



Handbook

for the

600 cc. s.v. Mark III

Direct Starting

Type 9 Engine

As supplied to

MESSES D. WICKHAM & Co. Ltd.
WARE, HERTS.

J. A. PRESTWICH INDUSTRIES LTD.,

NORTHUMBRIA AND PARK TOTTENHAM LONDON N17

Telegrams: Prestwich Southton, London Telephone: TOTENHAM 3701

8.2 H.P. at 2200 RPM.

Weight of Engine = 150 lbs

SPECIFICATION

Type: J.A.P. Mark III 600 c.c. side valve, direct starting.

Bore: 85.7 millimetres.

Stroke: 104 millimetres.

Compression ratio: 5 to 1.

Cylinder head material: Aluminium alloy.

Piston material: Aluminium alloy.

Piston ring equipment:

Top: Vacuum-compression:

Back: Plain compression ring, cast iron.

Top 2nd: 3 3/8" x 3 3/4" x 1 1/8" R

3rd: 3 3/8" x 3 3/4" x 1 1/8" R

Gudgeon Pin: 3/8" dia. circlip located.

Connecting rod: Steel forging.

Connecting rod bearings:

Small end: Plain phosphor bronze bush.

Big end: Caged roller bearing.

Crankshaft bearings:

Driving side: Ball bearing.

Timing Side: Needle roller 3/16" dia. rollers.

Lubrication: Dry sump.

Ignition system: Magneto: Wico, type CJ. 1392.

Magneto rotation: Anti-clockwise.

Carburettor: Zenith 24T-2, No. 4487. / 5 3/6

Valve Timing:

Inlet Valve opens: 10° or 3/4" before Top Dead Centre.

Exhaust Valve opens: 60° or 3/4" before Bottom Dead Centre.

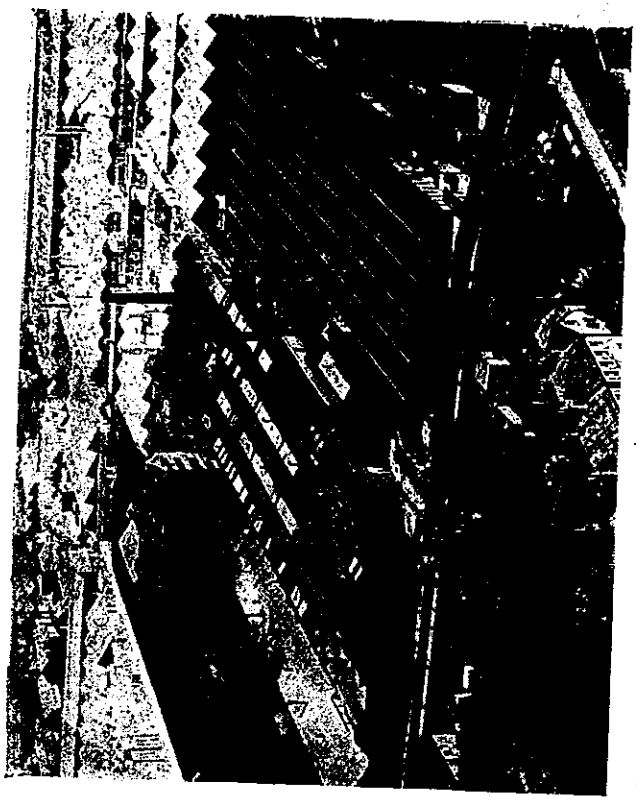
Ignition Timing:

Running Spark: 28° or 1/2" before Top Dead Centre.

Tappet Clearance:

Inlet .004". Exhaust .006". With engine cold.

Cooling: Air from fan flywheel.



An aerial view of the J.A.P. Works. Occupying five acres, the Works have been described as "the stables housing horse power, with quality and efficiency."

ABOUT OURSELVES AND OUR ENGINES

FOR more than half a century we have been making high-quality engines. Their success has been due, not only to our long manufacturing experience, but to the careful research and experimental work that has characterised the development of the J.A.P. engine.

There is not space here to tell the fascinating story of "JAP'S", of how we have come to reach the forefront of the industry; or to describe the special manufacturing processes which experience and ingenuity have given us, and which uphold our proud reputation for first-class workmanship and precision engineering.

Present-day trends in engine design are fairly clear. The obvious developments, such as the general substitution of aluminium for cast-iron as a piston material, are of less significance than the growing tendency to vary engine types and sizes to suit the conditions in which the engine will have to work. This tendency, which is well reflected in the J.A.P. range of engines, is an undoubted move to greater efficiency.

J. A. PRESTWICH INDUSTRIES LTD.

DESCRIPTION AND LUBRICATION

THE CYLINDER

Note the deeper finning brought low down the barrel, which ensures good cooling. A less obvious improvement lies inside the modern J.A.P. cylinder head. This is carefully shaped to promote gas turbulence, giving higher power and improved fuel consumption. The cylinder head of aluminium alloy is detachable, being fitted to the cylinder barrel by a number of special steel bolts. The cylinder is held to the crankcase by four holding-down nuts, which screw on to studs passing through the cylinder base flange. The valve ports and chambers have been carefully designed to minimise gas friction.

THE CRANKCASE

The crankcase is cast in a special aluminium alloy and is designed to ensure maximum stiffness of the walls. A feature of the crankcase is the patent J.A.P. lubrication system, which ensures a full supply of oil to all moving parts.

LUBRICATION

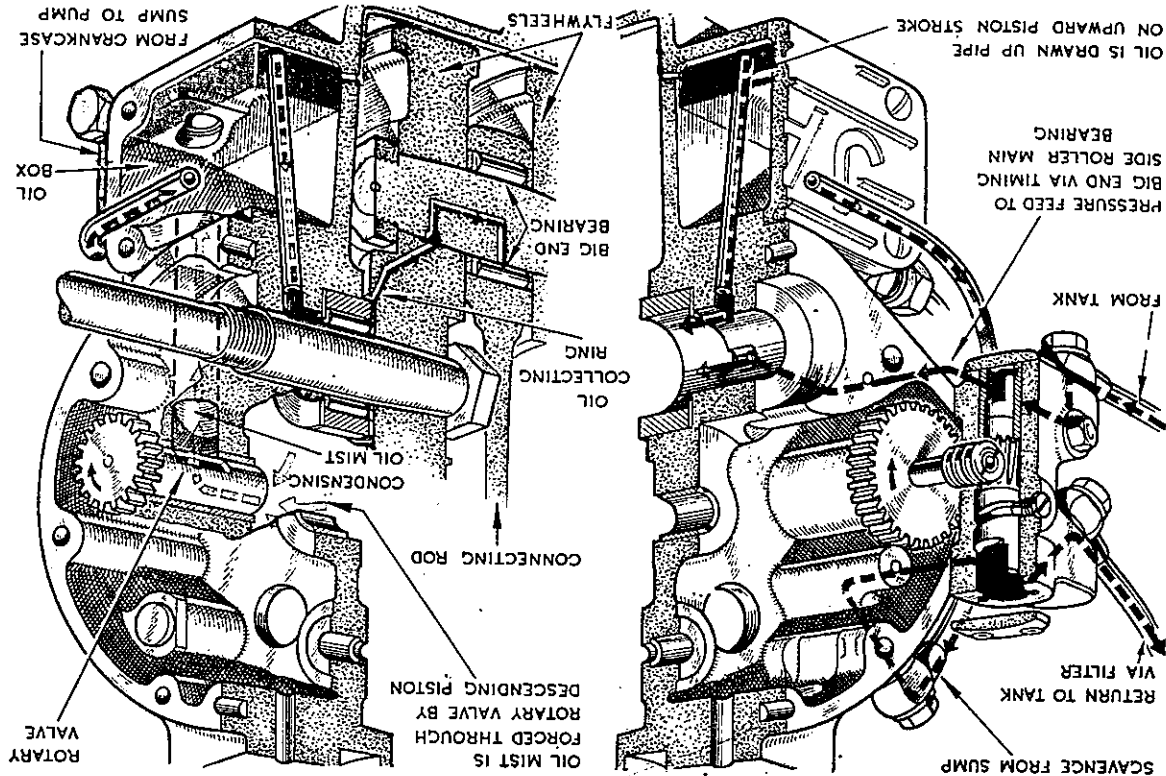
Complete cleanliness of the engine is ensured by the simple J.A.P. rotary valve.

