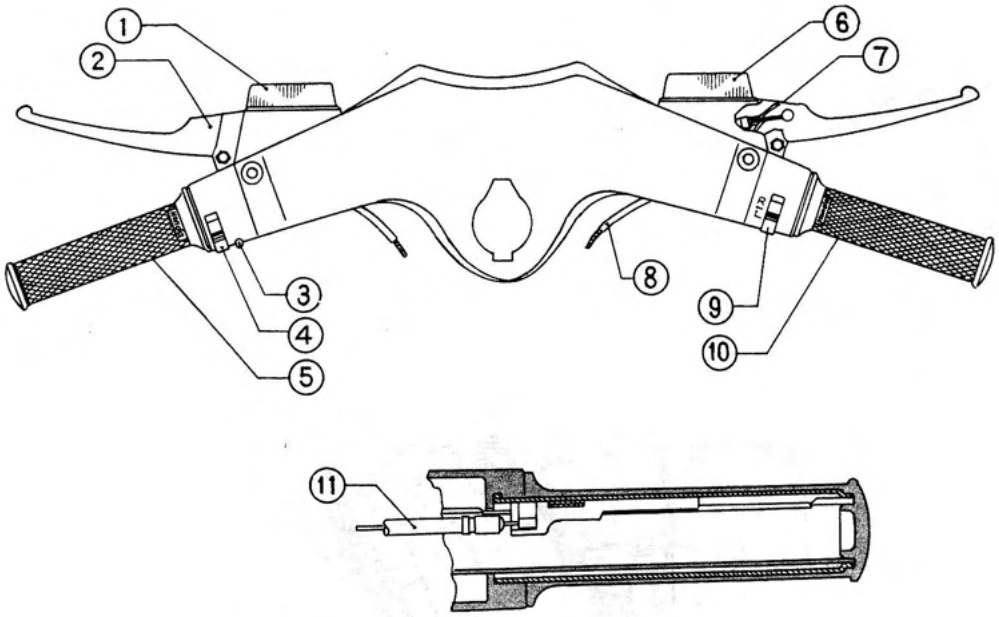
MEMO

8. STEERING SYSTEM

A. Steering handle

Special attention was paid in designing the steering handle as this affects feeling of riding and easy control.

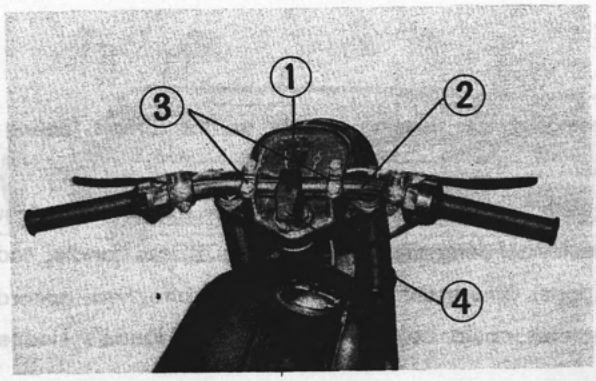
Especially for Model C72, it was aimed to take riding posture easy to correspond quick manipulation of control, which would be determined by the form of the handle, saddle and step. Moreover on control parts, adjustment equipments are attached according to each riders' choice. These features could be said to symbolizo Honda's kindness.



① L. front winker lens
② L. steering handle lever
③ Horn button
④ Head light switch
⑤ L. grip rubber
⑥ R. front winker lens
⑦ R. steering handle lever
⑧ Throttle wire
⑨ Winker switch
⑩ R. grip rubber
⑪ Throttle lever

Fig. 8-1. Handle of Model C72, 77

The handle complete of Model CB72, 77 is made of one piece of steel tubing attached to the fork top bridge by means of the handle pipe holder. The fork top bridge is fixed on the front cushion by 2 front fork bolts. Each wire is exposed in assembly to make it easy to replace the handle.



① Speedo-tachometer ass'y
② Steering handle comp.
③ Handle pipe holder
④ Steering damper knob

Fig. 8-2. Handle assembly of Model CB72, 77

B. Steering

Construction of steering of Model C72, 77, as shown in the Figure, is such having ball bearing and steering damper of friction plate system to meet requirement from controllability and stability at low and high speed running.

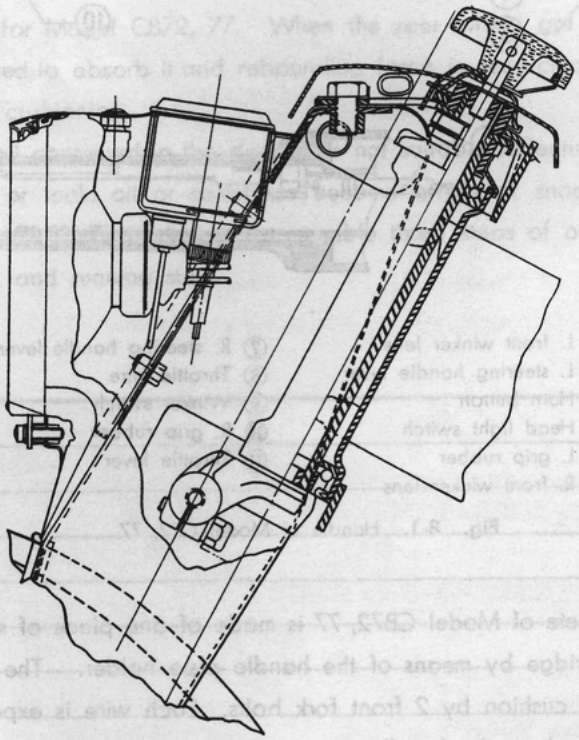
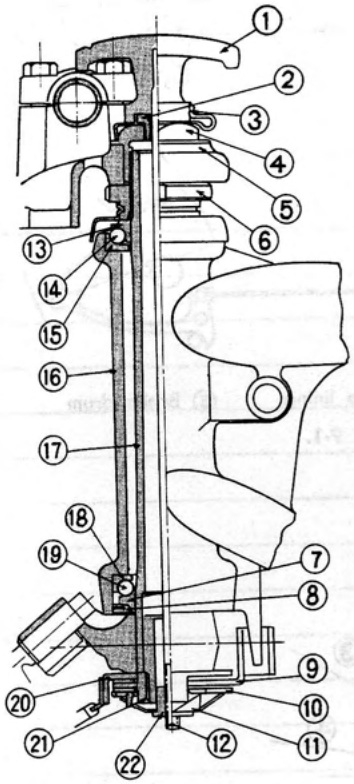


Fig. 8-3. Cross section of steering head of Model C72, 77

For Model CB72, 77, the steering stem which has cone lathe inside supported on the front cushion by means of 8×32 hexagonal bolt is the rotational axis centering frame head pipe and is important part for steering. On the steering stem, steering damper is attached and can be adjusted according to road condition, running state and loading condition.

If the knob of steering damper be turned to the right, steering damper spring nut is raised upward to clamp steering damper friction disc by means of steering damper plate A and B, consequently handle steering becomes heavy. On the contrary, if the knob be turned to the left, steering damper spring nut is lowered to make gap between plates A and B to become easy steering. (Fig. 8-4)



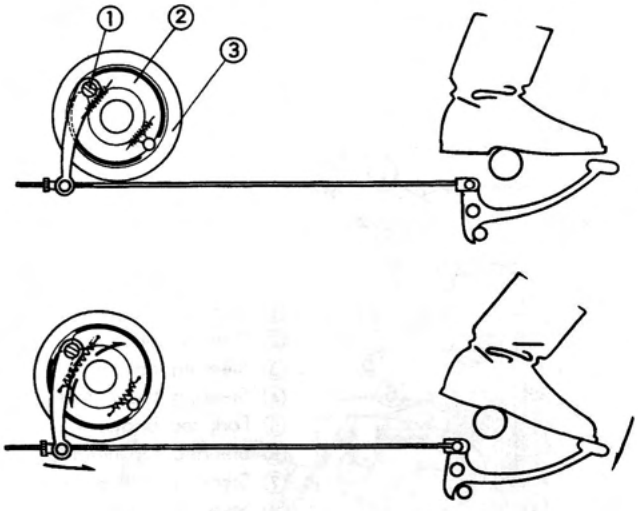
① Steering damper knob comp.
② Damper lock spring set bolt
③ Steering damper lock spring
④ Steering head stem nut
⑤ Fork top bridge
⑥ Steering top thread
⑦ Steering bottom cone race
⑧ Steering head dust seal
⑨ Steering damper friction disc
⑩ Steering damper plate B
⑪ Steering damper spring
⑫ Cotter pin, 2.0×15
⑬ Steering top cone race
⑭ Steel ball, 1/4"
⑮ Steering top ball race
⑯ Steering head pipe
⑰ Steering stem
⑱ Steering bottom ball race
⑲ Steel ball, 1/4"
⑳ Steering damper plate A
㉑ Steering damper lock nut
㉒ Steering damper spring nut

Fig. 8-4. Cross section of steering of Model CB72, 77

9. BRAKE INSTALLATION

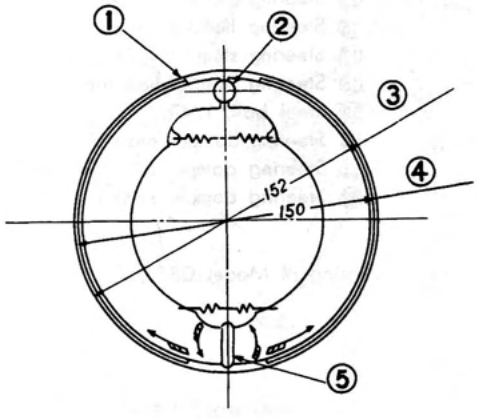
As reliability and durability of brake installation are indispensable condition for it, manufacturing brake was paid special attention. Rear wheel braking is done by expanding the brake lining installed is the brake drum which is actuated by link motion to turn the brake cam by pushing right foot.

Here special attention was paid to emit friction heat generated to get better durability. For the front brake, by right hand operation wire transmits force to work and brake mechanism is alike with the rear installation.



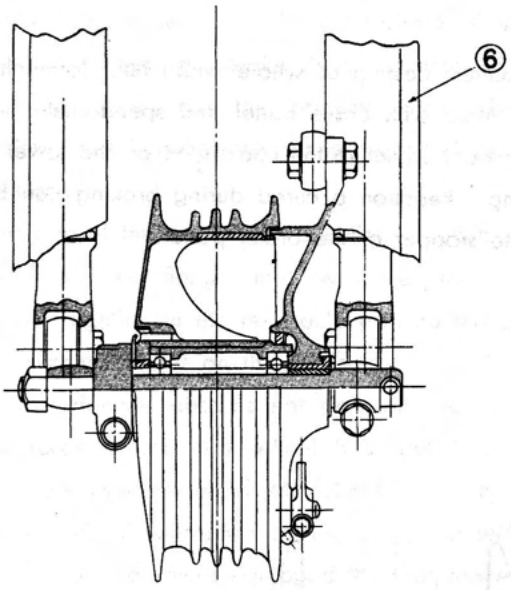
① Brake cam ② Brake lining ③ Brake drum

Fig. 9-1.



① Brake shoe width 30
② Brake shoe anker pin
③ Brake drum inner dia.
④ Brake shoe out dia.
⑤ Brake cam

Fig. 9-2.



⑥ Front fork

Fig. 9-3.

MEMO

10. CONSTRUCTION OF WHEEL

A. Front wheel

Front wheel body made of aluminum casting of whole width hub containing ball bearings and brake drum inside is fitted with brake panel and speedometer unit by wheel axis and nuts. To assemble the front wheel to the chassis, fit on the lower end of front fork slide pipe by the axle fitting. Reaction occured during braking can be caught by the left side bearing through the stopper of the brake panel.

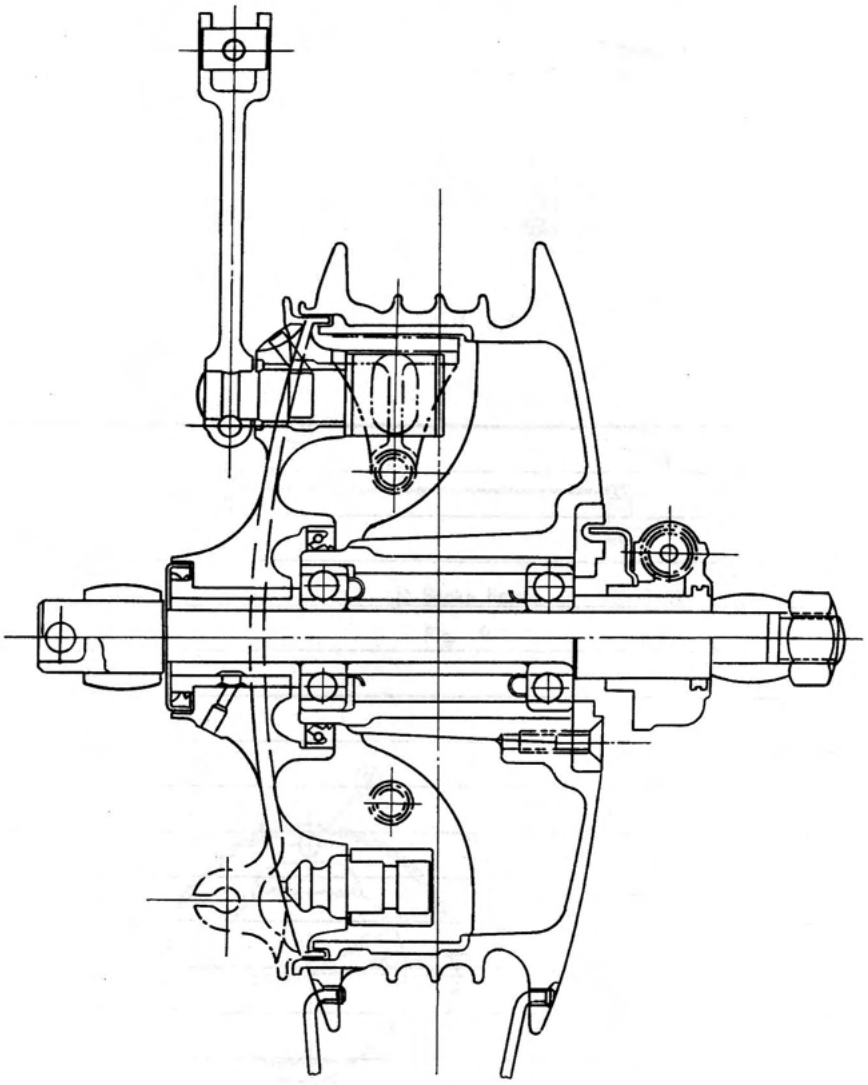


Fig. 10-1. Cross section of front hub

B. Rear wheel

The rear wheel of Model C72, 77 is consisted of wheel bearing, rear wheel hub of aluminium equipped with the brake drum, the final drive flange serving chain case partially and brake panel. On the left side, the brake panel is equipped through the distance collar, and between the wheel hub and the final drive flange there is fitted rear wheel damper.

