

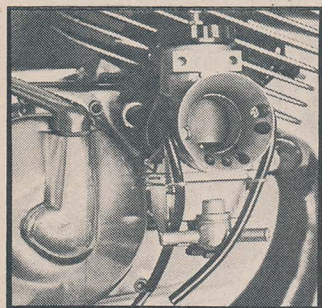
# ROTARY VALVE 30 bhp 125 engine AND IT'S BRITISH

by JOHN HARTLEY

**F**OR around £300 it should be possible by the end of the year for club racers to buy a new British 125cc racing engine. And that is not all, for its designers predict the new rotary valve, two-stroke single will produce up to 30bhp at 12 to 13,000 rpm, which is only a couple of bhp less than last year's 125cc World Championship winning Morbidelli!

At this stage, no doubt, you're thinking that you've heard it all before, and that bhp predictions don't win races. True, but the firm behind this one, Fieldhouse Engineering, of Rothley, near Leicester, have been making special barrels for the Villiers 210 cc engine used widely in kart racing for the past ten years. A couple of years ago they decided to develop their own 100cc kart engine, which went into production last year and 400 were made.

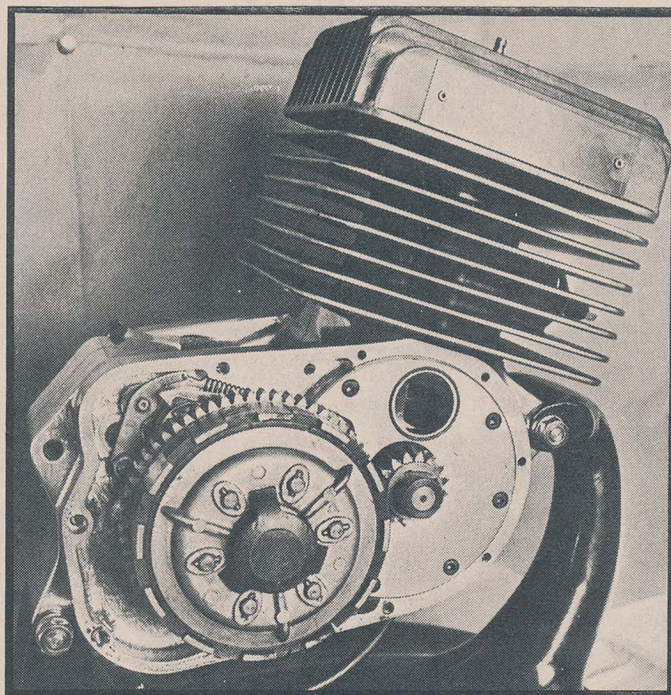
A nicely made rotary valve single, it develops about 18.5 bhp at 9,000 rpm, enough to win the Dutch kart championships, and a number of awards in Europe and the Far East. The point to remember about that power output is that the 100cc karts have no gearboxes, and



The 30 mm Amal carburettor is lined up with the inlet port to the disc valve.

need a wide power band, they also have to be fitted with silencers. But even that output is equivalent to 23 bhp on a 125, and so with a narrower power band, quite a bit more power should be available. Incidentally, Fieldhouse make special cranks and other modifications for the 210 cc Villiers units as well, so overall the firm has quite a bit of experience of racing two-strokes.

Aubrey Upton, who runs the firm, and his son Geoff, decided to make the most of their experience when it came to building the 125 racer engine. Their 100 cc kart engine has a



Gear primary drive and wet clutch simplify design and leave room for a large inlet port.

bore and stroke of 50 x 48.5 mm, so it was possible to use the same aluminium diecastings for the barrel and head of the 56 x 50mm 125 — suitably machined, of course. There is a five-speed gearbox, and here, Upton has concentrated on fitting it into the smallest case practical, to save weight.

He decided to split the crankcase vertically, the halves also carrying the gears. The Motoplat ignition system is mounted beneath a cover on the left-hand end of the crankshaft, while the gear primary drive and clutch are enclosed behind a cover on the right-hand side of the engine. The rotary disc valve is enclosed by a small cover. All main castings are aluminium, diecastings will be used on production.

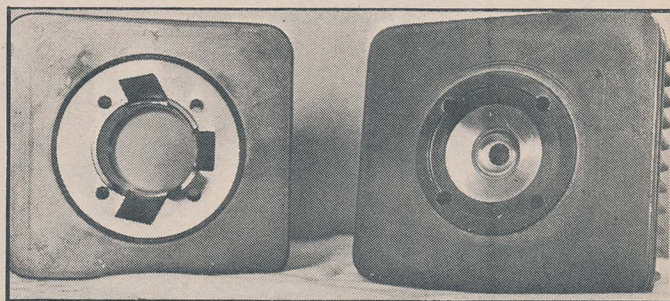
An Amal 30mm carburettor is mounted on a stub on the right-hand cover, and it lines up with

and thinks that the extra one may help with lubrication and cooling, but doesn't make much difference when it comes to power. Initial timing is: inlet opens 47 deg ABDC, closes 73 deg ATDC; transfers open 68 deg BBDC, close 68 deg ABDC; and exhaust opens 90 deg BBDC, and closes 90 deg ABDC. The rectangular exhaust port is divided by a vertical wall.

To match the shallow dome of the piston, there is a wide squish band in the cylinder head, the combustion chamber being a fairly deep and compact hemisphere. There are cut-outs in the skirt of the piston to give an easy passage to the transfer ports.

Straight cut primary gears transfer the drive to the seven-plate wet clutch — big enough for a 250, says Upton — and all the five speeds are straight cut, constant mesh gears. Overall ratios are: 39.8, 25.04, 17.13, 12.52 and 10.01:1. On the prototype there is only a left-foot lever, but right- or left-foot shifting will be catered for later on.

Complete, the engine/gearbox weighs 37 lb, says Upton, and at



A simple three-port layout is used. The combustion chamber is small but deep.

the inlet port to the disc valve. The crankshaft flywheels are chamfered to give an updraft port into the crankcase. Apart from the much earlier inlet opening it allows, the rotary valve also leaves space for an extra port, and on the first prototype there are just three ports. Upton has experimented with five ports,

only 13 in long, 12.5 in high, and 12.7 in wide, including the carburettor, it is pretty compact.

How will it go? Well, that remains to be seen, but there is no reason why it should not give a good account of itself. If you want it water-cooled, that's no problem. 'We could make a water-cooled barrel,' says Upton.