A vertical passage, closed at its upper end by a horizontal sleeve, runs between the timing case and the oil box. The horizontal sleeve is rotated at engine speed by the cam wheel and is blanked off at the driven end.

The inner end of this sleeve communicates with the crankcase and when a slot in the sleeve comes into line with the vertical passage, oil mist is forced through into the oil box by the descending piston. The oil mist condenses in the oil box and is returned by the crankcase vacuum to the flywheel chamber by way of a small pipe through the timing side bearing. The rotary valve is timed so that the slot begins to open 65° before bottom dead centre about the same time as the exhaust valve commences to open.

The oil pump incorporated is the J.A.P. double-acting type. One end of the plunger delivers oil from the oil tank to the engine, the other end returns the oil from the sump to the tank. The delivery plunger is the smaller in diameter; the larger plunger is the scavenging part of the pump and maintains the 'dry sump'.

The oil enters the big end bearing by a passage in the timing side flywheel and is pumped through the crankpin to the bearing. From here the oil escapes into the interior of the crankcase and by splash system lubricates the cylinder wall and piston.



The driving spindle bearing is lubricated by oil splash. The timing spindle bearing is lubricated by oil splash and by oil from the oil-box.

Surplus oil inside the crankcase is diverted into the sump, which is connected by an external pipe to the pump. An oil pipe connects the pump with the tank.

Oil collecting in the sump is thus returned under pressure to the oil tank, and this completes the circulation system. By removing the oil tank filler cap, the returning oil may be observed.

Daily—Check the oil level in the tank and replenish as necessary.

After every 50 hours—Drain the tank and refill with fresh oil.

RECOMMENDED OILS

The life of any engine depends largely upon the way in which it is treated during the first few hours running. All the bearings have to be bedded in, a process which requires a constant load maintained for some time and a generous supply of oil.

Once the engine has been run in, lubrication remains of prime importance. It is no less important that the correct grade of oil should be used.

The oils we recommend are:—

	ESSO	B.P.	SHELL	VACUUM	WAKEFIELD S.A.E. No.
UNITED KINGDOM	Summer ..	Essolube 50	Shell X100 40	Mobiloil HB	Castrol XXXL 40
	Winter ..	Essolube 30	Shell X100 30	Mobiloil A	Castrol XL 30
OVERSEAS	10° F. and over	Essolube 50	Shell X100 50	Mobiloil HB	Castrol XXXL 50
	32° F.—50° F.	Essolube 40	Shell X100 40	Mobiloil HB	Castrol XXXL 40
	10° F.—32° F.	Essolube 30	Shell X100 30	Mobiloil A	Castrol XL 30

THE TIMING PINION

The timing pinion (with left-hand thread) is screwed on to the main timing shaft up to a shoulder (see also page 19, paragraph 2). The cam levers are fitted with rollers bearing on the cams to lessen friction at this point. The cam contours themselves are carefully calculated to obtain maximum efficiency with minimum stress.

THE PISTON

The piston is of a special aluminium alloy and it is die-cast (die-casting produces a finer grain of metal). A hollow steel gudgeon pin is fitted and is located by spring circlips in the piston bosses.

THE CONNECTING ROD

The connecting rod is a steel stamping of ample strength. The big end bearing, of the roller type, has two rows of rollers fitted in an aluminium alloy cage.

FLYWHEELS

This J.A.P. engine employs internal flywheels, and there is thus no possibility of crankshaft whip and probable fracture. The flywheels are of large diameter, and great care is taken to balance and pair each individual wheel with its fellow. All spindles are specially hardened and ground, and are a taper fit in the wheels, being secured by a locknut.

VALVE STEM

On the 600 c.c. engine the valve stem is not drilled for a cotter, but is recessed near the end. A split taper cotter lodged here bears the pressure of the valve spring collar, which has a corresponding inside taper.

CARE AND MAINTENANCE

If the engine runs indifferently, first check the compression. Good compression is essential for satisfactory running.

TO CHECK THE COMPRESSION

Make sure that the cylinder head bolts are tight and that there is no leakage from the cylinder head gasket. Turn the engine by the starting handle; if compression is satisfactory, considerable resistance will be felt.

CHECKING THE TAPPETS

If there is little or no resistance remove the valve box cover and make sure that the tappets are free to rotate when the piston is at the top of the compression stroke.

Tappet clearance with engine cold:

Inlet: 0.004"

Exhaust: 0.006"

If the tappets are not free, adjust them to the correct clearances.

LOSS OF COMPRESSION AT THE VALVE SEAT

If the tappet clearances are correct when checked, the loss of compression will be occurring either at the valve seats or past the piston. For a check to be made at these points, the cylinder must be removed. (When dismantling, mark the piston to ensure correct re-assembly.)

Inspection of the valve seat may reveal a slight pitting, and in the case of the exhaust valve the valve or seating may appear burned. Fine emery powder mixed with oil should be used to grind in the seating until it is smooth and free from pit marks. When all parts have been checked for cleanliness, graphite, or engine oil, should be smeared on the valve stem before it is returned to the cylinder.

Having refitted the valve and valve spring assembly to the cylinder, assemble the cylinder to the crankcase and re-check the tappet clearance.

Take care that there is no excessive clearance between the valve stem and the tappet head. Too great a tappet clearance alters valve timing considerably and causes loss of power. The swiftly moving tappet also sets up a hammering effect on the valve seat.

LOSS OF COMPRESSION PAST THE PISTON

Check the cylinder bore and piston for seizure marks. Remove the piston rings and check the ring gap with the piston ring inserted in the cylinder bore. If the gap exceeds 0.020", new piston rings must be fitted.

If, when the cylinder is removed, heavy deposits of carbon are present, the engine needs decarbonising (see pages 24 and 25).

CHECKING THE CARBURETTER

Check the supply of fuel in the tank.
Inspect the fuel pipe from the tank to the carburetter.

For carburetter servicing instructions see pages 13 to 15.

SERVICE INSTRUCTIONS FOR WIPAC TYPE CJ MAGNETO No. 1392

INSTALLING MAGNETO

Slowly turn the engine crankshaft in the normal manner until the piston begins to rise on the compression stroke (i.e. when both valves are closed). Next assemble the steel float coupling on to the engine coupling. Finally take the magneto and turn the magneto shaft anti-clockwise until the impulse pawl engages the impulse stop, then slowly turn the magneto shaft in the opposite direction until the two driving dogs are in line with the two free slots in the steel coupling and secure the magneto in position. To re-check the timing, slowly pull the engine over on the compression stroke, and if the magneto has been correctly positioned, the magneto impulse will give a click just before top dead centre.

TIMING

No adjustment is provided for timing the magneto, which is unnecessary, as the magneto is correctly set before leaving the works, so that the starting spark occurs just before top dead centre and the running spark 28° or $\frac{1}{2}^{\circ}$ before top dead centre.

LUBRICATION

The only part requiring attention in the field is the cam oil pad, which should be re-lubricated after every 1,000 hours. This is done by removing the pad and squeezing and working into it a Summer grade of motor transmission grease which will closely resemble that used at the factory. Do not use ordinary grease as this will splash on to the breaker points, causing misfiring and difficult starting.

The main bearing situated at the rear end of the magneto is packed with grease before leaving the works and should be renewed only whenever the magneto is serviced. The front main bearing is oil impregnated and should only require a few drops of lubricating oil at the same time.

IMPULSE COUPLING

The impulse coupling is designed to give a spark of high density for starting. It automatically cuts out at about 165 r.p.m. The engine should not be run continuously below this speed, as this would cause unnecessary strain and wear on the impulse parts.

The impulse also provides a retarded spark for starting, automatically advancing it as the engine speeds up, returning to the retarded position when the engine stops.

CLEANING OF IMPULSE

If the impulse becomes clogged with dirt, and the trip arm fails to engage or disengage, or the impulse is sluggish in action, it should be flushed out thoroughly with paraffin, taking care not to allow any paraffin to work its way into the magneto housing.