On the right side of the wheel hub containing ball bearing, the chain case is equipped through the final drive flange fitted with the rear wheel damper and the final driven sprocket, and is tighten on the rear axle passing through the left side of the rear fork through the distance collar on the left side.

The rear wheel damper absorbs not only abrupts variation of rotation during braking and driving force of the rear wheel hub, but also is useful to protect transmission mechanism. The rear wheel of Model CB72, 77 is consisted of ball bearing (6304), the rear wheel hub of aluminium casting equipped with the brake drum and the brake panel. On the left side there equipped the rear brake panel of twin cam type through the panel side collar and on the right side of the wheel hub, and the final driven sprocket are fixed by the sprocket setting bolt, and fixed on the rear fork by the rear axle through the rear side collar.

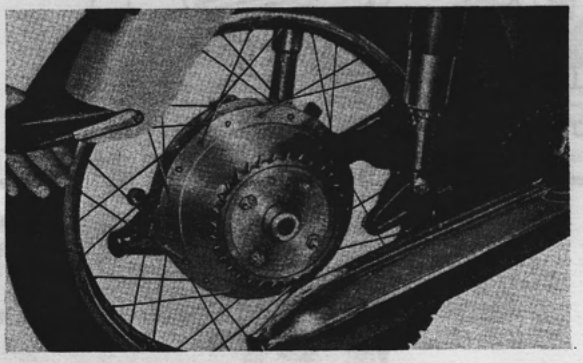
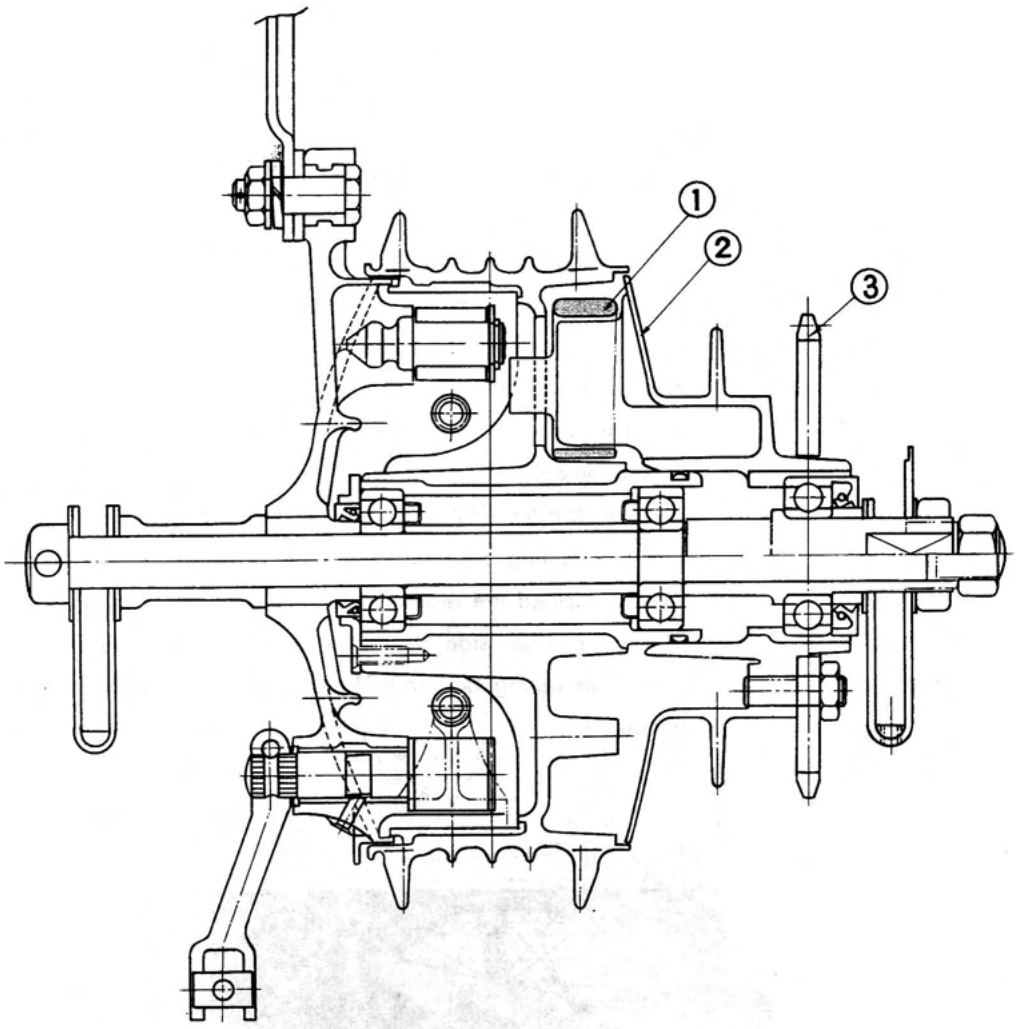


Fig. 10-2. To draw out the rear wheel from the frame (Model CB72, 77)



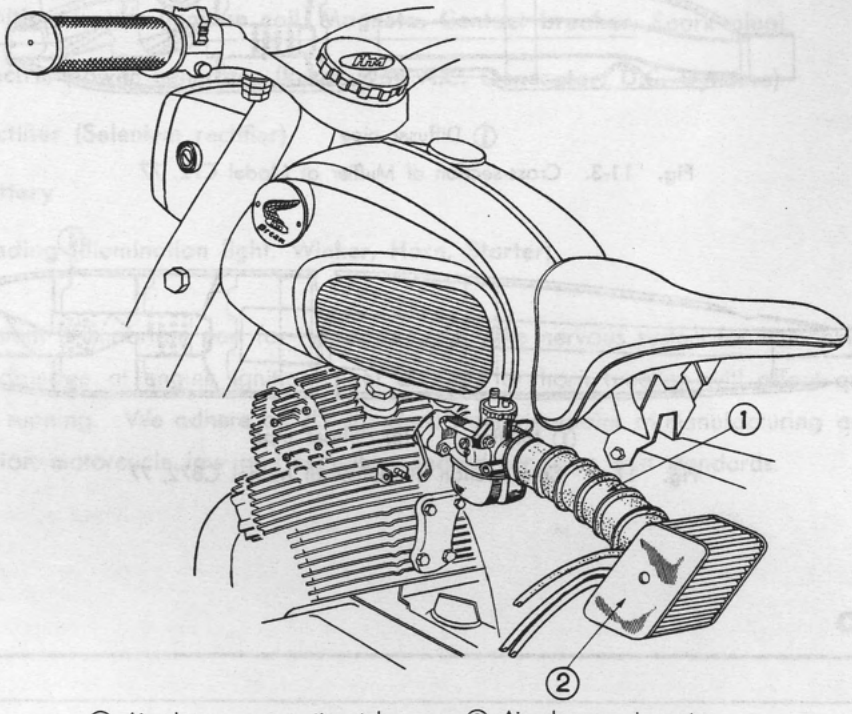
① Rear wheel damper ② Final drive flange ③ Final driven sprocket

Fig. 10-3. Cross-section of rear hub

11. AUXILIARY EQUIPMENT

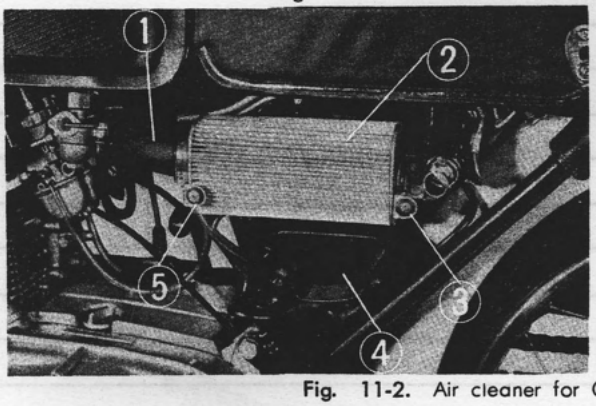
A. Air cleaner

The air cleaner element made of filter paper is stored at the center part of the body utilizing a point of excellence that the frame is made of steel sheet. It is aimed to get better filter effect by expanding surface area and also to prevent rain water to enter. For Model CB72, 77, as 2 carburettors are equipped, air cleaners are fixed on both sides each.



① Air cleaner connecting tube ② Air cleaner element

Fig. 11-1. Air cleaner ot Model C72, 77



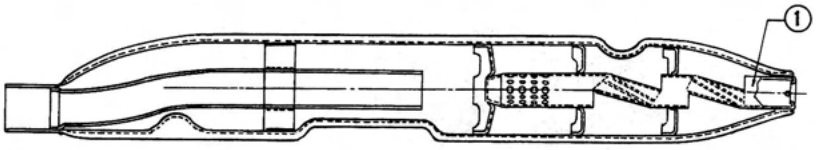
① Air cleaner connecting tube
② Air cleaner element
③ R. air cleaner support stay
④ Tool box complete
⑤ L. air cleaner support stay

Fig. 11-2. Air cleaner for CB72, 77

B. Muffler

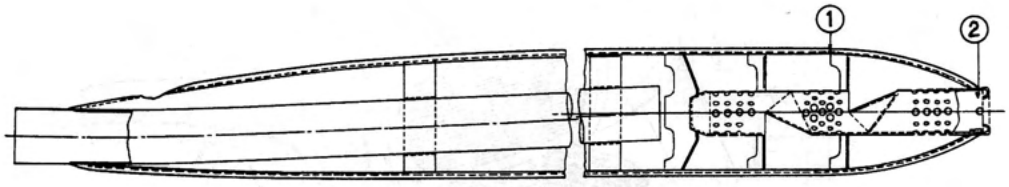
Construction of exhaust muffler.

Exhaust pipe conducts exhaust gas from cylinder head to muffler. Curvature of this pipe affects horse power developed exhaust gas conducted through exhaust pipe is damper inside of muffler by chocking passage and further discipate sound of the diffuser pipe to get silencing effect.



① Diffuser pipe

Fig. 11-3. Cross-section of Muffler of Model C72, 77



① Muffler ② Diffuser pipe

Fig. 11-4. Cross-section of Muffler of Model CB72, 77

MEMO

ELECTRIC EQUIPMENT

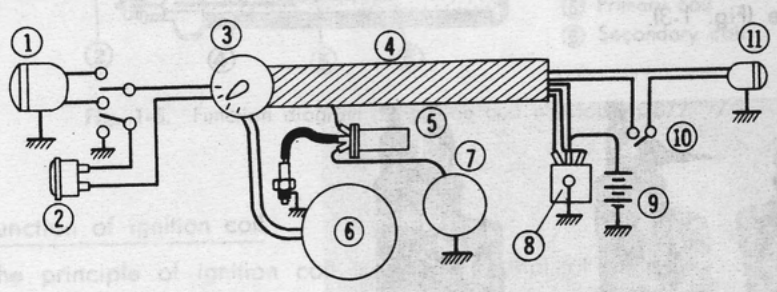
1. **Ignition system (Ignition coil, Magneto, Contact breaker, Spark plug)**
2. **Electric power generator (Rotor type A.C. Generator, D.C. Dynamo)**
3. **Rectifier (Selenium rectifier)**
4. **Battery**
5. **Loading (Illumination light, Winker, Horn, Starter)**

Electric system is important part for the motorcycle alike nervous system for humankind. Even a partial damage at engine ignition, light at night or horn function will affect quite often its smooth running. We adhere on JIS standard from viewpoint of manufacturing and traffic transportation motorcycle law and security standard for laws and standards.

CONTENTS

1. SYSTEM OF ELECTRIC EQUIPMENT

As ignition system, ignition coil and contact breaker are used. For electric generator, Rotor-type A.C. Generator is used, charging battery through selenium rectifier and discharging according to several loading.



① Head light
② Horn
③ Main switch
④ Wire harness
⑤ Ignition coil
⑥ Rotor-type A.C. generator
⑦ Relay
⑧ Selenium rectifier
⑨ Battery
⑩ Stop switch
⑪ Tail or stop light

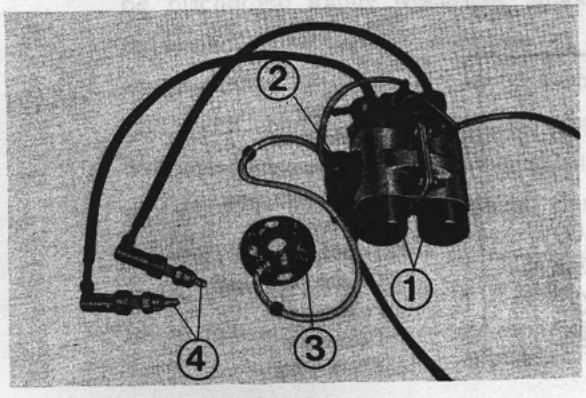
Fig. 1-1.

A. Ignition circuit

1. Ignition system

In gasoline engine, at the favorable time of the uppermost position of compression stroke mixture gas should be burned and exploded by any means of ignition.

For both Model C and Model CB, high tension battery ignition system is adopted (Fig. 1-2).

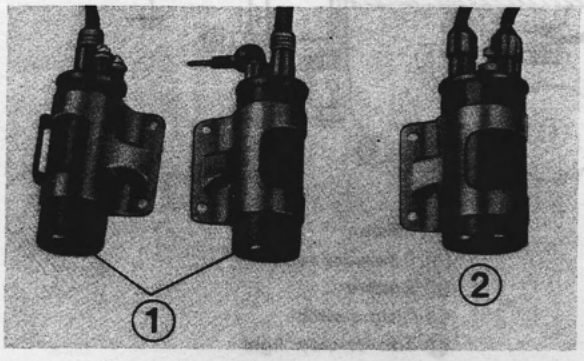


① Ignition coil
② Condenser
③ Contact breaker
④ Spark plug

Fig. 1-2. Ignition system

2. Ignition coil

Ignition coil is the same construction with that for Model C72. For Model CB72, 77-I type, there equipped with one coil each corresponding to 2 cylinders right and left, as the crankshaft angle is 180 degree. But for Model CB72, 77-II type, alike Model C72, one coil of simultaneous ignition system is equipped as the crankshaft angle is 360 degree (Fig. 1-3).

