BSA - SECTION B

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FIG. B1. Engine exploded.

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OPERATION OF THE TWO-STROKE ENGINE

FIG. B2.

Diagram A. Shows the piston nearing the top of its stroke, compressing a charge of mixture from the previous cycle, ready for firing. The inlet port is uncovered and a fresh mixture of petroil/air is induced through the carburetter into the crankcase, filling the vacuum caused by the ascending piston.

Diagram B. The compressed charge has just been ignited by the sparking plug and as the burnt gases begin to expand, the piston is rapidly forced downward on what is know as the firing stroke. The

fresh charge of mixture is compressed by the piston as it descends.

Diagram C. Shows the piston at the end of its downward stroke, leaving the exhaust port completely uncovered to enable the burnt gases in the cylinder to escape through the exhaust system. The transfer ports are also open, allowing the compressed mixture in the crankcase to force its way into the cylinder. Each transfer port (only one is shown in the diagram) is so arranged that the stream of incoming mixture is direct ed to the rear of the combustion chamber. As they sweep upwards under the cylinder head, they assist in forcing out any remaining burnt gases through the exhaust port. This particular stage of events is known as "scavenging."

Diagram D. Shows the piston rising, so compressing the charge of mixture ready for firing. The upward movement of the piston in the cylinder is also creating a partial vacuum in the ga s-tight crankcase which will draw in a fresh mix of petr oil/air from the carburetter when the inlet port is uncovered.

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The two-stroke is so called because a firing stroke occurs on one out of every two strokes of the piston, unlike the four stroke engine which fires once every four strokes of the piston. Induction and exhaust ports in the cylinder wall replace the valves, springs, cams and tappets normally used in a four-stroke engine. The upper portion of the cylinder is linked to the crankcase by two transfer ports, the purpose of which is detailed on page B3.

These notes, when read in conjunction with the corresponding diagrams, should acquaint the in-experienced mechanic with the basic principles of the two-stroke engine.

DESCRIPTION

The 175 c.c. two-stroke engine is of unit construction and has a single cylinder barrel of close grained cast-iron mounted on an airtight, two-piece crankcase. The domed "Lo-ex" aluminium piston is "pegged" to prevent the compression rings from revolving in the bore and is carried on an oval section connecting rod, employing a needle roller small-end. Housed between the two disc-faced flywheels is the big-end bearing, consisting of eighteen plain rollers.

The generator rotor is secured to the keyed shaft of the left-hand flywheel and is protected by a circular

cover containing a six-coil stator unit. Mounted on the right-hand shaft is the engine sprocket and contact breaker unit, which, becaus e the engine operates on the two-stroke principal, revolves at engine speed. From the engine sprocket the drive is taken, via the primary chain, to the clutch assembly. Here the transmission is controlled by a series of spring-loaded friction plates before passing through the four-speed constant-mesh gearbox to the gearbox sprocket.

DECARBONISING

Internal combustion of the petroil mixture in the engine produces normal carbon deposits on the piston crown, rings, cylinder head and ports. These deposits are not ha rmful providing they are not allowed to become too heavy and cause pre-ignition and other defects which would impair the performance of the engine.

The usual symptoms indicating an excessive build-up of carbon, are an increased tendency for the engine to "pink" (metallic knocking sound) when under load, erratic running and a tendency for the engine to run much hotter than usual. A general decrease in power will also be apparent, this usually being caused by heavy carbon deposits in the exhaust port restricting the natural flow of exhaust gases. This interferes with the scavenging which takes place in the combustion chamber, making it impossible for an efficient transfer of combustible mixture from the crankcase.

Decarbonising is quite a simple task, so, to ensure constant efficiency from th e engine, it is advised that the operation be carried out every 2,000 to 4,000 miles.

SILENCER

It should be noted that the exhaust system contributes a great deal to the efficien cy of a two-stroke engine. When decarbonising the engine therefore, do not omit to clean the silencer baffles and exhaust pipe bore.

The baffles in the rear of the D14 silencer are detachable. Access is gained by removing the silencer end cap, retained by two nuts and a spring washer.

FIG. B3.

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Remove these parts, then with a pair of pliers pull the baffles from inside the silencer and soak in caustic soda solution to dissolve the carbon. Take care not to splash your eyes or clothing with the solution which is

very corrosive. Reassembly is in the reverse manner. Ensure when reassembling, that the sealing ring is correctly located before replacing the end cap.

Before starting work on the engine ensure you have a clean bench or area in which to work, and somewhere to place the parts as they are removed.

REMOVAL OF CYLINDER

First turn off the fuel s upply and disconnect the fuel pipe union at the float chamber. Do not attempt to pull the pipe off the union unless it is in need of replacement. Disconnect the air cleaner, undo the two nuts securing the carbure tter to the cylinder flange studs and tie the carburetter out of the way.

Using a suitable "C"-spanner, release the exhaust pipe union nut at the front of the barrel. If any difficulty is encountered in unscrewing the nut, apply a few drops of penetrating oil to the threaded portion and allow to soak before attempting to unscrew it any further. Disconnect the high-tension lead and remove the sparking plug.

Take off the four large fixing nuts from the top of the cylinder head and lift the head clear. Note that on early D14 models two cylinder head gaskets of 0·025" thickness were fitted. Later these were replaced by a single gasket of 0·050" thickness. Always check the gasket thickness when fitting, as two must be fitted if of the thinner type. Before attempting to remove the cylinder barrel, first unscrew the two petrol tank front fixing bolts, loosen the rear fixing bolt and raise the tank slightly to provide sufficient clearance. The petrol tank on the Bushman models must be removed completely. Care must be taken, when sliding the barrel off the studs, to sup port the piston as it emerges from the end of the bore, otherwise it may be damaged as it falls clear. Should the barrel be found difficult to remove, it may help if the two crankcase joint screws below the bottom fin of the barrel are slackened.

PISTON

After placing the cylinder head and barrel safely to one side, the piston can now be examined. Unless the piston or small end bearing is to be removed, the piston need not be disturbed. Should it be necessary to remove the piston, first prize out one of the gudgeon pin circlips with a suitably pointed instrument.

FIG. B4. Removing circlip

Before withdrawing the gudgeon pin it is advisable to first warm the piston by wrapping it in a rag that has been soaked in hot water. Application of this rag will cause the aluminium alloy piston to expand more than the steel gudgeon pin, allowing the pin to be extracted more easily. Care must be taken not to damage the small-end needle rollers in the connecting rod when removing the gudgeon pin.

Scrape off any carbon which has accumulated on the piston crown, being careful not to damage the surface of the metal. A s tick of tinsmiths solder, flattened at one end, makes an ideal scraper tool and will not score the piston. After removing the carbon, wipe the piston clean with an oily rag.

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FIG. B5.

PISTON RINGS

Examine the piston rings and note that they are prevented from turning in their grooves by means of pegs which locate in the piston ring grooves.

The outside face of each piston ring should posses a smooth metallic surface and any signs of heat discolouration indicates that the rings are in need of replacement. The rings shou ld also retain a certain amount of "springiness" so that when released, the free gap is considerably greater than the gap measured when the ring is in the bore.

Each ring should be free in its groove but with minimum side clearance. If the rings tend to stick in the grooves, remove them and clean out all the car