BREAKER POINT OPENING

Remove cover screws and cover to obtain access to the breaker points.

The correct breaker point opening is .015". When re-adjustment is necessary, loosen the screw which locks the fixed contact plate and raise or lower the plate until the correct opening of points is obtained, then lock the plate securely.

REPLACEMENT OF BREAKER POINTS

The breaker points are supplied as an assembly including the fixed and moveable point, the die-cast back plate and oil pad. To remove the original assembly, loosen the breaker arm spring retainer screw and release the two leads coming from the coil and condenser, then remove the two screws securing the die-cast back plate to the main housing.

When fitting the new breaker point assembly secure the die-cast back plate in an approximate position and adjust the breaker point opening to .015", then slightly loosen the two back plate screws and turn the plate within its slots until the breaker points begin to open and when the rotor laminations have left the core laminations by approximately $\frac{1}{8}$ ". Finally tighten the two screws and reconnect the two leads from the coil and condenser.

REMOVAL OF CONDENSER

The condenser is housed in the base of the main housing immediately below the breaker points. Remove the hexagon nuts securing the connecting lead and earthing strip. Unscrew the condenser out of its housing, using a special tool, part number 00146, but before doing this it is advisable first to remove the magneto cover so that the connecting lead can be pushed back into the main housing out of the way of the tool.

REPLACEMENT OF H.T. LEAD

The H.T. lead is secured to the H.T. coil by passing the wire through the small hole in the coil H.T. tab and twisting the wire around this tab. When removing, or refitting a new H.T. lead, exercise the greatest care to ensure that no damage is done to the coil.

Never solder the H.T. lead to the tab because even with the greatest care it is possible to sever the internal connection.

This would not immediately be apparent, but the defect would cause the coil to break down within a comparatively short period.

REMOVAL OF COIL

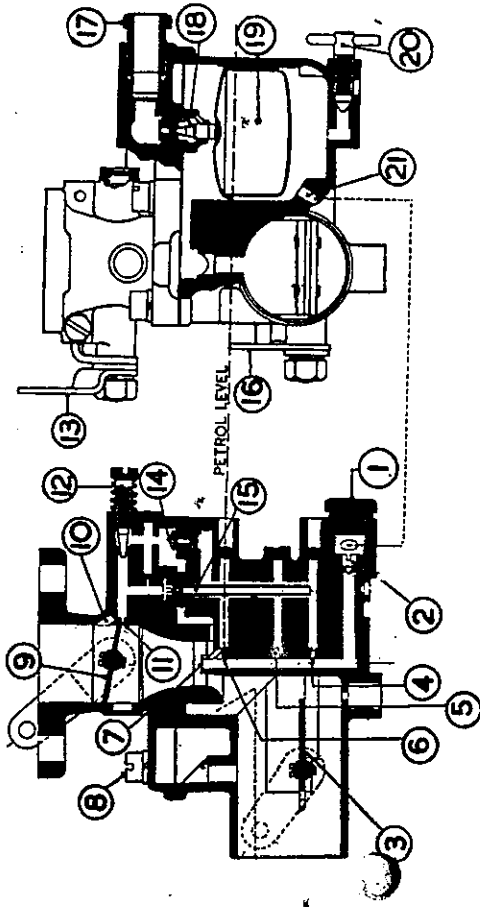
Remove cover and H.T. lead. Loosen the breaker arm spring retaining screw and release the primary lead. Then remove the two hexagon posts holding down the core clamps; this will also release the earth primary lead. Turn the magneto shaft until the magnetism no longer grips the coil core to the main housing, pull the coil and the coil core free.

In replacing the coil and coil core be sure that the primary earth lead is fastened under the coil core hexagon posts and the insulated primary lead to the breaker arm spring retaining screw.

SPARE PARTS AND RETAIL PRICE LIST FOR WIPAC C.J. MAGNETO No. 1392

Owing to market conditions, prices are subject to alteration without notice.

Part No.	Description	Price	No. Off.
08185	Cover Screw	\$2.160	2
01407	Unit	\$2.206	1
01422	Clamp Unit	\$2.210	2
01403	Unit (includes all parts bracketed)	\$2.202	1
01404	Coil Group	\$2.486	1
01404	Condenser Unit	\$2.203	1
01405	Contact Breaker Unit	\$2.204	1
01293	H.T. Outlet Block	\$2.163	1
01468	Main Housing Unit (includes all parts bracketed)	\$2.227	1
01322	Bearing Bush	\$2.165	1
00466	H.T. Lead Group (23" inclusive)	\$2.045	1
01118	Sleeve	\$2.164	1
01323	Unit (C.W.) (includes all parts bracketed)	\$2.164	1
01387	Bearing Gasket	\$2.164	1
01409	Ball Race Unit (includes Bearing Gasket)	\$2.297	1
01417	Bearing Spacer	\$2.164	1
01338	Oil Seal	\$2.164	1
01285	Impulse Stop Plate	\$2.164	1
01301	Plate Gasket	\$2.164	1
00700	Screw Lock Washer	\$2.164	3
06178	Screw	\$2.164	3
06179	Unit (includes all parts bracketed)	\$2.201	1
01400	Trip Unit	\$1.775	1
01420	Spring	\$2.515	1
06180	Spacing Washer	\$0.697	1
00697	Drive Cup Unit	\$0.492	1
01418	Impulse Unit (C.W.) (includes all parts bracketed)	\$1.371	1
06181	Remote Control Stops	\$2.211	1

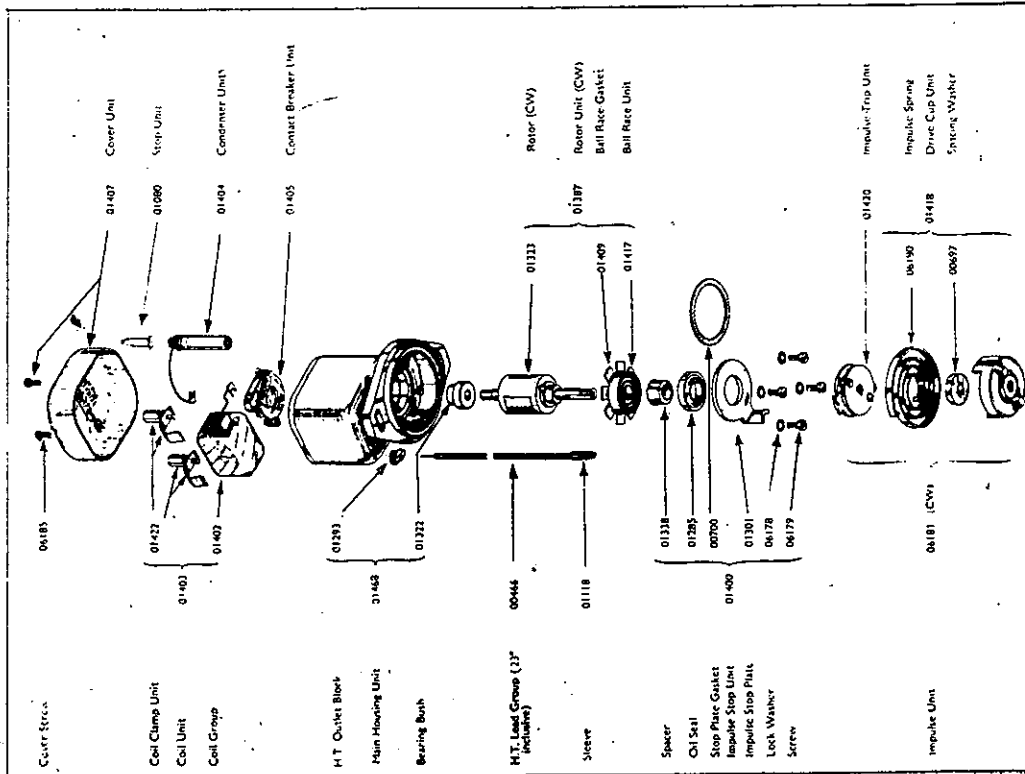


SECTION CARBURETTER TYPE 24T-2

GENERAL DESCRIPTION

The 24T-2 Carburettor shown above in cross section is a vertical instrument in general use on light Commercial Vehicles, Marine Engines, Stationary Industrial Plant and various types of Mobile Agricultural Equipment. The float chamber is offset in order to keep it as close as possible to the main discharge tube, thus ensuring high angle operation in any direction without flooding, or stalling. The instrument can be arranged to take all air through the main intake which is invariably protected by an air cleaner. This feature is called for when working under dusty conditions close to the ground, if long life and reliable service are to be obtained.

