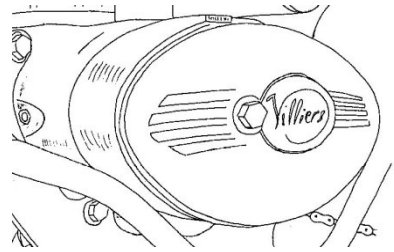
# 6 Primary Drive

The same clutch and the primary drive were used on both 197 and 250cc engines, including the 2T and 3T twins, the only difference being the use of three extra inner clutch springs, in the competition role. Again quite adequate for an untuned unit but they cried "enough" under competition use.




To cope with any increased power output, a stronger spring set up must be used to prevent clutch slip. One option is to use the minicar engine modified splined clutch centre, which houses a single large outer spring and a smaller inner one. High performance Kart engines have gone one step further in that they use a single spring of huge proportions designed for foot pedal operation. This spring does give a very heavy (almost impossible) clutch action in the motorcycle mode, but does eliminate clutch slip altogether. If the longer 2T clutch operating arm is used, it will lighten the lever action, but decrease the lift.

The standard clutch basket is another item which tends to dislike heavy usage, and splays out under load as well as cracking around the rivets which hold it to the chain wheel. The basket can be strengthened by welding a band around it. It is best replaced by an all steel machined item which is then re-rivetted to the original chain wheel, or the whole assembly being ditched in favour of a one piece machined basket and chain wheel, available new and from autojumbles.

Primary chains are another problem area in that they are prone to stretch, requiring frequent strips to reshim the gearbox to maintain chain tension. A minimum of one and a maximum of four gaskets being used to achieve 1/4" up and down movement of the chain. If a Renold twin row chain is used, this problem is eased. The twin chain together with a duplex front sprocket fits straight on, the chain inner row driving the single clutch sprocket, the outer row being supported by the clutch drum which is machined to the correct diameter for the job. As the duplex front sprocket is only available in 20 teeth, the primary drive ratio is unaltered at 20/43, but if the single row chain is kept, then alternative front sprockets from the 8E or 2T (23T) can be used, but only raise the primary ratio. This method can be used to raise the overall gearing, but it also speeds-up the gearbox which in turn decreases the torque through it, not a bad idea for high performance work where the box is rotating at something like twice its original design speed anyway

(aftermarket components will give you 16T, 17T, 18T ratios). As the primary chain is an over-stressed item, even in the lower power roles, the use of a split link is not recommended under any circumstances, as its failure (and it will) can cause severe damage to both engine and rider. On a road racing engine the primary chain suffers even more, and should be confined to the nearest dustbin after fifty miles, or the chances of making the finishing line will drop to zero.

Brian Wolley commissioned Tony Hayward to build a belt drive system for his Silverstone Mk2 some years ago, but this engine and clutch were of Greeves manufacture and the gearbox by Albion. The belt used was of 1 inch polypropylene and said to be able to transmit 50 bhp.

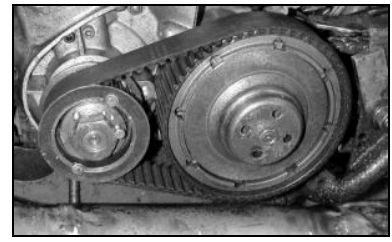


**Figure 32** Belt primary drive

A belt drive was available new from Igor Ashwell for the 9E, which he used on his own kart, to good affect. The system uses a 30 mm belt, which retains the standard primary drive ratio, and the original Villiers clutch basket rivetted to a new pulley (where the new pulley replaces the original sprocket). The clutch runs cooler in the open air and does not slip, even though he only used three friction plates, and the standard nine spring centre and plates. The photo (Fig 32 ) is from John's VMCC racer which is fitted with a Nametab Engineering belt drive of the same construction.

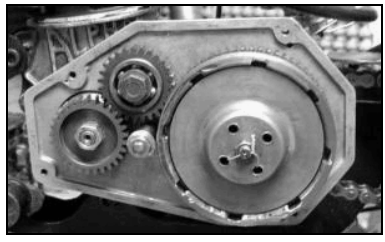


**Figure 33** Kartpro geared primary drive

As the belt primary drive will be wider than the standard chain setup, a new cover must be made up to hide the modification, this can best be done by making a spacer for the chaincases, or a plain sheet alloy cover and run the system dry.

Chaincases changed little throughout the years, and then mainly cosmetically, until the introduction of the small case especially for Minicar engines. These cases are slimmer and were adopted for use on trials machines by the Greeves factory long before Villiers made them a standard fit on the 36A and 37A engines. New slimline primary chaincases are available from Nametab Engineering and others. These are CNC machined and include an 'O' ring at the crankcase joint.

As a final look at primary drives, it is interesting to note that a few years ago an all gear driven set was available. Produced by Kartpro, it featured an idler pinion to maintain the correct engine rotation, but was housed in an odd