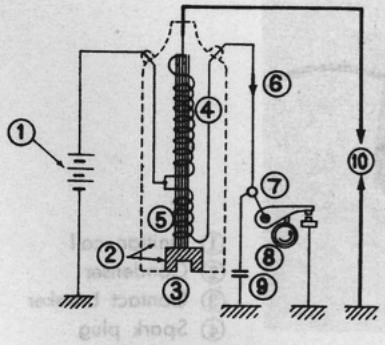


① L.R. coil for I-type
② Coil for II-type

Fig. 1-3. Ignition coil

A. Construction of ignition coil

Ignition coil is shown in Fig. 1-4 where fine enamel wire of 0.08 mm dia. is wound over the iron core about 1.000~2.000 rounds as the secondary coil on which further enamel wire of 0.6 mm dia. is wound over it about 200~300 round as the primary coil. And stored in the cylindrical case after insulating process and drawing out the terminals (Fig. 1-4).



① Battery
② Insulation
③ Ignition coil
④ Secondary side
⑤ Primary side
⑥ Primary current
⑦ Contact breaker
⑧ Point cam
⑨ Condenser
⑩ Spark plug

Fig. 1-4. Cross-section of ignition coil

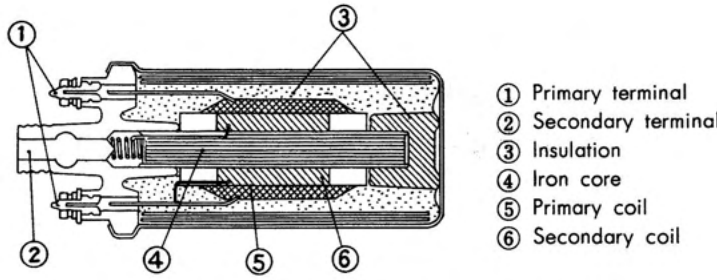


Fig. 1-5. Function diagram of ignition coil of Model CB72, 77

B. Function of ignition coil

The principle of ignition coil is similar to that of induction coil. As shown in Fig. 1-5, rotating cam axle and crank with constant periodical relation, there generates high voltage on the secondary coil as follows.

a. When the point of the contact breaker is closed primary current flows in the direction as shown by arrow and generates magnetic flux inside the iron core.

b. When the point is opened by the cam, the magnetic flux which is generating by primary current is going to disappear suddenly.

c. Due to large variation of magnetic flux and large number of winding, there generates high voltage in the secondary coil.

d. Here generated high voltage will charge on distributed static electric volume of the secondary coil itself, then as it voltage increase, further start charging on volume of high tension cord and plug continuing increase of voltage.

e. When voltage increases up to ample amount, spark will occur at the plug gap. As soon as spark started sparking voltage drops down instantaneously. Accordingly electric load charged on the distributed static electric volume will be discharged totally (volumetric spark). And continues discharge of energy contained in the wire by disappearing magnetic flux (induction spark).

f. Magnetic flux approaches down to zero instantly where voltage no more maintain spark voltage and discharging spark disappears.

g. Still energy in wire due to remaining minute magnetic flux will generate damping vibration inside secondary and primary coil, and disappear acting as resistance loss on the circuit.

h. Then returning cam angle to original state to actuate the function as stated (a) to follow the same process repeatedly .(Fig. 1-5～1-7).

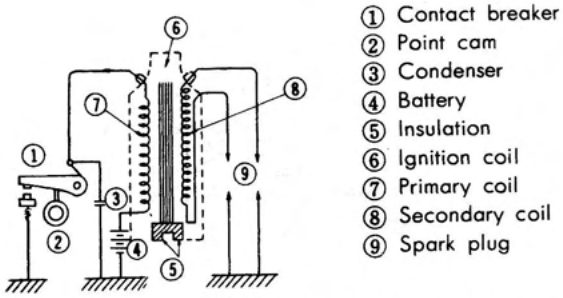


Fig. 1-6. Function of ignition coil of Model C72, 77, CB72, 77

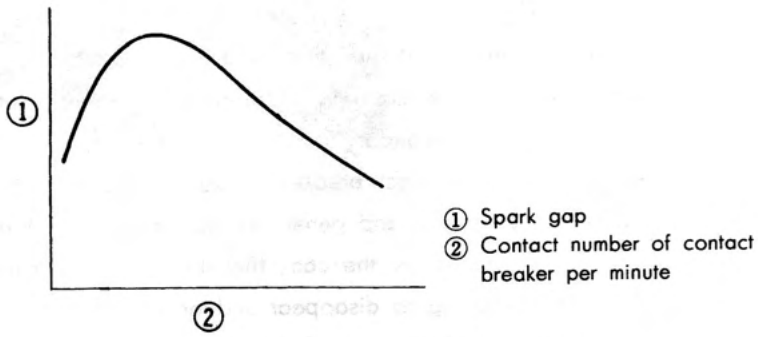


Fig. 1-7. Spark plug gap diagram

B. Contact breaker

The contact breaker is a important part of mechanism to operate contacting and breaking the primary circuit of the ignition coil or magneto ignition coil securely. It is stored inside of the magneto for a rotary axis type magneto and fitted on the fixed stand for a combined flywheel magneto type but for separated flywheel type and battery ignition type the contact breaker is each one unit. The contact breaker is consisted of the breaker arm point on the base (movable contact point and fixed point), terminal of the primary wire, spring and oiled felt.

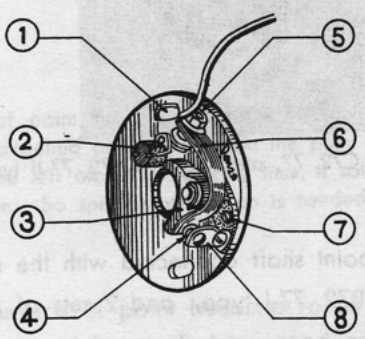
The breaker arm is made of bakelite impregnated with cloth or pressed thin steel attached a cam follower on its end. On its other end of each part movable contact point is fitted and insulated from base electrically.

Function of the contact breaker is required to move very lightly, so it is designed to be small size, light weight and strong to make inertia small. It is necessary to put a constant spring load to avoid chattering while in short of the point. On the other hand there is other restriction of spring strength to avoid disordering of firing timing due to wear of sliding part of cam follower.

Generally contact point pressure is designated between 700 and 900 gr. and to prevent wear of the cam follower grease should be applied on oil felt.

Required characteristics for point are as follow.

1) High unti-wearing property.
2) High heat conductivity.
3) High melting point.
4) High unti-oxydation.
5) Have a moderate hardness.



① Fixing hole of contact breaker
② Oil felt
③ Breaker arm
④ Point
⑤ Terminal
⑥ Spring
⑦ Point fixing screw
⑧ Base of contact point

Fig. 1-8.

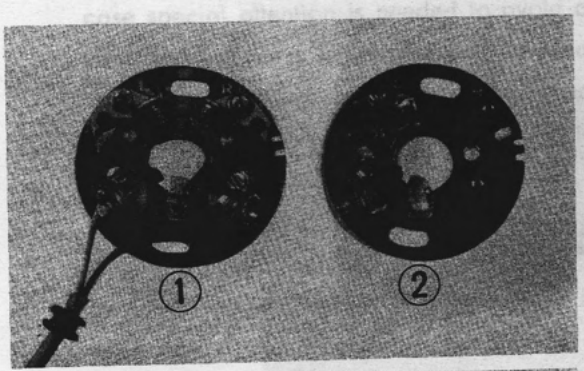


Fig. 1-9. Contact breaker assembly

① 2 points for Model CB72, 77-I type
② I point for Model C72, 77, for CB72, 77-II type

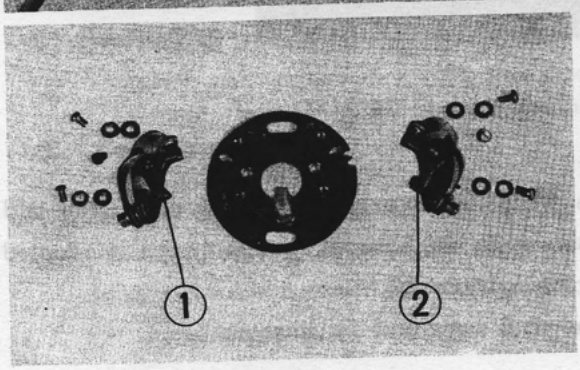


Fig. 1-10. Contact breaker of Model CB72, 77-I type

Generally for automotive use, 4～5 mm (0.157～0.196 in.) tangsten is applied. Sparking is generated by magneto cam contacting and breaking of timing of crankshaft and cam shaft by the contact breaker.

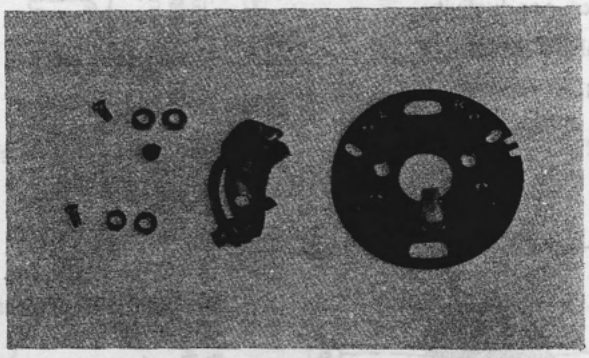
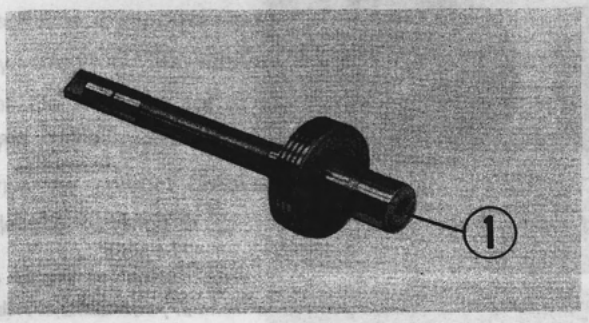


Fig. 1-11. Contact breaker of Model C72, 77, and Model CB72, 77-II type

One cam is profiled at the end of the point shaft connected with the spark advance inside of the cylinder head for Model CB72, 77-I type, and 2 sets of contact breakers are set relatively at 90 degree on the base, and designed to operate at correct timing of L. and R. cylinders. 2 coils, 2 points, 1 mount cam for Model CB72, 77-I type.

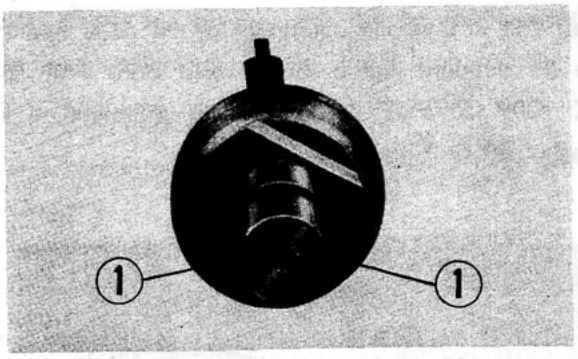


① One mount cam

Fig. 1-12. Point shaft cam profile (Model CB72, 77-I type)

For Model C72, 77 and Model CB72, 77, 2 cams are profiled on the point shaft and 1 contact breaker is fixed on the base. Here simultaneous ignition system is adopted as explained in the paragraph about the ignition coil.

Model CB72, 77-II type : 1 coil, 1 point, 2 cams and simultaneous spark.



① Cam

Fig. 1-13. Point cam profil (Model CB72, 77 and Model CB72. 77-II type)

Note :

surface of point becomes rugh with working time elapse. Especially there occurs extraordinary wear if attached oil or grease on the point surface. Further if attached oil or grease on the point surface be left alone for a long time, it solidifies and forms insulating surface to effect ignition be impossible. So special precaution is needed to prevent attaching oil.

If the surface of point becomes rough or disty, use a fine file or sandpaper to polish and adjust, and if case is more worser, take out the contact breaker base and the breaker base and the breaker arm, polish both contact surfaces with oil stone. In this case special attention is needed to avoid one side wear. This one side wearing affects very bad Influence for a new part or repaired part.

Therefore centering and parallel adjustment of both contact point is essential requirement. Also if there is found too much play within axle hole of the breaker arm it is needed to replace with new one.

On the other hand, terminals of contact breaker and insulating parts of wire have to maintain ample insulating standard, so that special precaution is required to keep clean avoiding vapour, oil, dirt to be attached. In case of adjustment of the surface of point wipe its surface with clean cloth stained with trichrene to avoid grease, oil or dirt to be attached.

C. Condenser

Function of condenser is to avoid harmful spark between points, and if taken its volume value too large spark performance becomes worse. Therefore generally it is selected adequate value between 0.1 and 0.35 microfarad.

On the other hand it is required such feature to resist high voltage as high voltage

of several hundred volt acts on the condenser at the point opening instance. So it is prescribed in the JIS standard that it should resist more than one minute under such condition as A.C. 700V (50 or 60 ~) maintaining insulation of more than 5MΩ after heating 30 minutes at 80°C (Fig. 1-14, 1-15).