The carburettor consists of two main castings, the upper or barrel portion being secured to the lower bowl portion by five screws, one of which is shown (8). In order to keep this carburettor as simple as possible we have used one principle jet and a slow running jet. Suitable air bleeding is arranged to atomise the fuel and to maintain a correct mixture strength under all conditions of engine operation. The drawing shows the principle, or main jet (2) covered by the large hexagon plug (1). The slow running jet is also shown (15). The air bleeding to the main jet system is controlled by the air jet (14), and this air supply is taken from the main air intake. It will be noticed that this air issues from the holes (4), (5) and (6) at high engine speeds when the fuel in the main discharge tube (7) falls to its lowest level. Fuel metered by the slow running jet (15) is atomised by an air supply taken through the main air intake and controlled by the screw (12). This mixture issues through the idle discharge channel (10) and the progression orifice (11). The float chamber contains a normal type float (19) and the usual



EXPLODED VIEW OF WIPAC CJ 1392 MAGNETO

combined needle seating valve (18). The correct fuel level is automatically provided by the size of the float chamber and the float, together with the position of the needle seating, the latter part is usually fitted with one washer, but two washers can be used if it is desired for any reason to reduce the fuel level in the float chamber.

MAIN ADJUSTMENT

The combination of choke tube, main jet and air jet will be found correct for the engine to which the instrument is fitted and it should not be necessary to alter these parts when dealing with ordinary running trouble. Cleanliness is the keynote for good results. Take special care to use a suitable screwdriver when removing the main jet in order to prevent damage to the thread in the carburetter casting. A gasket must always be used between the two halves of the carburetter.

SLOW RUNNING ADJUSTMENT

This should be carried out when the engine is hot; the minimum running speed is usually set around 550-600 r.p.m. A spring-loaded adjusting screw is provided close to the throttle lever by means of which the exact throttle opening can be adjusted for idling. The head of this screw should be turned clockwise to increase the idle speed, and vice versa. The slow running mixture screw (12) will provide a richer idler mixture if turned in a clockwise direction by reducing the supply of slow running air. On the other hand, if there is evidence of rich running, i.e. black smoke from the exhaust when idling, this screw should be given a quarter, or one-half turn in an anti-clockwise direction. The usual setting is about one complete turn open from the fully home position, but of course this varies slightly from one engine to another.

COLD STARTING

The rich mixture necessary to meet this condition is provided by closing the choke or air strangler (3) and it will be noted that this action has the effect of opening the throttle the correct amount to ensure easy starting. As soon as the engine is running the strangler flap will open automatically to admit air; however, as the engine warms up the control operating the strangler must be moved to the fully open position.

HOT STARTING

When the engine is hot or warm, the choke is not required, and the throttle position is not important. If the engine does not immediately respond check the usual details, such as petrol tap in "on" position, etc., before operating choke. If at any time an over-rich condition is suspected, a few rotations of the crankshaft with the throttle held wide open may be helpful.

GENERAL

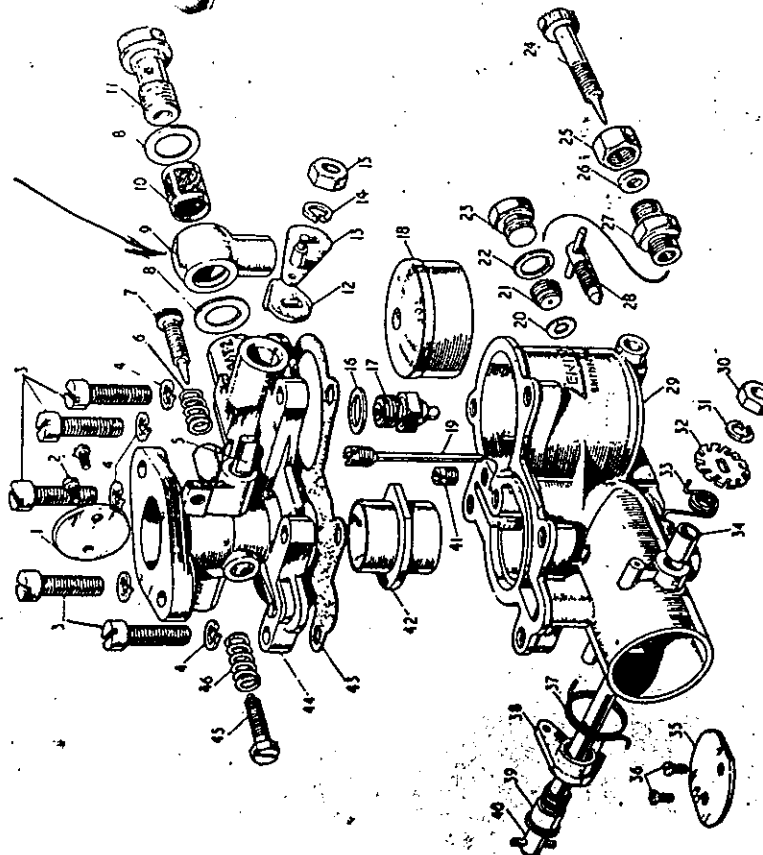
The carburetter is an accurate metering instrument. Consequently, absolute internal cleanliness is essential if satisfactory results are to be obtained. When the complete instrument is removed and dismantled for cleaning purposes, it is a good plan to clean the outside of the carburetter thoroughly before any dismantling takes place. The parts should be carefully set out on a clean sheet of paper and the main castings blown out with compressed air if this is available. Check the inter-connection between the choke and the throttle lever to ensure this part works quite freely. The strangler flap complete with its spindle should move quite freely against the light anchoring spring when the strangler lever is held in the closed position and the flap is pushed with the finger. It will be noted that the light spring referred to is secured in one of the notches of the spring anchor plate, and the spring loading can be readily adjusted. The standard position is the top or "12 o'clock" notch. The rod inter-connecting the choke with the throttle should be adjusted so that the throttle is opened about 1 mm. or 40 thou. of an inch (.040") measured between the tip of the butterfly plate and the bore of the carburetter. This, of course, should be checked with the choke in the closed position. The amount of throttle opening is not critical and the above setting will usually ensure an easy start and a reasonable warming-up speed. In common with all air intake choke valves the strangler flap must be completely closed against the air intake bore when the external lever is moved to the fully closed position. When replacing the carburetter, take care to use a thin flange gasket as a thick gasket may tend to squeeze out, causing the flange on the carburetter to bend and this would allow an air leak to occur. When dealing with a flange in this way it can be trued up in the usual manner with a file. Before attempting to start the engine, subsequent to refitting the carburetter, it is a good plan to check the throttle control and also the choke control to make quite sure these parts work correctly, giving the full amount of travel, etc.

The Maker's adjustment of the carburetter and setting for the main jet adjuster gives correct mixture strength for all conditions up to about 3,000 feet altitude above sea level. When operating at higher altitudes it may sometimes be necessary to deal with symptoms of rich running and possibly loss of power. In these cases, the main jet adjuster will be found most useful in obtaining a clean running exhaust. Turning the adjuster in a clockwise direction one-quarter of a turn at a time will be found effective in weakening the mixture delivered by the carburetter. In any case of difficulty our own Service Department or the nearest Zenith Carburetter Service Station should be consulted.

PN 71100 A.M.A.L Carb. 3979 (3654)

ZENITH CARBURETTOR
24T-2 53 mm. flange centres

2 TR-A 1/4 x 1/2



Standard Setting	
Adjustable	
Choke Tube	20
Main Jet	110
Air Jet	2.00
S.R. Jet	50
Needle Seating	2.0 mm.

1526
1467

ZENITH CARBURETTOR SPARE PARTS LIST

Owing to market conditions, prices are subject to alteration without notice.

Ref. No.	Part No.	Description
1	012465	Throttle
2	16776	Screw Fixing Throttle (2 off)
3	012405	" Bowl to Barrel (5 off)
4	04691	Spring Washer for do. (5 off)
5	012628	Throttle Spindle
6	09846	Spring for Air Regulating Screw
7	09845	Air Regulating Screw
8	06101	Fibre Washer for Plug or Elbow (2 off)
9	06103	Petrol Elbow or Banjo
10	06109	Filter Gauze
11	06098	Plug, Fixing Petrol Pipe
12	013111	Throttle Stop
13		Lever (supplied by J. A. Prestwich)
14	04691	Spring Washer for Throttle Lever
15	05581	Nut for Throttle Spindle
16	09619	Washer for Needle Seating
17		Needle and Seating (1.5 mm.)*
18		Float
19		Slow Running Tube*
20		Washer for Main Jet
21		Main Jet
22		Washer for Plug over Main Jet
23		Plug for Main Jet
29		Carburettor Bowl (assembled with items 37, 38 and 39)
30		Nut for Strangler Spindle
31		Spring Washer for do.
32		Spring Anchor Plate
33		Spring for Strangler Spindle (Automatic)
34		Sleeve for Strangler Spindle
35		Strangler Flap
36		Screw Fixing Strangler Flap (2 off)
37		Spring for Strangler Lever
38		Strangler Lever
39		Bearing for Strangler Lever
40		Strangler Spindle
41		Air Jet*
42		Choke Tube*
43		Gasket (Bowl to Barrel)
44		Carburettor Barrel
45		Throttle Stop Screw
46		Spring for do.

* IMPORTANT — state Size required.

Carb gasket flat 21

13110
09721
01781

-25 ea

88

DISMANTLING THE ENGINE

Although the following has been included in this handbook for the sake of completeness, we strongly urge that, whenever possible, dismantling and re-assembly are left to your service engineer. They are not jobs for the inexperienced.

During the dismantling process, note carefully the positions of all washers and bearings so that they can be correctly replaced.

SUGGESTED SEQUENCE

1. Close all taps, and then remove the fuel and oil pipes.
 2. Remove throttle control cable.
 3. Disconnect the air cleaner.
 4. Remove silencer.
 5. Remove carburettor from inlet pipe.
- Removed from the vehicle, the engine should then be placed on a bench.

Remove the top half of the engine cowl by unscrewing the four nuts fixing the cowl to the crankcase housing.

Remove the fan flywheel by taking off the nut on the main shaft (right-hand thread), having first placed a tommy bar in the flywheel and rotated the flywheel until the tommy bar is in contact with the flywheel housing. (Extractor holes are provided for withdrawing the flywheel.)

Take off the nuts on the fixing studs going through the crankcase and then draw off the housing.

The engine can now be held in a vice by one of the crankcase lugs.

Remove the starting dog from the main shaft (right-hand thread). A special tool is required for this purpose.

Remove the screwed plug above the starting dog boss, then remove the camshaft sprocket nut (right-hand thread).

Remove the screws and nuts holding the magneto chain cover, pull the chain cover forward approximately half an inch, insert a flat punch between the joint faces pointing downwards on to an exposed tooth of the chain sprocket on the camshaft, a sharp downward tap on the punch will release the sprocket from the tapered shaft. The chain cover can now be withdrawn complete with magneto, chain and sprockets.

Remove the magneto drive from the crankcase by removing the screw and the fixing nuts round the timing chest.

Removal of the magneto drive exposes the cam gear. Take out the cam wheel (if the valves are closed, it can be pulled out), then

remove the two cam levers, marking the exhaust lever so that they can later be replaced in the correct position.

Remove the pinion by unscrewing (left-hand thread). A special spanner is required for this purpose. The rotary valve, also the pump driving wheel, will pull out quite easily.

The flywheel key on the driving side spindle should then be removed; also the large nut on the driving spindle which locks the flywheels to the driving side bearing (right-hand thread).

Remove the eight bolts holding the cylinder head to the cylinder. Remove the cylinder head and gasket.

Take off the four nuts at the base of the cylinder and draw the cylinder straight off the piston, being careful to avoid damage to the piston or connecting rod. When dismantling, mark the piston to ensure correct re-assembly.

Remove one of the circlips with the tag end of a small file shaped to go behind the circlip in the groove cut in the piston. Place the tool in position, holding the piston with the left hand, with the thumb over the gudgeon pin. Then gently push the tool away from yourself, making sure with the left thumb that the circlip does not fly. The gudgeon pin will then push out, and the piston can be taken off the connecting rod.

Remove the two tie bolts at the bottom of the crankcase, take the crankcase out of the vice and place it on the bench, taking care that no great quantity of oil is still in the case. Tap one half of the case away from the other with a mallet until the two halves can be drawn off the flywheel spindles. When taking off the driving side half of the case, make sure that the seal around the spindle is not damaged.

To split the flywheels: remove one of the crank-pin nuts and give one or two hammer blows to the side face of the flywheel, at right angles to the crank-pin hole. These will loosen the flywheel from its taper. The big end can now be exposed for dismantling and inspection.

REMOVAL OF MAIN BEARINGS

The drive side main bearing is a ball race.

The timing side main bearing is a crowded roller bearing.

To remove the drive side main ball race take out the four countersunk setscrews holding the bearing retaining plate. Remove the oil seal sleeve on the other side of the bearing. The ball bearing can now be driven out of the housing. Care should be taken not to damage the oil seal.

The Mark III engine has a crowded roller bearing in the timing side; it will be found that the outer race of this bearing is a press fit in the crankcase. This can be removed by heating the crankcase with a blow lamp. Apply the heat uniformly to obtain the even expansion of the crankcase which releases the interferences between the bearing and its housing.

When the crankcase is really hot, tap out the crankcase on to a wooden bench and the bearing will fall out.

When the engine has been completely dismantled in this manner all the parts should be washed in paraffin ready for inspection. Parts should be renewed as necessary, and all carbon deposit should be removed from the piston, cylinder head and valve pockets.

Compression of the valve springs and removal of the two cone pieces make it possible for the valves to be withdrawn.

RE-ASSEMBLING THE ENGINE

Cleanliness in this operation is most important.

THE CYLINDER

Grind the valves in their respective seatings with fine emery paste and oil until the valve and cylinder seatings are bedding correctly, then clean off all traces of emery by washing in paraffin and drying with a rag.

Smear a little oil on the valve stem.

When the valve spring and collars have been placed in position the valve can be put into the seat to which it was ground. Compress the spring and with a little grease on the split cone pieces to keep them in position, release the valve spring.

FLYWHEEL ASSEMBLY

Fitting New Mainshaft Spindles. Thoroughly dry all tapers and holding the thick part of the flywheel in a vice, fit the spindle. (The driving side spindle is keyed and has a right-hand thread locking nut.)

When fitting a new timing spindle, secure the flywheel in a vice. Tap the spindle into the taper and tighten the nut (left-hand thread).

Next fit the crank pin into the timing side flywheel, making sure that the oil feed hole in the flywheel is in line with oil hole

in the crank pin taper. Tap the crank pin until it is right home, then tighten the nut (right-hand thread). Check that the oil hole from the flywheel timing spindle boss to the crankpin roller track is completely clear by squirting oil through. Failure to do this may lead to a seized engine.

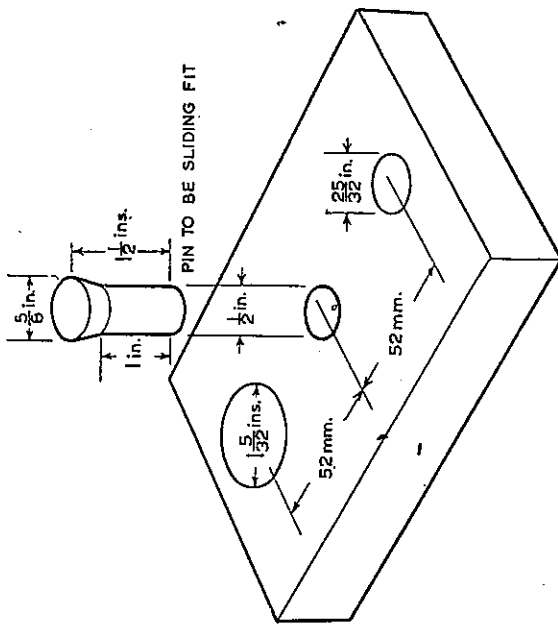


FIG. 4. STEEL BLOCK FOR ASSEMBLING FLYWHEEL.