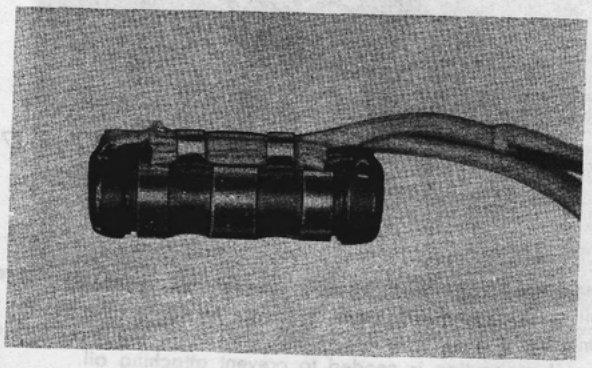


Fig. 1-14. Condenser (Model CB72, 77-I type)

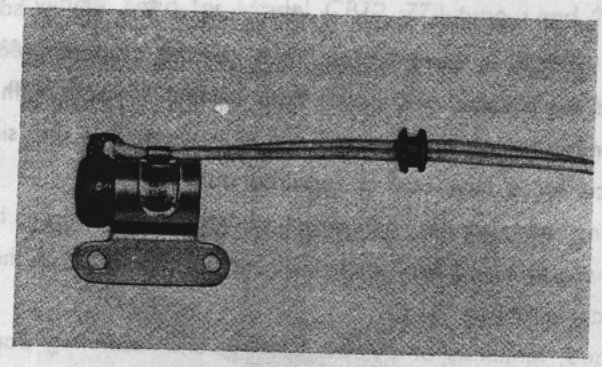


Fig. 1-15. Condenser (Model C72, 77 and Model CB72, 77-II type)

Simple test for condenser is done like the following. After checking insulating value by mega, disconnect both poles of condenser from mega while mega is running, then short both poles by wire. At this instance, if spark occurs large enough, it is decided the volume value is good standard. By use of the service tester it can be tested precisely volume value and insulating performance.

D. Spark plug

Spark plug plays the most important part within ignition system of engine, and it takes charge of starting engine, receiving high voltage generated by ignition coil or magneto

to make combustion of mixture gas by high voltage spark occured spark gap within plug in the combustion chamber.

a) Conditions needed to embody for spark plug

There are five subjects to be solved to fulfil its function perfectly, which will be explained as follows.

(A) Current

Electric current flows through the shortest way, and always tries to spark out of spark gap. At manual temperature electric insulating character of insulation is high, but at high temperature this character decreases. Therefore it is needed high insulation material which is hard to decrease its character even at high temperature.

(B) Explosion pressure

Inside the cylinder, 35~45 atmospheric pressure due to explosion always seeks path to escape. If air tightness of plug is inadequate, combustion gas of high temperature will penetrate inside it to loose its function due to overheating.

(C) Combustion head

Temperature of combustion of mixture gas will reach up to 2000°C. It is needed to discipate this heat sooner to develop engine performance preventing over heating of plug, sparking in advance or burning electrode.

(D) Carbon in case of incomplete combustion

If get dirty on the insulating part, engine will fail its smooth running due to high voltage leaks partially and poor sparking.

(E) Lead compound

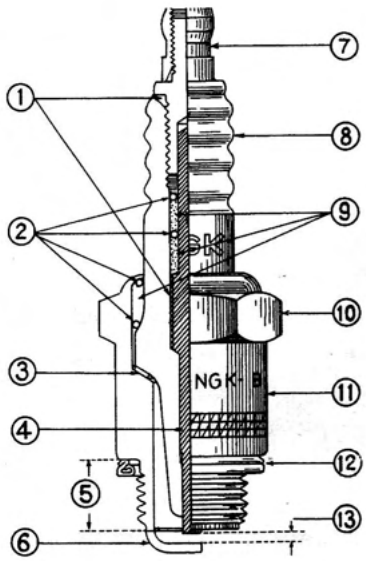
4-ethyl lead is contained in gasoline to control explosion, and lead oxidized compound is made due to combustion. If it is deposited on the plug, this compound becomes a medium having conductivity at high temperature and high voltage current will escape as explained before.

E. Construction of plug

Here is shown the plug used generally for automobile (Fig. 1-16).

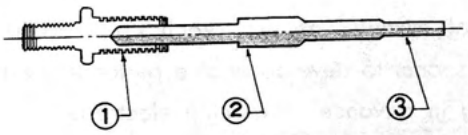
a) Electrode

As material of electrode it is required to be hard to wear, low sparking voltage, high heat conductivity, high resistant to oxidation, high conductivity and easy to manufacture. At present Nickel alloy or heat resistant alloy is used (Fig. 1-17).



① Adhesive
② Wire packing
③ Plate packing
④ Central pole
⑤ Screw width
⑥ Lateral pole
⑦ Terminal nut
⑧ Insulator (with corrugation)
⑨ Powder filled
⑩ Spanner part (hexagonal)
⑪ Main body
⑫ Gasket
⑬ Spark gap

Fig. 1-16. Plug construction

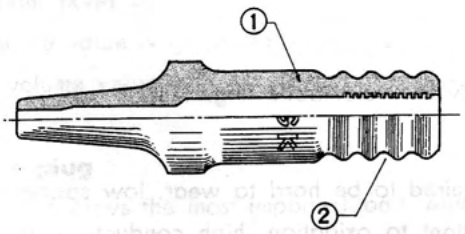


① Iron wire
② Copper wire
③ Special nickel alloy

Fig. 1-17. Construction of electrode

b) Insulator

As insulator, special high alumina substance is used mainly. This material has a very excellent character comparing with that of famed foreign product. This superb character can be attributed to high content of alumina and a perfect material refinery process and can maintain high performance due to burning process in high temperature tunnel oven (Fig. 1-18).



① Special high alumina substance
② Corrugation (to prevent blush over)

Fig. 1-18. Insulator

c) Concerning plug insulator (Insulator of special high alumina substance)

Characteristic of insulator and spark plug

Item	Compositions		Apparent specific gravity	Insulation resistance MΩ				Compression strength	Coefficiency of heat expansion	Coefficiency of heat conductivity	Heat shock resistance	Amount of errosion (Lead bromide)	Amount of errosion (Lead oxide)
	Al_2O_3 %	SiO_2 %	g/cc	200°C	300°C	400°C	500°C	kg/cm² (lb/in²)	20°C ~ 1000°C	Cal/cm	750°C	$PbBr_2$	PbO
	90.2	7.1	3.51	∞	∞	800	80	11,800 (167796)	7.8×10^{-6}	0.026~0.029	6 times	0.07	13.2

Main benefits of this insulator are as following :

(A) As insulating character is excellent, it is not trouble of misfire due to decreasing of insulating character at high speed loading condition with preventing effect of flush over by the head corrugation.

(B) Due to high heat conductivity, heat conducted to plug can be discipated quickly preventing over heat.

(C) Due to high resisting character to heat shock, there is no trouble of damage on the insulator by sudden raise and drop of heat no gas leakage due to strong construction.

To join the central electrode with insulator, and insulator with main metal body, special powder is used. This way of filling powder is prevailed method in the aircraft plug manufacturing and comparing usual cement adhesion. Air tightness is perfect for long range use accordingly central electrode can discipate heat evenly and distribute heat evenly.

Amount of wear of electrode is indistrict. Larger size of diameter of electrode is adopted to ease heat discipation and to get least wear and special alloy having heat resistant character was selected corresponding to such circumstances of high compression and high rotation. Very strict testing is done before using as even a minute crack in the material might be the cause of extraordinary wear.

d) Heat value of plug

a) Favorable condition for plug function

Ignition part of plug is up to be dirty by carbon generated by combustion gas

during engine revolution or by oil penetrated into the combustion chamber. This deposit is electric conductible itself, and makes short circuit of high voltage electricity. Accordingly weaken spark to decrease engine power misfiring and in worst case will stop engine revolution. To prevent such phenomenon surface of insulator should be heated enough to cut off carbon deposited, and this is called " self cleaning temperature " (about 450° C ~ 600° C according to engine state). On the other hand, it burned sparking part of plug at higher temperature, sparing part will become over heated point which invites harmful knocking to burn mixture gas before hand than sparking the plug, which affect decreasing of engine power. Therefore it is requested that temperature of whole body of spark plug should be maintained less than that of premature sparking (less than 800° C according to engine state). As a result it can be said " sparking part of plug is no good if too cooled also if too hot ".

b) Escaping of heat

Heat received from combustion gas escapes as shown in the figure and sparking part maintains a certain temperature balancing heat quantity escaping and receiving.

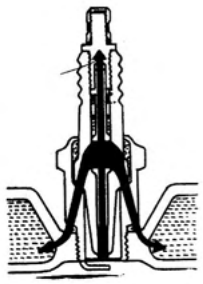


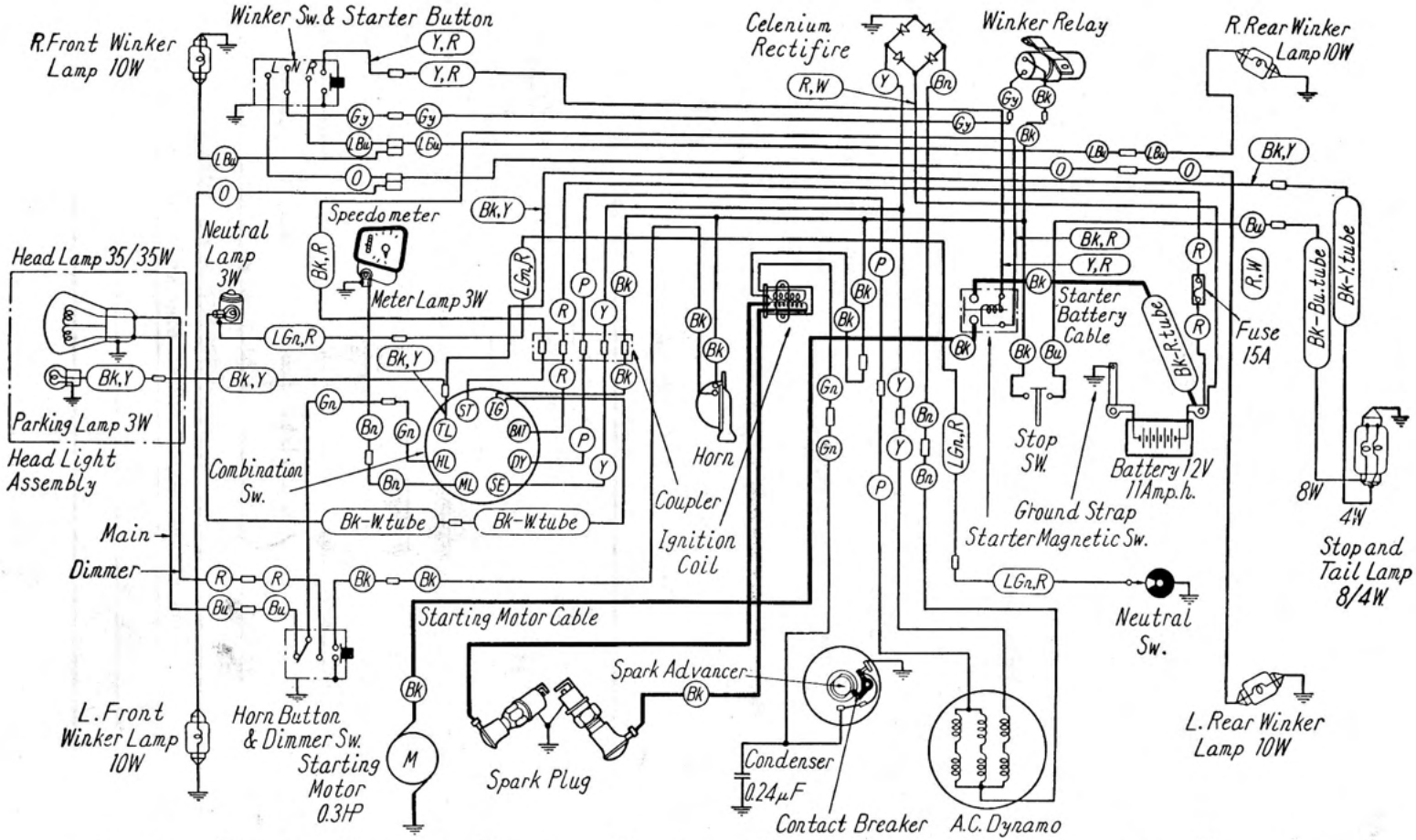
Fig. 1-19.
Way of escaping heat

c) Necessity of different types of plug having each different heat value.-Difference of heat quantity received by each plug. Heat quantity of plug received from engine depend on kinds of engine (air cooled or water cooled, 2 cycle or 4 cycle), design (compression ratio, shape of combustion chamber, plug position) and running state (speed, loading, different fuel, flat ground or climbing slope) greatly.

Therefore it is necessary to furnish different types of plug to function satisfactorily under each different operating condition. This rate of escaping of heat is called " heat value of plug ", and it is determined by its construction, form, dimension and material. It is called " cold type " (for high temperature use) which discipates heat easily and is hard to be over heated, and on the contrary such types as hard to discipate heat and easy to be heated is called " hot type " (low temperature use).

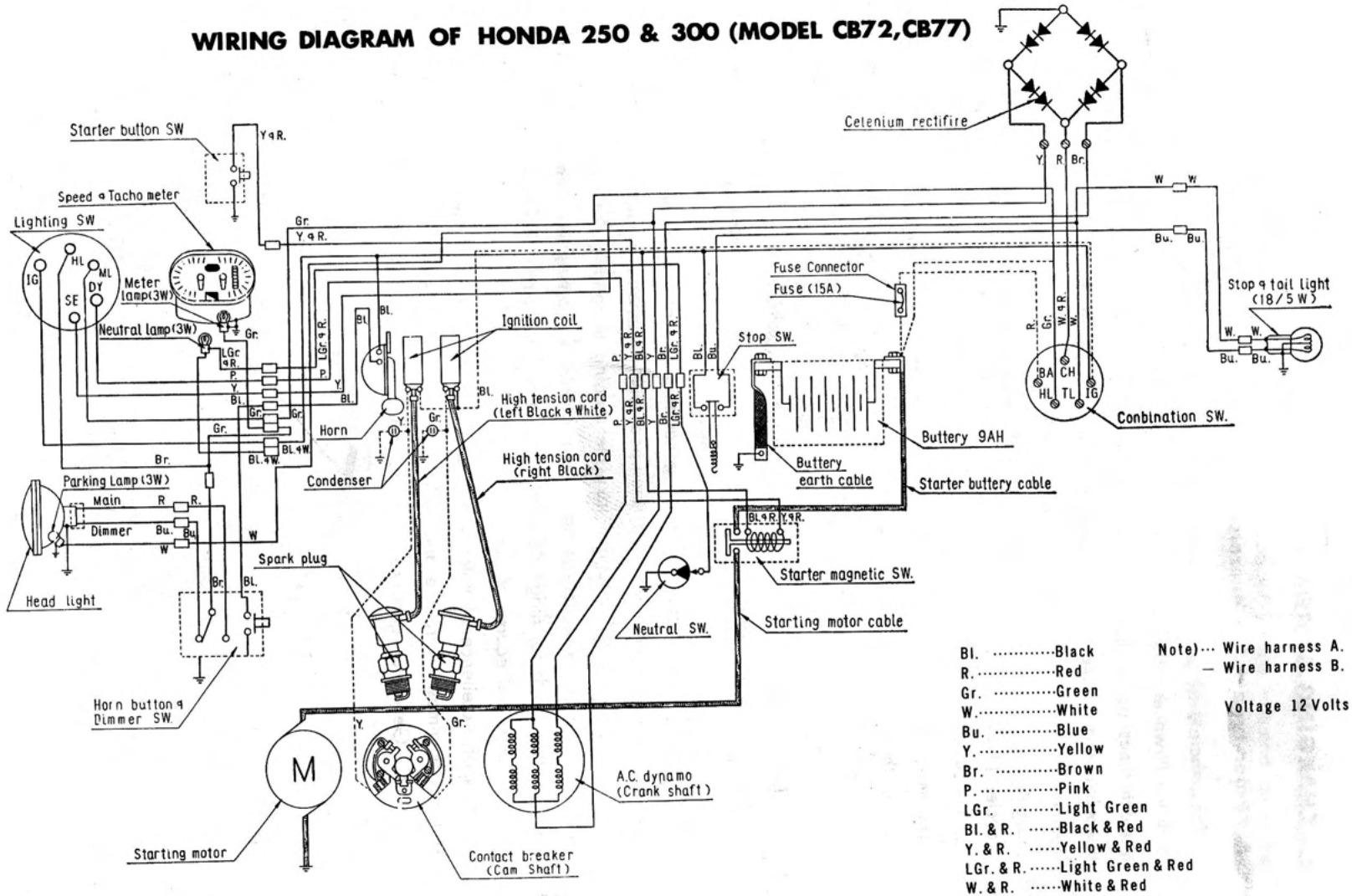
In Fig. 1-20, difference between types functionally are shown.