Obtain a block of steel shaped as in Fig. 4. The timing side flywheel can now be placed on the steel block with the spindle through the bore of the block and with the peg which projects on top of the block against the flywheel step (bob weight). Fig. 5 shows the position of the flywheel after it has been placed on the block.

Assemble the roller cage to the crank pin and place the rollers in the slots. Smear a little oil on the rollers and crank pin, and place the big end of the connecting rod over the rollers. Make sure that the connecting rod is perfectly free when revolving.

Place the driving side flywheel, with the spindle fitted, on to the crank pin, with the outside diameters set in line. Lightly tap the flywheel on to the taper and begin tightening the crank-pin nut, making sure that the two flywheel rims are in line (check with a steel rule). The connecting rod should have a minimum side play of .015" and a maximum side play of .035" after the flywheels have been finally tightened. The flywheels should finally be trued up between centres.

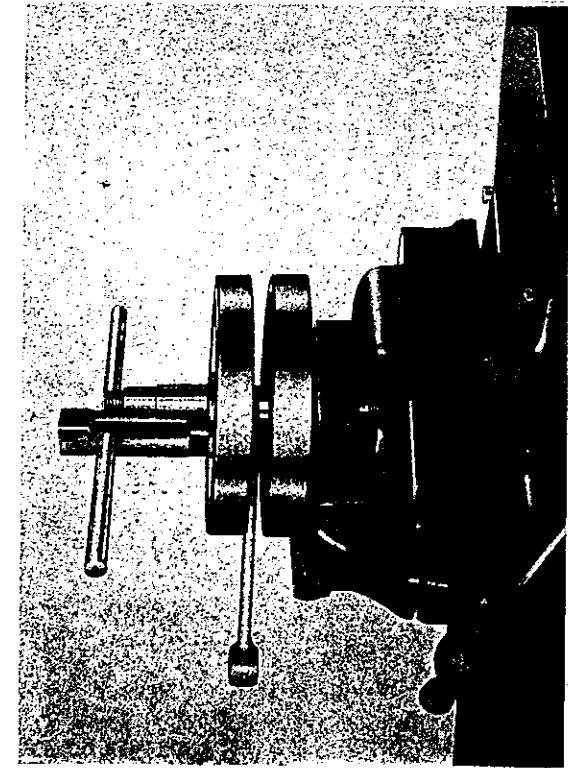


FIG. 5. FLYWHEEL MOUNTED ON BLOCK.

Fitting the Flywheels into the Crankcase. Place the flywheels, with the driving side spindle upright, in the vice (using soft clamps), and lightly tighten the vice on to the timing side spindle. Using a mallet, tap the driving side half crankcase on to the driving side spindle, having first assembled the main bearing. This is easily done if the crankcase is heated to allow the bearing to be dropped in.

Push the distance piece on the spindle through the seal, fit the cover plate and tighten the nut holding the flywheels to the driving side ball race. Remove the flywheels from the vice and place them on the bench. Then, using a little grease, assemble the rollers in the timing side half crankcase. Place sealing compound to the joint face and slide the timing side half crankcase on to the spindle, taking care that the rollers do not fall out. Place the two bottom tie bolts through the crankcase and line the cylinder joint faces together. A slight blow on either side of the timing side half crankcase will then spring the two halves of the crankcase together. Set the cylinder face of the crankcase for alignment and tighten up the tie bolts. With one of the lugs in the vice holding the crankcase, check the flywheels to make sure that they revolve quite freely.

PISTON AND RINGS

Ascertain that the Vaccum piston ring, with the face marked TOP uppermost, is fitted into the top ring groove of the piston, also that the slot in the piston skirt is on the exhaust side of the cylinder.

Re-assemble the piston and rings complete to the connecting rod, smearing oil into the small end bush and gudgeon pin bore of the piston.

When fitting the circlip into the piston, make sure the gap does not correspond with the slot in the piston (this makes for easier removal when dismantling). With the piston ring gaps on opposite sides of the piston, the cylinder barrel (complete with valves, tappets and cylinder base gasket) can be fitted to the crankcase. Be careful not to break the piston rings when placing the cylinder over the piston. Now tighten the cylinder base nuts diagonally.

Refit the fan flywheel housing, also the fan flywheel.

CAM GEAR

Refit the pinion to the timing spindle, making sure it is screwed up tight to the shoulder of the spindle. A special tool is required for this purpose.

Replace the cam gear in exactly the same position as it was before dismantling, with the inlet cam lever first, followed by the exhaust camlever.

Refit the camwheel, holding the camlevers up with the thumb and finger of the left hand, and with the timing mark on the camwheel tooth corresponding with the mark on the timing pinion.

Replace the rotary valve with the timing mark on the face corresponding with the mark on the camwheel. The rotary valve rotates clockwise. When replaced, the leading edge of the slot in the rotary valve spindle should correspond with the leading edge of the slot in the bush when the exhaust valve just begins to open. Failure to time the rotary valve correctly will cause excessive oil consumption.

Replace the pump driving wheel; there is no special position with relation to the engine timing for this part.

Adjust the tappets and check the valve timing (see page 2 for correct timing).

Replace the distance collar on the camlever spindle. Now fit the timing cover, making sure that the two rubber sealing washers are in the recesses. Take care that the bore of the oil seal is not damaged when passing over the timing spindle thread. Add a little sealing compound to the joint faces and tighten the nuts.

TIMING THE MAGNETO

Remove the magneto end cover, revealing the contact breaker, rotate the magneto (clockwise at the coupling end) to set the contact breaker at breaking point.

Rotate the engine clockwise, looking at the timing side, bringing the piston to the top of the compression stroke. Rotate anti-clockwise to bring the piston $\frac{1}{2}$ " from top face of the cylinder joint face.

Fit the magneto chain cover, supporting the magneto driving sprocket through the screwed plug hole, to lead the sprocket on to the camshaft taper. Tap the sprocket on to the taper by using the tubular spanner and a light hammer. Fit the camshaft sprocket and tighten with the tubular spanner. Adjust the magneto chain tension if necessary.

Refit the magneto chain cover screws and nuts.

Check the magneto timing and replace the end cover.

Refit the starting dog (right-hand thread).

Refit the screwed plug to the magneto chain cover.

Refit the cylinder head and gasket, tightening the bolts diagonally.

Check the compression by turning the flywheel with the sparking plug in position.

Refit the engine top cowl.

Refit the carburetter.

DECARBONISING

Thoroughly clean the engine, taking particular care round the cylinder base. Remove sparking plug, carburetter and exhaust pipe. Undo the four nuts which hold the cylinder to the crankcase. The cylinder is now free to be lifted upwards until it leaves the piston.

After removal, the inside of the piston should be filled with rag to prevent damage by the connecting rod. A good plan also is to cut pieces of rubber hose a little longer than the cylinder studs in the crankcase, and slip them over the studs. This prevents the skirt of the piston being damaged by the studs.

It is advisable to cover the crankcase opening to prevent any deposit falling inside the case before scraping the carbon from the piston.

Piston rings should not be removed unless there is carbon deposit behind them which chokes up the grooves.

The whole operation needs care and cleanliness.

If there is any necessity to remove the piston, one circlip only needs removal, and the gudgeon pin can be tapped out from the opposite side.

The valves can be removed from the cylinder, carbon scraped off the heads, and valves ground in carefully with fine emery and oil. When grinding, lift the valve off its seating frequently during the process; this prevents deep scores.

Scrape all carbon from cylinder head and ports, and if necessary finish off with a little fine emery cloth and oil. Thoroughly clean all parts and refit valves.