WIRING DIAGRAM OF HONDA 250 & 300 (MODEL C72,C77)



(Gy)---Gray (Bu)---Blue (Bk)---Black (Bn)---Brown (Gn)---Green (O)---Orange (R)---Red (W)---White (Y)---Yellow
(P)---Pink (LGn)---Light Green (LBu)---Light Blue (Bk,R)---Black and Red (Bk,Y)---Black and Yellow (R,W)---Red and White
(Y,R)---Yellow and Red (LGn,R)---Light Green and Red (Bk-Y.tube)---Black wire covered with yellow tube (Bk-Bu.tube)---Black wire covered with blue tube (Bk-R.tube)---Black wire covered with red tube (Bk-W.tube)---Black wire covered with white tube

WIRING DIAGRAM OF HONDA 250 & 300 (MODEL CB72,CB77)



Bl.	Black
R.	Red
Gr.	Green
W.	White
Bu.	Blue
Y.	Yellow
Br.	Brown
P.	Pink
LGr.	Light Green
Bl. & R.	Black & Red
Y. & R.	Yellow & Red
LGr. & R.	Light Green & Red
W. & R.	White & Red
BL. & W.	Black & White

Note)··· Wire harness A.
— Wire harness B.

Voltage 12 Volts

2. CHARGING SYSTEM

A. Rotor-type A.C. Generator

The principle of generation of electricity by Rotor-type A.C. Generator is same as that of the flywheel magnets. Magnetic flux in the iron core of coil turn its direction as much times as number of magnetic pole for each a turn of the magnetic iron. For each a turn of the magnetic iron, as magnetic flux in the iron core changes with

$$\frac{\text{magnetic pole number}}{2}$$

cycles (3 cycles per one turn for 6 poles generator), so there generates A.C. voltage in the generating coil due to this variation of magnetic flux.

The more magnetic force of magnetic iron, and the earlier rate of change of magnetic flux in the core (the more quick the rotation of magnetic iron, and the more number of magnetic poles) and also the more number of winding of coil, the large A.C. voltage is generated (Fig. 2-1, 2-3).

All these conditions couldn't be satisfied from viewpoint of manufacturing, and among magnetic force of magnetic iron, number of magnetic poles and number of winding of coil there is such inter relation as to increase one sacrificing other. Due to defects of Rotor-type A.C. Generator (Flywheel, generating coil of Generator), which works with wrong voltage variation and not equipped with a voltage regulator, there occur too much raise or drop of voltage if take the loading at random not using regular loading. But recently these defects have been overcome by magnets manufacturers' effort. On the other hand for magnetic weakening of magnetic iron preventive measures have been taken in the course of design. (Fig. 2-2)

A point of excellence of Rotor-type A.C. Generator due to it simple and strong construction is almost no trouble and lack of wear parts. Special feature of using Rotor-type A.C. Generator combined with ignition coil is to make it possible emergency

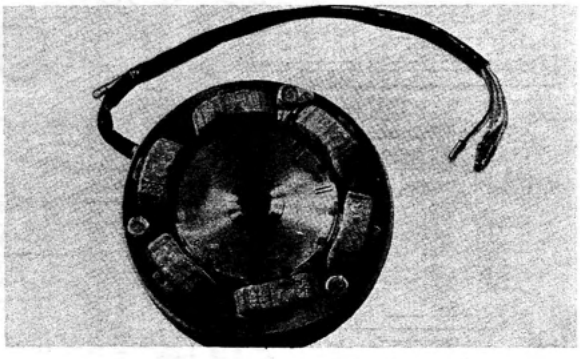
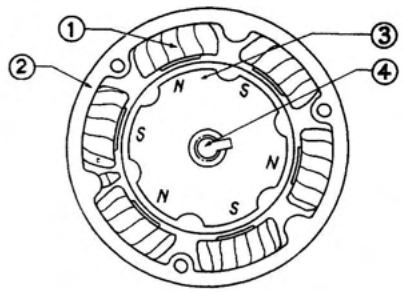


Fig. 2-1. Rotor-type A.C. Generator

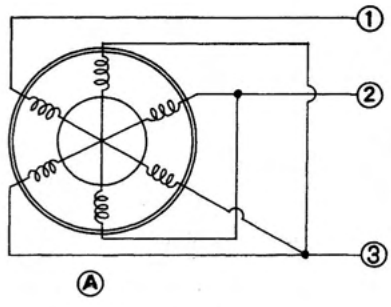
starting which is impossible to be followed by Rotor-type A.C. Generator. Frequently there occurs perfect discharging carelessly from capacity battery mounted on motor cycle, due to its small capacity.

For the battery ignition system, it is impossible to spark unless replacing battery or re-charging, but for the Rotor-type A.C. Generator system it is still possible to spark by kicking even after perfect discharging of battery due to its feature of steep and high induction voltage of Rotor-type A.C. Generator under light load where generated voltage be conducted to ignition coil in D.C. or A.C. as it is through selenium rectifier. Therefore it enables emergency starting by switching of adequate circuit connection.



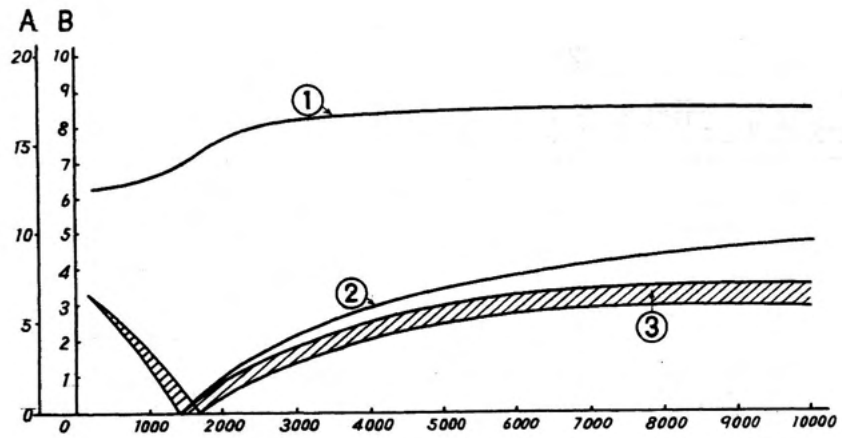
① Coil
② Fixed core (iron core and coil)
③ Rotor (magnetic iron)
④ Crankshaft

Fig. 2-2. Construction of Rotor-type A.C. Generator



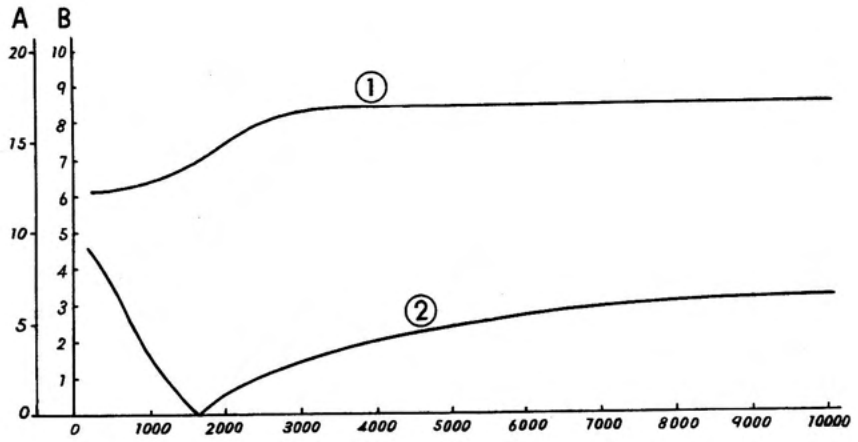
A : Generator
① Yellow (usual use)
② White (day and night)
③ Brown (common use)

Fig. 2-3. Circuit diagram of Rotor-type A.C. Generator



① Battery voltage E_B A : Volt
② Charging current Z_B B : Amp

Fig. 2-4 (a). Characteristics of Rotor-type A.C. Generator (daytime)



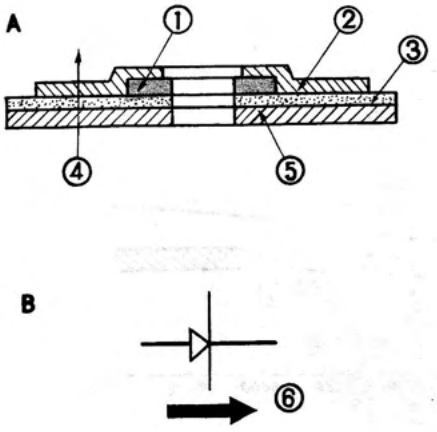
① Battery voltage E_B A : Volt
② Charging current Z_B B : Amp

Fig. 2-4 (b). Characteristics of Rotor-type A.C. Generator (during night)

B. Selenium rectifier

The selenium rectifier is used for rectifying the D.C. current from the A.C. current, always combined with Rotor-type A.C. Generator or A.C. generating coil.

There are several kinds of construction, material and form for this rectifier, but the principle is same utilizing its special character of easy flow current to one direction and closing to other. Types of rectifier generally used are selenium rectifier, copper oxide rectifier, and germanium rectifier. Rectifying unit to rectify by the selenium rectifier is shown is Fig. 2-5 (a), and is composited by rectifying plates combined with



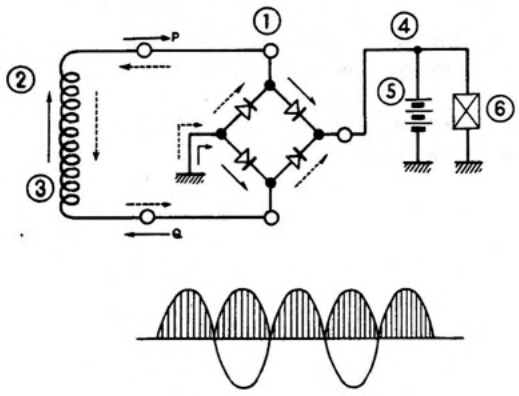
(A) Rectifying plate
① Insulating membrane
② Electric pole
③ Selenium
④ Positive direction
⑤ Base plate (nickel plated steel or aluminum)
(B) A sign of rectifier or rectifying plate
⑥ Direction of current

Fig. 2-5 (a).

end plates and spacers of required number in series or parallel and further according to rectifying system it is set in comb-like arrangement on different rectifying circuit style. Rectifying plate is shown in Fig. (A), where on the base steel sheet or aluminium plate of nickel plated circular or rectangular from, refined selenium mixed with an adequate amount of impurity is spattered in vacuum and further ready fusable alloy of Cd, Bi or Sn is pured on its surface to make electric pole after perfect heat treatment to make it active metal selenium.

Then it becomes possible to get such phenomenon as current is easy to flow to positive direction and almost shut to flow to another direction if put current to the reverse direction to that shown by arrow. This is called rectifying action of selenium rectifying plate. This characteristics caused by unsymmetric conductivity due to the layer of barrier on the contacting surface between pole and metal selenium of semi-conductivity. As moisture is very harmful effect on the selenium rectifying plate, unit-moisture processing is done by moisture resistant point to prevent corrosion.

The selenium rectifying unit which is common for Model C72, 77 and Model CB72, 77 is connecting in bridge and number of selenium rectifying plate becomes much and the ignition coil works for both cycles of positive and negative loading. Durability of the selenium rectifier depends on temperature largely, and it is prohibited to raise more than 30°C. So is requested not to flow over current for a long time.



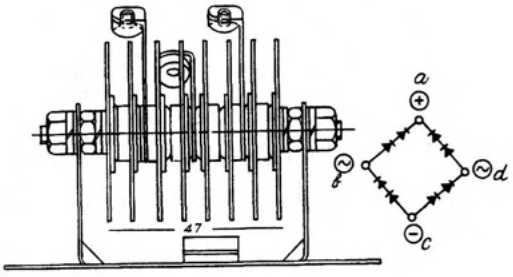
① All wave rectifier
② Generating coil
③ A.C. voltage
④ D.C.
⑤ Battery
⑥ Loading

Fig. 2-5 (b).

On the other hand, there is so-called resisting reverse voltage which more voltage is put to reverse direction there occurs puncture (Here punctured part turns to be insulating substance at once and this damage self-restores its function reducing effective rectifying area. The more number of puncture, the more rectifying efficiency will be de-

creased to be overheated). Therefore it is necessary to raise total resisting reverse voltage by putting required number of plates in series corresponding to A.C. voltage generated by the generator coil.

In Fig. 2-5 (b), put A.C. voltage between terminals P.Q. of the generating coil as (A) : (B) : (C) = 1 : 2 : 1, it is evident (C) is most suitable for high A.C. voltage rectifier as the reverse voltage per one rectifying plate is smallest. Generally speaking is selenium rectifying system for use of automotive A.C. generating coil (C)>(B)>(A) is the order to select corresponding to voltage.



① Selenium rectifier ass'y
a : Red terminal
b : Brown terminal
c : Volt
d : Yellow terminal

Fig. 2-5 (c).

Remarks :

Special precaution is necessary in using selenium rectifier not to run engine under such condition as no loading state (for instance unloading state of battery during daytime or taking out state yellow of fusel, as high voltage generated by generating coil under no load or light load condition acts to the reverse direction. This leads to puncture trouble and will damage the selenium rectifier if continued a long time.

On the other hand, there occurs ageing change in the selenium rectifier for a long term use increasing internal resistance in the rectifier plate to decrease output voltage and to increase temperature.

The largest cause of aging change is temperature raise and at more than 70°C in the rectifier this change occurs rapidly, therefore it is required to select cool position to equip it.

There is such tendency as to increase current to reverse direction if selenium rectifier has not been used for a long time. In such case, before using raise voltage slowly during one hour from lower voltage (about half of standard) to restore its function.

C. Battery

All the battery for automotive use are lead storage battery and its construction is as shown in the figure that is anode plate group and cathode plate proup (one plate more than anode group) are put together in turn inserting separator between anode and cathode plates, and these combined plates are stored in the cell (ebonite or stirol model) dipped with electrolysis solution. One unit as shown in the figure is called on

unit cell and generates about 2.1 Volt (in case of perfect charge, this will be up to 2.5 Volt during charging).

For Model C72, 77, 6V is used and for Model CB72, 77, 12V is used, connecting each cell of each 3 piece or 6 piece by connecting rod in series.

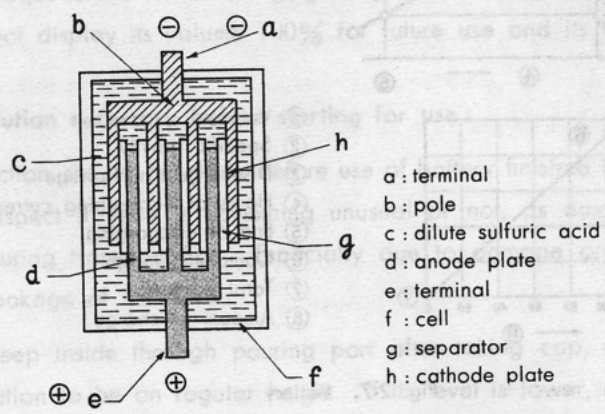


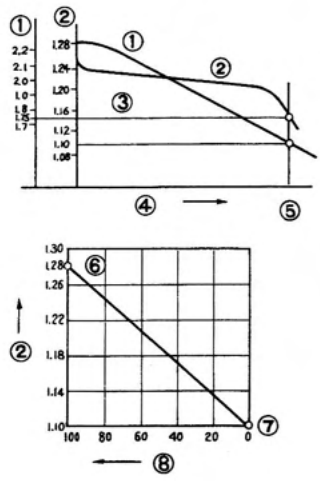
Fig. 2-6. Storage battery

The pole plate is made of lead antimony lattice painted with powder of lead oxide in paste state and dried. For anodic plate, hard lead oxide in dark brown color is filled up and for cathode plate gray porous sponge like lead is filled.

There contains expanding substance to prevent contracting solidification while in use as for separator thin cypress sheet (recently rubber sheet with fine holes or sythetic plates are used) is used, and glass mat is inserted between anodic plate and separator to prevent oxidation of separator and dropping substance of anodic action.

There occurs discharge when connected load between both terminals of battery, and gradually substance of both pole plate changes to lead sulphate, accordingly, specific gravity of dilute sulphuric acid will decrease to drop terminal voltage. This rate of decrease of specific gravity is proportional to amount of discharge approximately as shown in Fig. (a). So it will be determined amount of discharge or remaining amount by checking variation of specific gravity if known the initial specific gravity (sg. at complete charge 1.260 and sg. at complete discharge 1.10). Specific gravity or dilute sulphuric acid varies with change of temperature. If also depend on the kind of battery but generally about 1.260 is selected with converting standard temperature 20° C. If put current on the discharged battery in the direction reversal to discharging, lead sulphate generated on both plates restore their original state, i.e. become lead oxide

and sponge lead again, and specific gravity of dilute sulphuric acid increase gradually and increase terminal voltage as charging progress.



(a) Discharge characteristics under constant current

① Voltage
② Specific gravity
③ Discharge limit voltage
④ Hours of discharging current
⑤ End of discharging
⑥ Complete charge
⑦ Total discharge
⑧ Amount of charge

Fig. 2-7. Battery

a) Volume and rate of discharge (rate of charging)

Volume of battery is defined as amount of volume dischargeable down to discharge end voltage terminals regulated by JIS from complete charged battery discharging under constant current (mean value 1.575V per each unit cell). To express its value Ampere hour (Ah) (discharging current times discharging hours) is used.

Volume of battery depends on temperature of discharging current and specific gravity. As conditions of volumes test regulated by JIS for use of battery for motor cycle, specific gravity of electrolysis solution should be 1.260 ± 0.005 (converted to 20°C), current 10 hours rate, and temperature of solution 25 ± 2°C. Concerning rate of discharge, given here the battery completely charged, discharge down to the end discharge voltage with X ampere within T hours, volume of this battery is expressed by XT ampere-hours (Ah), and X ampere is called the current of rate of discharge of T hours.

Therefore battery of 10 hours rate volume 11 Ah means such capacity as to discharge 10 hours down to the end discharge volt and current of 10 hours rate of discharge is 11A. Similarly for charging current, it is expressed 10 hours rate of charging. To express amount of charging or discharging current, duration of time in hours down to the end discharging volt is used.

b) Initial charging

Battery can be stored after assembly for a fairy long time, if not electrolysis so-

lution be poured in and seal tightly a pouring orifice. Therefore when battery not charged yet is to be used initial charging is necessary. This is done after pouring electrolysis solution charging with regular initial charging current for about 70 hrs. continuously to attain both pole plates a perfect charging state for the first time.

It is required the initial charging should be done perfectly, otherwise this battery will not display its volume 100% for future use and its life be shorten seriously.

Precaution necessary before starting for use :

Inspection should be done before use of battery finished initial charging as follow:

(1) Inspect if there is something unusual or not, as damage, happens sometimes during transportation. Especially due to damage on the case there happens leakage of solution.

(2) Peep inside through pouring port after taking cap, or check the level of solution to be on regular height. If its level is lower, check damage if any on the case. If no damage, supplement dilute sulphuric acid of same specific gravity with other cell.

(3) If time elapsed more than two weeks after the initial charging, it is necessary to supplement charge to supply amount of self discharged electricity while let alone. During this supplement charging, it is desirable to check level of solution to adjust regular height and further measure and keep record of voltage, specific gravity and temperature for each cell for future reference.

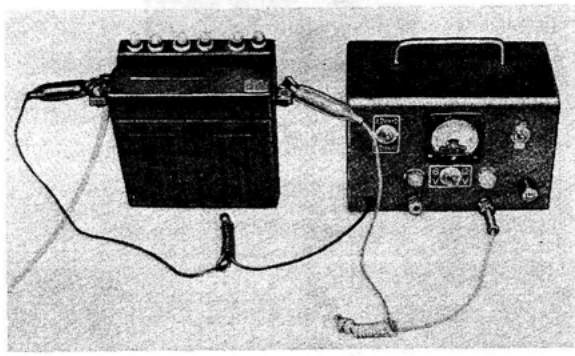


Fig. 2-8. Supplement charging of Battery

Precautions while in use :

(1) Inspect battery periodically, once a week for automotive use. At least twice a month or after each 1.000~2.000 km (620~1.860 mile) running.

(2) Special attention should be paid on the level of solution and if short supply distilled water or drinking water (no content of metal as ferrous). If the case of battery is transparent there is shown level of solution, but generally the height of solution should be adjusted about 13 mm (0.51 in.) over the separator. If the pole plate be exposed in the air due to drop of level, there occurs oxidation on the plate making white sulphuric lead which decrease volume of battery, and effect the performance of exposed plate to be serious cause of inner shorting. So many troubles are experienced due to this cause, therefore it wouldn't be exaggeration to say that is the most part of causes to shorten it life.

(3) Keep always in charged state. If used for a long time in insufficient charged state trouble called sulphation will be accelerated and at last it invites such difficulty as to make it hard to restore original substance by usual charging. Such pole plate warps easy to short. On the other hand, if used with thin solution due to over discharging separator gets damage. Therefore it is requested to supplement change before the discharge limit. (Fig. 2-8~2-10)

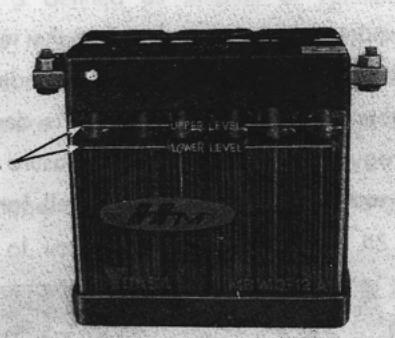
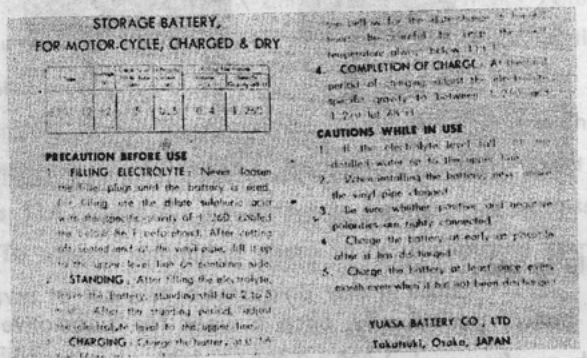


Fig. 2-9. Sign of level of solution.


STORAGE BATTERY,
FOR MOTOR-CYCLE, CHARGED & DRY

PRECAUTION BEFORE USE

CAUTIONS WHILE IN USE

YUASA BATTERY CO., LTD
Takatsuki, Osaka, JAPAN

Fig. 2-10. Precaution for use

For the battery, MBJ4-12 type (Voltage 12V, volume 10 hours rate 10 Ah) is applied. Duration of battery is expressed by hours from the complete charging state to the complete discharged state using electricity for each separate loading while in stationary state. Therefore if the loading overlapped duration will be shorten so much. This relation could be presumed from the following table.

Kinds of loading on battery	Standard	Mean consumption of current	Duration of battery (approximate)
Head light	35/35W	10～3A	2 hrs
Cell motor	0.4kW	10～50A	Listed on other part
Magnetic starter switch	—	3.5A	Listed on other part
Neutral lamp	3W	0.25A	40 hrs
Winker lamp	10W×2	1A	10 hrs
Tail light	4W	0.35A	30 hrs
Stop light	8W	0.7A	—
Speedometer lamp	3W	0.25A	40 hrs
Ignition	Stop —	.5A	1.6 hrs
	Running	0.8～1.2A	—
Horn	100P	1.5A	6 hrs

* In case of point classed and switch on

For instances, if the head light 35W is on, consumption is 3A only and duration will be about 2 hrs. but if the tail lamp (0.35A) and ignition (3.5A) were used simultaneously total consumption will be 6.85A. From the figure above shown duration becomes 35～40 minutes.

While in running, charging is done corresponding to engine revolution, so that difference between charging and discharging current will be have charging or discharging.

Charging current > discharging current
→charge battery

Charging current < discharging current
→discharge battery

Especially as large current flows while in use of cell motor, it is required to control less than 5 seconds for one action, after that takes rest 10～15 sec. to repeat next action.

There occurs rapid drop of voltage if large current taken out from the battery but it restores the original voltage if taken a rest.

Therefore continuous pushing on the cell button causes voltage drop preventing restoration to the effect of early exhaustion.

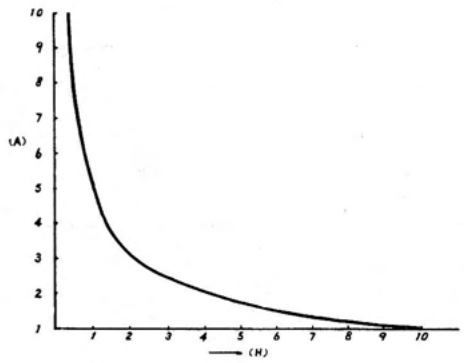


Fig. 2-11. Relation between discharge current and duration for MBJ 4-12 type (12 V, 10AH) battery

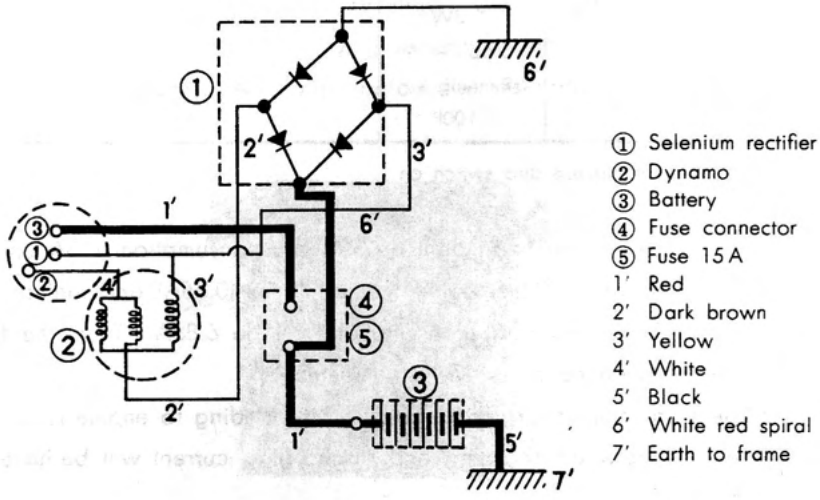


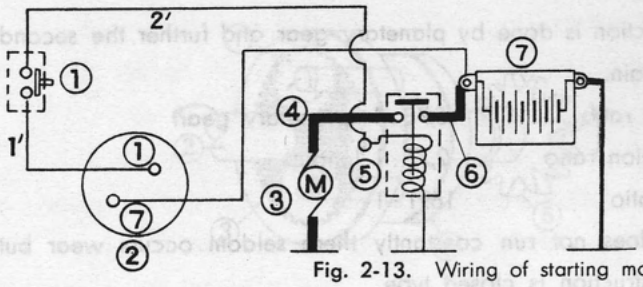
Fig. 2-12. Charging current circuit diagram