Before replacing cylinder see that the piston ring slots are spaced equidistant round the piston, smear with thick oil, also bore of cylinder.

See that cylinder and crankcase faces are perfectly clean.

Gently ease cylinder on to piston, closing each ring together with the fingers just as it enters the cylinder. A little goldsize can be smeared on the cylinder base or crankcase face.

Press cylinder on to its base and rotate the engine so that both the tappets are set down, and not touching the valves.

Screw on cylinder nuts finger tight, tightening up finally a little at a time diagonally across. It is important that the nuts should be evenly tightened, otherwise the base will be strained, and there is a risk of the cylinder fracturing. Adjust the tappets to the clearances shown on page 7.

DON'TS

DON'T forget to adjust the tappets.

.. have too lean a jet; this is false economy.

.. forget to check oil level in tank.

.. fit unsuitable cheap sparking plug.

.. over-rev the engine—give it a chance to bed in.

.. forget to tighten cylinder and head according to instructions.

.. forget to inspect exhaust valve occasionally.

.. forget to re-fit the rubber washers when re-assembling timing case.

.. forget to give the engine number and symbols in any enquiry, and when ordering spare parts.

.. forget we regrind cylinders and fit new pistons and rings in 24 hours.

.. forget we specialise in overhauls and repairs, and make a special charge during winter months.

.. forget it is necessary when a new half crankcase is required to return the opposite half for fitting.

.. forget the same applies to flywheels.

SPARES AND REPAIRS

A complete stock of replacement parts for the J.A.P. power unit is maintained. The repair and overhaul of customers' engines at the hands of an expert staff is a speciality.

To facilitate delivery of SPARES the following points should be observed:—

1. The engine number MUST ALWAYS be quoted, WITH ALL ITS SYMBOLS; example—UCZ/R This number will be found stamped on the top front crankcase bolt lug.

2. All correspondence should be conducted under one name only; and since, according to the usual business methods, we must be in receipt of a remittance before despatching any parts, time will be saved by sending the correct amount with the order, if not ordered C.O.D.

REPAIRS are always executed as speedily as permits. When sending an engine to us for an overhaul or repair, full instructions should always be sent in advance stating definitely whether work is to be put in hand, or whether an estimate only is required. In the latter case, the engine is stripped upon receipt, carefully examined, and a full report and estimate of cost sent. This estimate may be treated as an invoice, and a remittance to cover the amount will save any delay when the engine is ready for despatch. If an estimate has been asked for, work is not commenced until we are in receipt of definite instructions to proceed. In despatching repaired engines, unless we are instructed to the contrary, we return them by goods train, carriage paid, when an invoice will be sent for the carriage charge. In the case of urgent repairs, however, or when we have received instructions, engines are sent by passenger train, carriage paid. A further invoice is then sent for the carriage charge, or an approximate amount is included in the estimate; and balance is returned after the account has been received from the Railway Company. If the engine has to be stripped for an estimate and the estimate is not accepted, a small charge may be made for the work entailed.

When spares for engines are ordered, a later type part may be supplied at our discretion.

The following points should be noted:—

1. In the event of damage to one side of the crankcase, the other side must be returned to us with the order, since the two halves have to be machined up together to secure correct alignment of the two cylinder faces.

2. An order for a flywheel must always be accompanied either by a description of the marks and letters on the rim, or, if

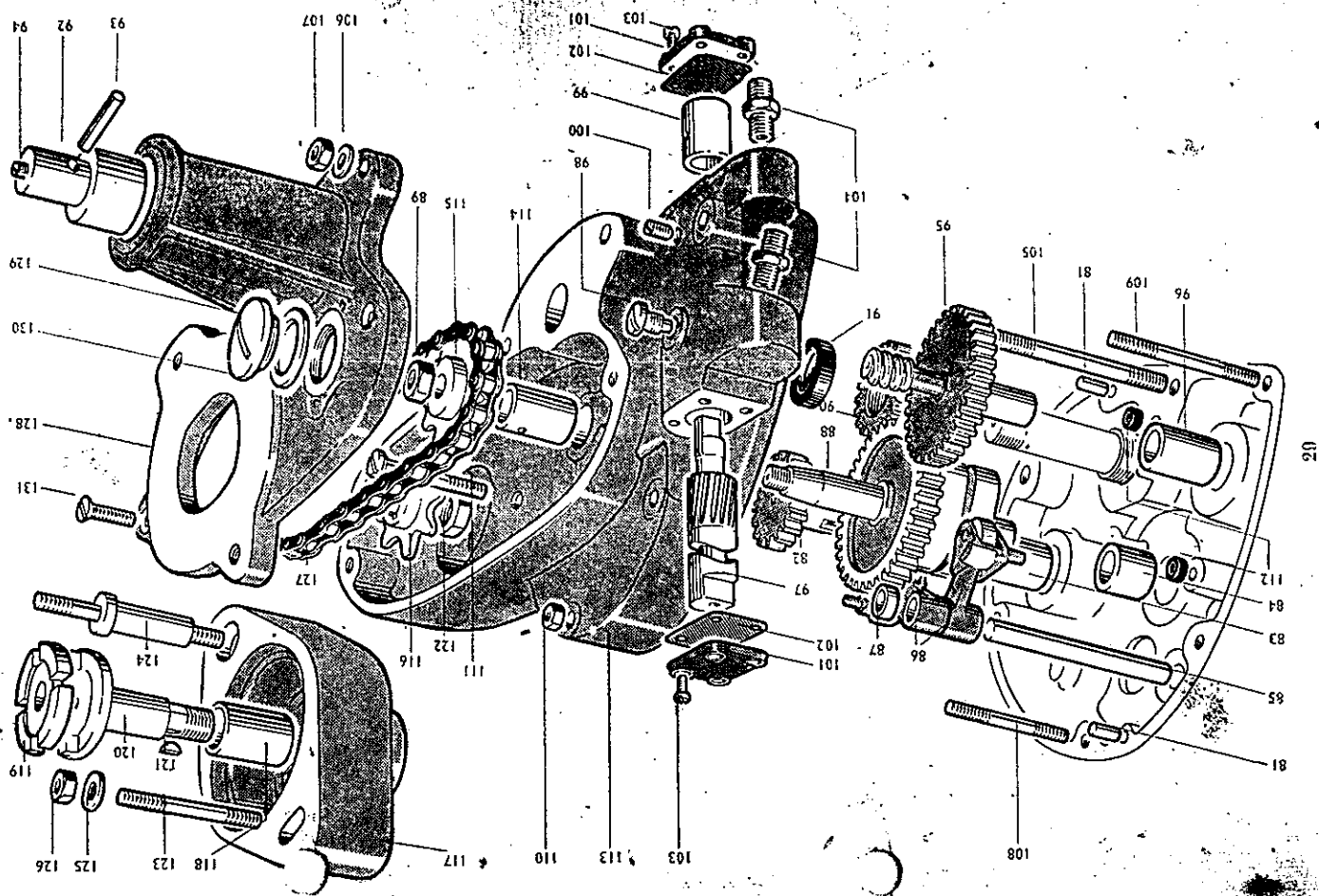
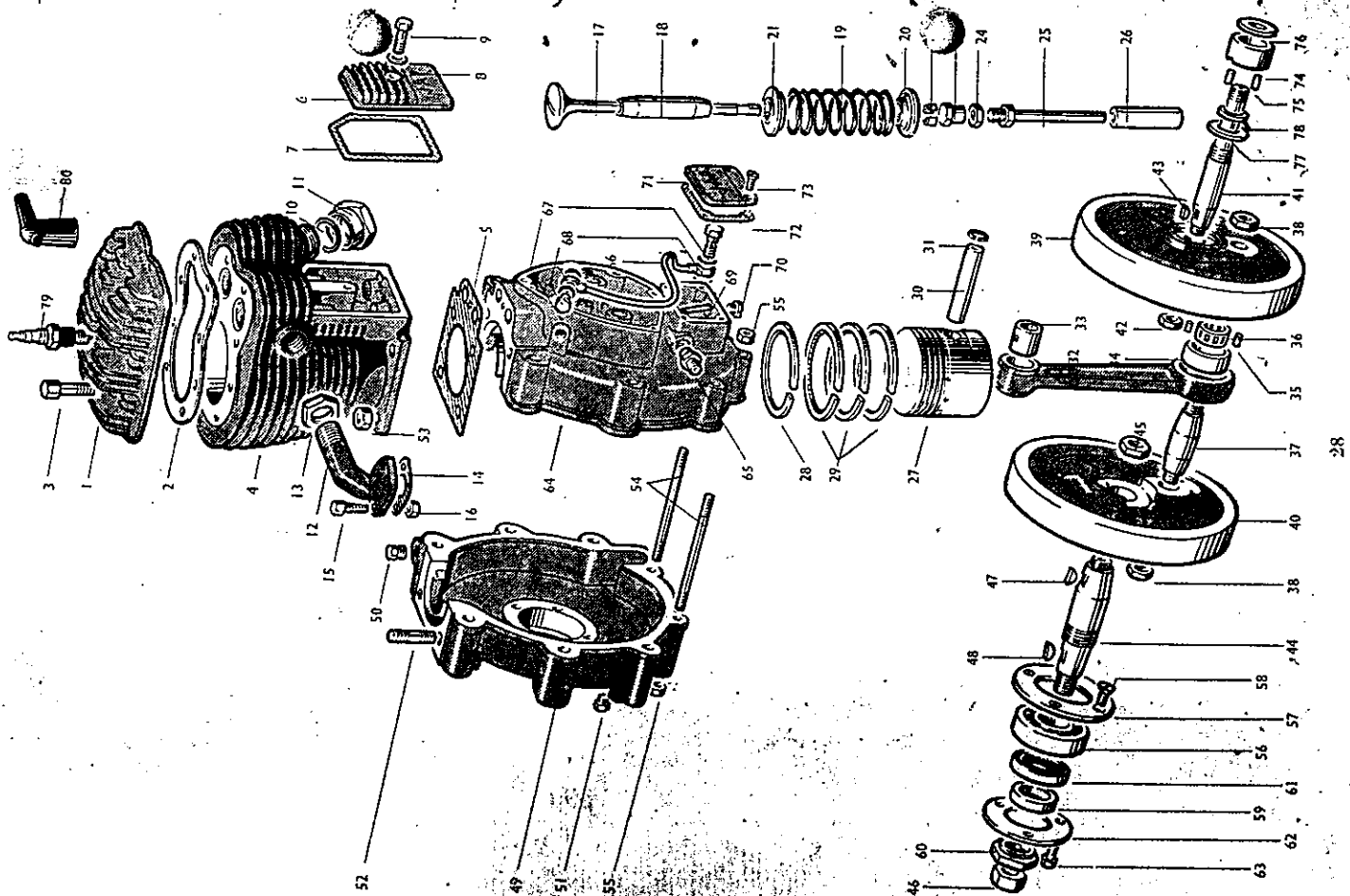
these are obliterated, by the opposite wheel to that required. All flywheels have to be balanced most carefully and paired up with each other.