D. Starting Motor

a) Starting circuit

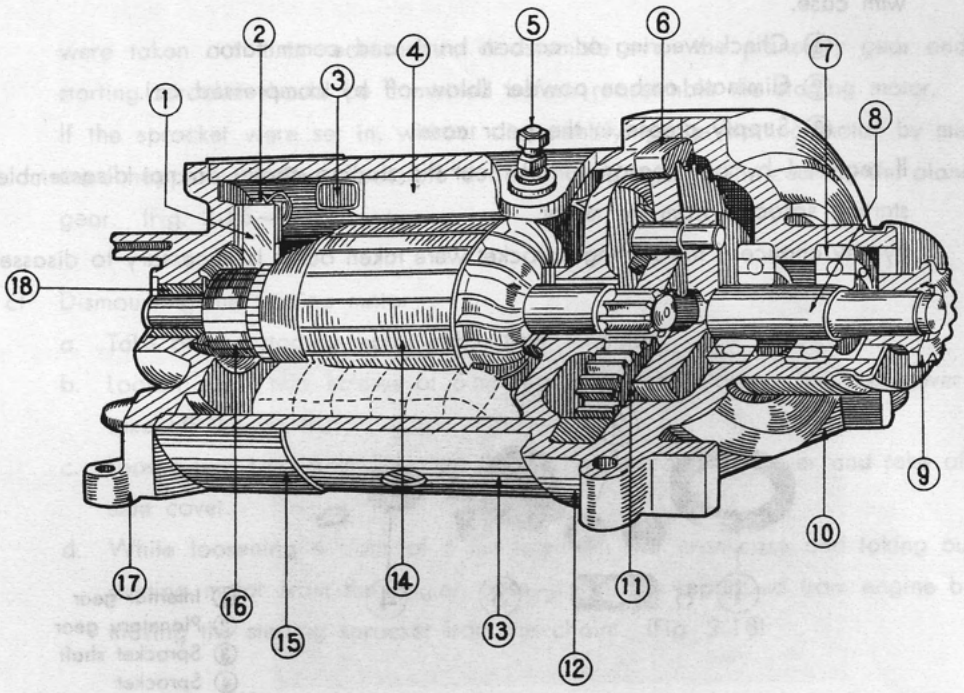
The starter switch of push botton style is equipped on the right side of the handle. Pushing it, the starter magnetic switch is operated to feed current of about 100A to the starting motor from the battery for Model C72, 77, and about 60A for Model CB72, 77 to rotate the starting motor.

The starting motor is equipped in front of the crankcase and the crankshaft is rotated by starting chain through the overrunning clutch from the dynamo side.



① Starter switch
② Combination switch
③ Starting motor
④ Starting motor cable
⑤ Starter magnetic switch
⑥ Starter battery cable
⑦ Battery
1' Black red spiral
2' Yellow red spiral

Fig. 2-13. Wiring of starting motor



① Brush
② Brush spring
③ Field coil
④ Pole core
⑤ Terminal
⑥ Internal gear
⑦ Ball bearing
⑧ Sprocket shaft
⑨ Sprocket
⑩ Gear housing
⑪ Planetary gear
⑫ Center bearing holder
⑬ York
⑭ Armature
⑮ Cover band
⑯ Commutator
⑰ Commutator end frame
⑱ Bearing bush

Fig. 2-14. Starting motor

b) Reduction of starter

To get required torque and revolution to rotate the crankshaft by reducing revolution of the motor mechanical reduction is necessary. To complete this in high

weight the primary reduction is done by planetary gear and further the secondary reduction by starting chain.

Primary reduction ratio	5,78 : 1 (planetary gear)
Secondary reduction ratio	2,77 : 1 (chain)
Total reduction ratio	1691 : 1

As the starting motor does not run constantly there seldom occurs wear but to prevent moisture its construction is closed type.

Therefore after each 5.000~10.000 km run the following points should be checked with case.

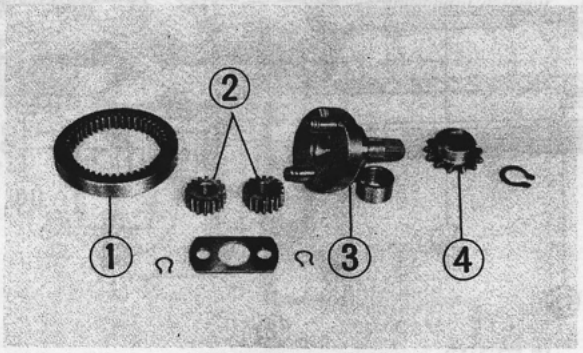
① Check wearing on carbon brush and commutator.

② Eliminate carbon powder (blow off by compressed air).

③ Supply grease in the gear case.

If required by any reason to take out the starting chain, do not disassemble the starting sprocket from the motor.

By any chance if the starting sprocket were taken out it is necessary to disassemble



① Internal gear
② Planetary gear
③ Sprocket shaft
④ Sprocket

Fig. 2-15.

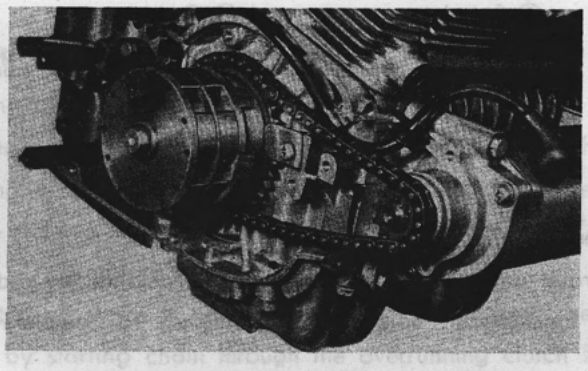


Fig. 2-16. Starting motor attached on engine

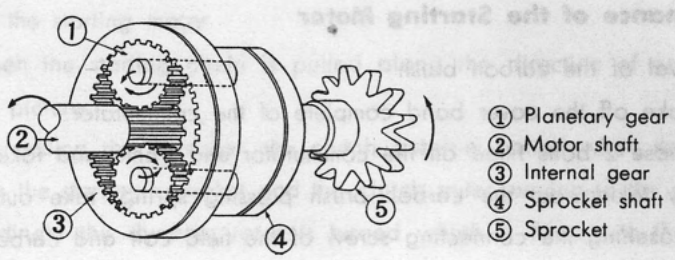


Fig. 2-17. Reduction mechanism

were taken out it is necessary to disassemble even the planetary gear and the starting sprocket should be combined before reassemble the starting motor.

If the sprocket were set in, without disassemblying the starting motor by mistake there happens rotation impossible due to hitting against the case by the planetary gear. (Fig. 2-15~2-17)

c) Dismounting the starting motor

a. Take off the starting motor cable from terminal.

b. Loosen each two screws of 6 mm tightening the starting sprocket cover and take off the cover.

c. Loosen two screws of 5 mm on the starting motor side cover and take off the side cover.

d. While loosening 4 bolts of 6 mm fitted on the crankcase and taking out the starting motor from the engine case, it will be separated from engine by removing the starting sprocket from the chain. (Fig. 2-18)

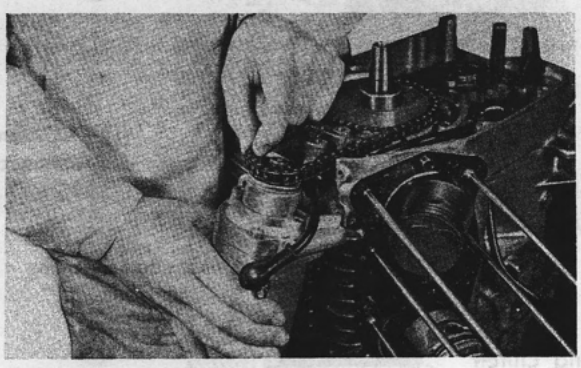
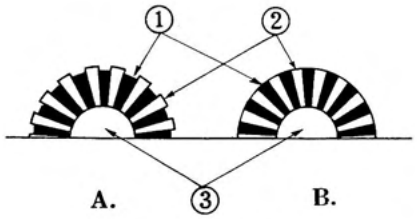


Fig. 2-18.

E. Maintenance of the Starting Motor

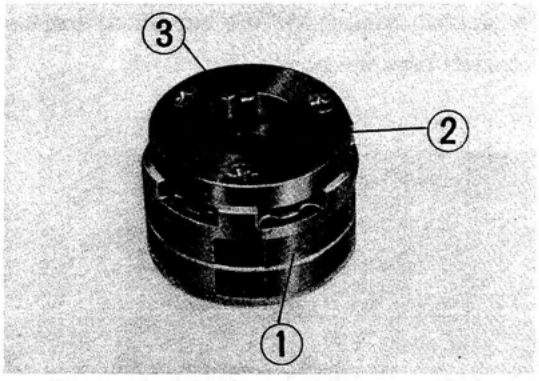
1. Removal of the carbon brush
   a. Take off the cover band complete of the commutator.
   b. Loose 2 bolts fitted on the commutator end frame and take it out.
   c. By taking out the carbon brush pressing spring, take out the carbon brush loosening the connecting screw of the field coil and carbon brush.



① Mica piece
② Commutator (Copper)
③ Motor shaft

Fig. 2-19. Cross-section of commutator

2. Commutator
   The commutator is as shown in Fig. (A) while in use copper pant get wear to turn like (B).
   In such cases it is requested to adjust to be (A).
   It is advisable to rely on specialist shops as this adjustment requires highly technics (under cutting of mica). (Fig. 2-19)



① A.C. Generator rotor
② Starting clutch-outer
③ 10.2×11.5 roller

Fig. 2-20. Generator starter and starting clutch

3. Over running clutch
   This transmit rotation from the starting motor to the crankshaft, but reversally from the crankshaft can not rotate the starting motor.
   This construction is quite same with Model C72. (Fig. 2-20)

1. If turns the starting motor
   a. When the starting chain is pulled along the direction of arrow as shown in the picture.
   b. By rotating the sprocket, the clutch outer is turned when the roller is joined with the starting sprocket and the clutch outer moving to the narrow side. Accordingly the dynamo rotor is turned which is fixed with the clutch outer as one unit.
   c. On the rotor is fixed on the crankshaft by a key of 4 mm rotation of the clutch outer is transmitted on the crankshaft.
   d. The starting clutch roller spring is useful for smooth running of roller without any irregular meshing.
      Furthermore a spring cap is used to make smooth motions of the starting clutch roller spring and the roller.

2. When the engine starts running
   a. Rotational speed of the crankshaft becomes faster than that of the sprocket.
   b. Transmission from the starting motor is cut, due to centrifugal force on the roller which presses the spring and moves to the wider space of the clutch outer.

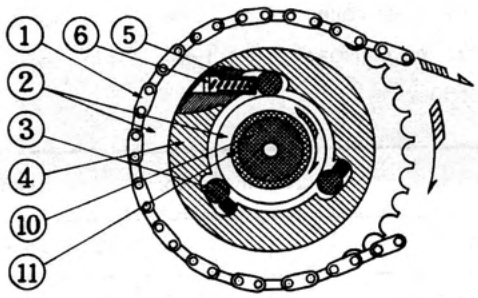


Fig. 2-21. Picture showing principle of function of the overrunning clutch (A)

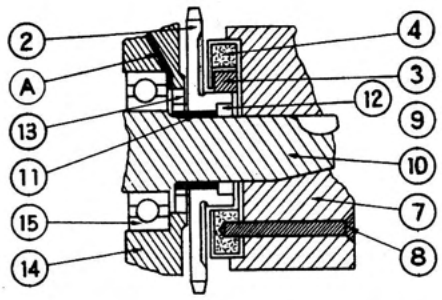


Fig. 2-22. Picture showing principle of function of the overrunning clutch (B)

3. Lubrication

Lubrications for the over running clutch is done by oil dropped through the hole (A) in the figure which passes through the groove at three parts (B) and starts inside of the inner oil seal 2035 of 20 mm bush and the lock oil seal 326575 to prevent burning.

Therefore after disassembly it is necessary to clean oil holes (A) and (B) by compressed air.

4. Precaution about maintenance

As life of the over running clutch depends on the function of roller, special attention is needed for its handling.

a. Grease put on the roller should be used designated one. (Part No. 719111. silicon grease)

This designated grease have several features, that is high resistant to cold and hot (−40°C∼200°C), least variation for frictions coefficients due to temperature and other variation.

Before putting this grease cleanse each part by gasoline, and after drying up, paint grease thinly all over the surface of the foller.

b. Be careful about magnetic force

Not only roller or roller spring, but also parts around the clutch should be avoided from magnetizing. Any time resistance will unfavorably affect smooth running of roller.

No.	Part name	Quantity	No.	Part name	Quantity
1	Starting chain	1	8	Cross hole screw	3
2	Starting sprocket	1	9	Half moon key (large)	1
3	Roller	3	10	R. crankshaft	1
4	Clutch outer	1	11	Bush	1
5	Starting clutch roller spring cup	3	12	20305 oil seal	1
			13	326275 lock oil seal	1
6	Starting clutch roller spring	3	14	R. crank bearing housing	1
7	A.C. dynamo rotor	1	15	Z bearing	1

F. Starter magnetic switch

Current to rotate the starting motor will reach about 100A. To reduce resistance big wire is needed, and also the switch to make on or off should be larger size at the contacting part. Accordingly it will be difficult to find such place as easy to operate switch feeding current directly on the starting motor.

In such cases, switch utilizing magneto can be equipped at the most convenient place between the battery and the starting motor and put the switch to operate this magneto separately to make possible remote control with least current.

1. Principle of function

a) If current flows on the primary side, an electromagnet actuates to attract iron core resisting spring force.

b) The contact point at the end of the iron core connects the secondary circuit. (Fig. 2-24)

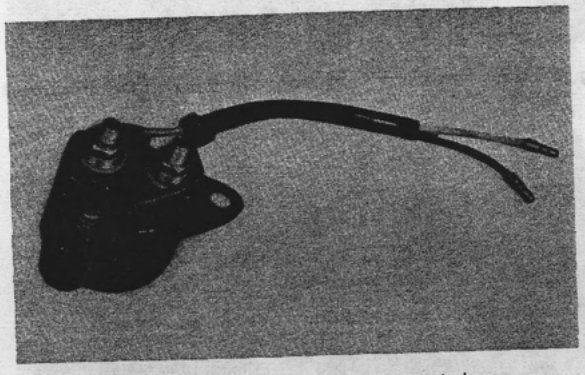
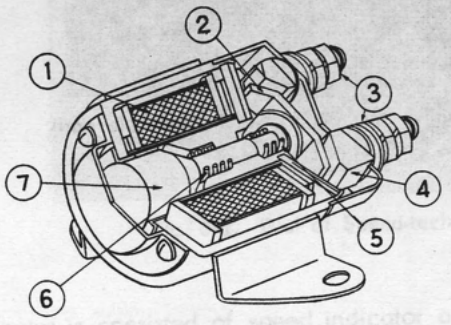


Fig. 2-23. Starter magnetic switch



① Magnet coil (primary coil)
② Contact (operating side)
③ Terminal
④ Contact (fixed side, secondary side)
⑤ Contact return spring
⑥ Return spring
⑦ Moving core

Fig. 2-24. Construction of starter magnetic switch

2. Precaution

a) When put voltage of 12V between both terminal of the primary circuit, if heard cracking sound, the contact point of the primary circuit is connected.

b) If used for a long time, contact point gets were and damage to increase resistance, and sometimes no current flows (even if sound of cracking is heard, sometimes the starting motor forced to stop). In such cases, disassemble it and polish the contact point with a file or a sandpaper. To disassemble take this switch from the body.

c) Operational current on the primary side less than 12V, 3.5A. (Fig. 2-5, 2-6)

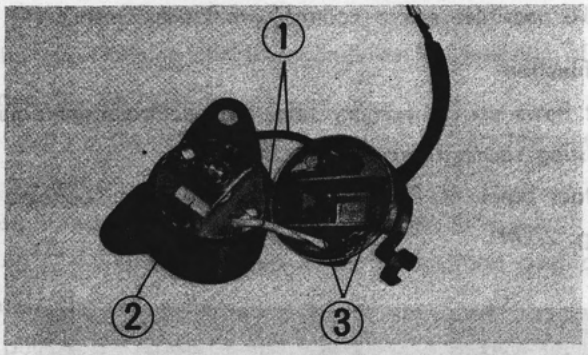


Fig. 2-25. Disassembly of magnetic switch (cap is opened)

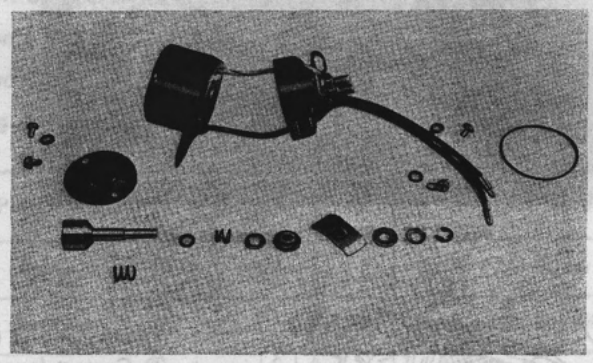


Fig. 2-26. Disassembly of magnetic switch (assemble part)

3. PARTS FOR USE OF SAFE GUARD

Speedometer, Tachometer

For Model C72, 77 is equipped only a speedometer but not a tachometer.

The speedometer is generally magnetic type, and rotation proportional to that of the wheel is transmitted to the speedometer by means of a flexible cable.

For the tachometer, magnetic tachometer is used alike the speedometer and rotation proportional to that of the cam shaft in the cylinder head is transmitted to the tachometer. (Fig. 3-1)

Fig. 3-1. Speed-tachometer

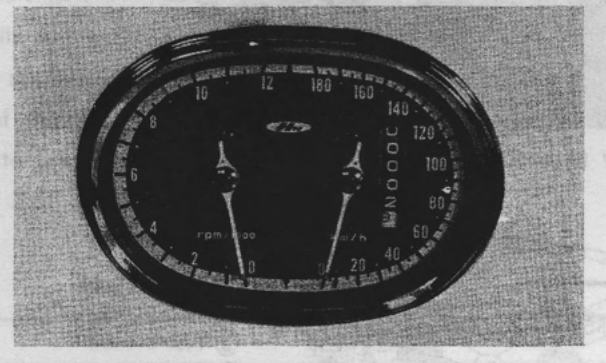


Fig. 3-2. Dial of Speed-tachometer

The speedometer is consisted of speed indicator and distance meter, and speed is expressed by km/h, and running distance is integrated up to 99.999 km by the distance meter. The tachometer shows revolution number per minute by indicator (r.p.m.). Constructionally it is same type with speedometer and stored in the same case of the speedometer. Only different points are that no integration mechanism and different sign and measures on the dial plate.

Construction of the speedometer and tachometer is shown in the figure.
The magnets rotate with same rotational speed with that of the flexible cable and the induction disc (of aluminium or copper made) moves with indicator as one unit.
The magnet shelter disc furnishes magnetic field to generate eddy current on the disc by the rotating magnet.

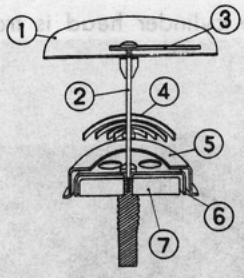


Fig. 3-3. Principle of speedometer

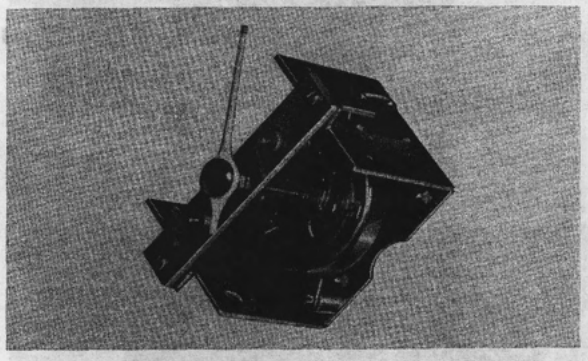


Fig. 3-4. Parts of speedometer

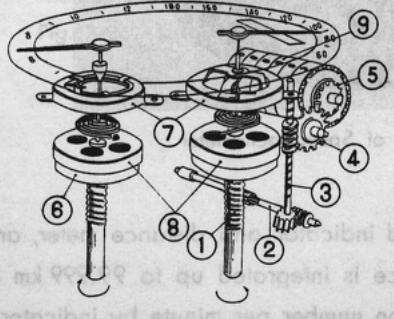


Fig. 3-5. Construction of total distance meter

By means of this eddy current the magnet shelter disc is moved by proportional revolving force to the magnet and indicator shows on the dial balancing with reaction of the correctly adjusted hair spring.

When the cam is stopped, (on the tachometer, engine is stopped) the indicator and the induction disc come back to the zero by restoring force of the hair spring.

For the speedometer revolution of the front wheel is reduced in the gear box, and the cable turns 1400 revolutions per 1 km running, on the other hand for the tachometer, revolution of the cam shaft is reduced further.

Reduction ratio of the tachometer axis to the crankshaft is 3 : 20. (Fig. 3-4)

$$\frac{\text{Total distance meter}}{\text{reduction}}$$

JIS Regulation

Type	Flexible shaft	Reduction ratio	Speedometer indication
two or tri wheel car	1400	1/1400	60 km/h
4-wheel car	637	1/637	60 km/h

The distance meter is shown constructionally on Fig. 3-5, this magnet shaft cutted worm on it transmit its rotation as No. 2→shaft No. 3→shaft No. 4→wheel No. 5→wheel reducing each speed.

On the dial of the total distance meter figures as 0, 1, 2...9 are marked, and teeth are cut so as to rotate each wheel for one turn, the succeeding wheel rotates $\frac{1}{10}$ revolution. (Fig. 3-5)

MEMO

TROUBLE SHOOTING

TROUBLE SHOOTING

Procedures of diagnosis for finding out causes of trouble and their probable causes are discribed as follows :

1. Engine does not start or hard to start

(1) Remove the carburetter float chamber and check for fuel flow, if fuel is not supplied enough ;

1-1. Clogged fuel line

1-2. Clogged fuel tank cap vent hole

1-3. Clogged fuel cock

1-4. Clogged carburetter line or stuck needle valve

(2) Remove the spark plugs, attach them to the spark plug caps, turn in the ignition switch and rotate the crank shaft with starter motor while the (—) electrods are grounded. If the spark plugs do not spark well or nil ;

2-1. Faulty spark plug, (to make sure, check the spark plug with spark plug tester.)

2-2. Sooty or wet spark plug

2-3. Contact breaker point

2-4. Faulty condenser

2-5. Incorrect adjustment of contact breaker point

2-6. Short circuit or breakage in ignition coil or wiring

2-7. Damaged combination switch

(3) Check compression pressure at the cylinder with a compression gauge and if lack or nil of compression is indicated in either cylinder ;

3-1. Incorrect tappet clearance

3-2. Incorrect seating of valves in valve seats

3-3. Excessive wear in valve

3-4. Excessive wear in piston ring, piston cylinder

3-5. Blown out cylinder head gasket

3-6. Seized valve in valve guide

3-7. Faulty valve timing

(4) Start engine following the procedure of starting but engine seems to start but won't continue running ;

4-1. Too wide opened choke shutter in cold weather

4-2. Wide opened air screw of carburetter adjusting air-screw

4-3. Damaged carburetter insulator or gasket

2. Engine does not develope full power

(1) Stand the motorcycle on the main stand and rotate the rear wheel by hand when the charging gear is set in neutral, if wheel does not turn easily ;

1-1. Dragging rear brake-incorrect adjustment

1-2. Damaged wheel bearing

1-3. Too tight drive chain tension, in correct adjustment

(2) Check the tyre air pressure and inflate to the specific amount.

(3) Check the clutch for slip and if it is found slipping ;

3-1. Improper adjustment of clutch

3-2. Worn clutch facing

3-3. Weakened clutch springs

(4) Measure the highest revolutions of crankshaft with a revolution counter and if the engine does not develope full revolution ;

4-1. Choked carburetter at somewhere

4-2. Clogged air cleaner

4-3. Insufficient supply of fuel to the intake

4-4. Clogged muffler

4-5. Faulty ignition coil or contact beaker points

4-6. Faulty seating of valve

4-7. Incorrect ignition timing

4-8. Excess weak valve springs

4-9. Faulty spakr plug ; test the spark plug with spark plug tester

(5) Check oil level in the crankcase and adjust the level to the specification, or excess amount of oil result in the trouble.

(6) Inspect for excess heating of engine and if found it same ;

6-1. Excess carbon deposit in combustion chamber

6-2. Inferior grade of fuel is used

6-3. Slippery clutch

6-4. Lean air-fuel mixture ; improper size of main jet in carburetter

6-5. Dirty cylinder and cylinder head

(7) Check for the engine develpoing or knocking when it submit to quick accereration or successive running at high speed and if it is so ; The probable causes are same as No. (6).

3. Engine runs erratic and/or with miss firing

(1) Adjust air screw of carburetter properly and still runs under same circumstances.

1-1. Faulty ignition timing

1-2. Damaged carburetter insulator or packing

1-3. Faulty spark plug

1-4. Faulty condenser

1-5. Faulty ignition coil

1-6. Faulty contact breaker point

1-7. Incorrect tappet clearance

(2) Check for missing at high speed and if the engine is still under the same.

2-1. Insufficient supply of fuel

2-2. Incorrect valve timing

2-3. Damaged or weak valve springs

2-4. Other causes mentioned in No. (1)

4. Excessive oil consumption or exhaust blue or black smoke

(1) If the engine exhausts smoke while continuous running at high or low RPM.

1-1. Worn cylinder or piston rings

1-2. Reversely assembled rings in piston

1-3. Excess clearance between exhaust valve and guide

(2) If the engine exhausts smoke just after when closing throttle valve suddenly from certain opening ;

2-1. Excess clearance between inlet valve and guide

2-2. Clogged air vent hole or plastic tube

5. Clutch jerks or engages unsmoothly

(1) If the machine moves off with jerking or the engine stops at the moment when the clutch engaged.

1-1. Uneven tensions of clutch springs

1-2. Distorted clutch plates or facings

1-3. Sticky movement of clutch plate in the clutch outer

6. Gear shifting does not operate correctly

(1) When the changing gear does not engage.

1-1. Worn notch on the shift drum

1-2. Stuck shift fork to the shift drum

1-3. Worn shift fork

(2) If the gear jumps out while running ;

2-1. Worn dogs on the gear shifter

2-2. Worn or distorted shift fork

2-3. Weakened shift drum stopper spring

7. Engine runs with unusual noise when the tappet clearances assumed correctly :

(1) If knocking noise is head from cylinder when accererating engine.

1-1. Excess clearance between cylinder and piston

(2) If chattering noise is head even if the cam chain has been adjusted ;

2-1. Excess worn cam chain

2-2. Excess worn cam chain tensioner spring or roller

(3) When knocking noise is head from crank case.

3-1. Worn crank shaft big end

3-2. Worn crank shaft bearing

(4) If the clutch incures noise when operating clutch lever.

4-1. Excess clearance between the clutch plate and clutch outer

4-2. Excess clearance between the clutch center and clutch plate

8. Troubles in steering

(1) If it is felt that the steering is hard at turning ;

1-1. Over-tight steering ball races

1-2. Damaged steering

1-3. Bent steering stem

(2) Steering wanders or pull to one side while running.

2-1. Worn front and/or rear wheel bearing

2-2. Distorted front and/or rear wheel rim

2-3. Loosen spokes

2-4. Worn rear fork pivot bushing or front arm pivot bushing

2-5. Bent front fork or frame or rear fork

2-6. Incorrect rear wheel alignment

3-7. Uneven strengh of cushion springs on both side

9 9. Troubles of brakes

(1) The brake does not actuate properly even after the free play

1-1. Worn brake shoes

1-2. Worn brake cam

1-3. Worn brake pedal shaft

1-4. Brake shoe contaminated with oil or water

1-5. Stuck brake cable or rear brake link

1-6. Lack of grease in brake cam

(2) Brake squeaks when applied.

2-1. Excess worn brake shoe

2-2. Contaminated surface of brake shoe

2-3. Warped or pitted wall of brake drum

2-4. Excess wear of brake panel spacer

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