We cannot supply a crankcase or crankcase half other than complete with all cylinder holding-down studs, bushes and other fittings.

4. Carriage in all cases must be paid by the customer. Packing material is free, but cases are charged for and are credited if they are returned to us in good condition, carriage paid.

5. The name of the sender should ALWAYS be attached to any parts sent in to us, quite irrespective of any correspondence that may have taken place.

ENGINE DIAGRAMS AND SPARE PARTS LISTS



Flex Oil Liner M. AD501.
Clutch cover assem 6 1/4 AG 116-35
75%

**600 CC. S.V. MK. III DIRECT STARTING
TYPE 9**

As supplied to Messrs. D. Wickham & Co. Ltd.

Illust. No.	Part No.	Description	No. Off
1	12763/1	Cylinder Head	1
2	12769	Gasket	1
3	13706	Fixing Bolt	8
4	12765	Barrel	1
5	19545	Base Washer	1
17	7524	Valve—Inlet and Exhaust	2
18	10116	Guide—Inlet and Exhaust	2
19	6276	Spring—Inlet and Exhaust	2
20	6973	Collar—Cono End	2
21	6272	—Guide End	2
22	7225	Split Collar	4
6	12145	Box Cover	1
7	14186	Washer	1
8	18316	Bolt Washer	1
9	3691	Bolt	1
11	6241	Exhaust Union Nut	1
10	6242	Ring	1
12	21158	Inlet Pipe	1
13	6246	Locknut L.H.	1
27	1099 21550	Piston	1
28	1099 21551	Ring—Compression—Top Groove	3
29	6938/2	Gudgeon Pin	1
30	9910	Connecting Rod with Liner	2
31	11676	Conrod Liner—Big End	1
32	11488	Roller—Big End	1
34	10683	Cage—Big End	1
35	18449	Bush—Small End	8
36	10465	Bush—Big End	1
37	6526/1	Crankpin	1
38	8493	Nut X	1
39	3249	Timing Spindle	2
41	21150	Nut—Flywheel End	1
42	4606	Key	1
43	16668	Oil Seal	1
91	20385	Starting Dog	1
92	21192	Peg	1
93	21204	Grab Screw	1
94	18502	Driving Spindle	1
44	19494	Nut—Flywheel End	1
45	7619/1	—Fan End	1
46	7209	Key—Flywheel End	1
47	16668	—Fan End	1
48	16668	Flywheel—Timing Side	1
39	14012/6	—Driving Side	1
X 40	12782/1	Crankcase—Timing Side	1
64	21148	Liner—Timing Side	1
74	14013	Roller—Timing Side	1
75	9434	Recess Washer—Timing Side	15
76	10878	Thrust Washer, small—Timing Side	1
78	11475/1	large—Timing Side	1
77	9667/2	Dowel	1
81	6245		2

continued

Illust. No.	Part No.	Description	No. Off
—	S.A. 2938	Starting Handle Assembly	1
—	S.A. 3003	Crankcase Oil Return Pipe Assembly	1
—	3328/2	Union Centre-Piece	2
—	3328/4	Washer	4
50	3730	Top Plug	1
51	3730	Oil Drain Plug	1
—	19003/5	Bearing—Driving Side	1
56	19506	Retaining Plate—Driving Side	1
57	19495	—Sido	1
58	12314	Retaining Plate Screw—Driving Side	4
59	19497	Distance Piece—Driving Side	1
60	19498	Distance Piece Locknut—Driving Side	1
61	19507	Oil Seal—Driving Side	1
62	19496	Retaining Plate—Driving Side	1
63	10341	Retaining Plate Screw—Driving Side	3
84	7012	Bush—Carnwheel	1
85	6692	Camlever Pin	1
82	7411	Rotary Valve	1
83	7412	Bush	1
52	7544	Stud—Cylinder Fixing	4
53	* 303	Nut—Cylinder Fixing	4
69	6742	Oil Box Pipe—Internal	1
70	7476	Plug	1
71	6616	Cover	1
72	6628	Washer	1
73	4106	Screw	4
65	8328/3	Union	1
—	8073	Nipple	1
—	8203	Nut	1
54	9893	Stud, 4 1/2" x 1/4"	2
55	285	Stud Nut, 1/2" B.S.C.	4
105	B.1	Timing Cover Stud (two bottom holes, 3 1/4" x 1/4")	2
106	18316	Washer (two bottom holes, 1/2" B.S.C.)	2
107	285	Nut (two bottom holes, 1/2" B.S.C.)	2
108	5058	Stud, 2 1/2" x 1/4" B.S.C.	2
109	5585	Nut, 2 1/2" x 1/4" B.S.C.	1
110	3574	Nut, 1 1/4" B.S.C.	3
111	9650	Screw	1
112	12348/8923	Joint Washer	2
25	12348/8923	Tapet Stem and Body	2
23	8921	Top	2
24	8924	Locknut	2
26	12703/1	Guide	2
88	7005	Camwheel	1
89	18825	Nut	1
90	7829	Timing Pinion	1
86	7430	Camlever—Inlet and Exhaust	2
—	9474	Roller	2
—	10897	Bush	2
—	7572	Pin	2
87	7018	Distance Piece	1

