

MIKE HASWELL

# RACING ahead

## HINTS & TIPS FOR NEW RACERS

**T**his month we look at motor maintenance, which is often sadly neglected until the motor stops working. Just because it isn't broken doesn't mean that you don't have to fix it, its more like a car engine in that it really benefits from a good tune-up. One of the first signs you notice when a motor is going off, is that the motor seems to have less acceleration coming off the corners. As it now has less punch, you start to drive it harder and then find that you have gone flat before the end of the race.

You should take the brushes out after every couple of races and have a careful look at them, checking for any signs of discoloration. If they are a uniform bronze colour, then they are fine and you can

continue to use after cleaning off the carbon deposits. The best way to do this is by using the round end of a comm stick. If the brushes have a bluish tinge near the contact face then they must be replaced immediately, as they have overheated at some point and the comm will need a skim. If you find that you have a set of purple brushes, this is a really bad sign and means that the motor has been badly overheated and will be in dire need of a rebuild.

### Motor Break Down Tips

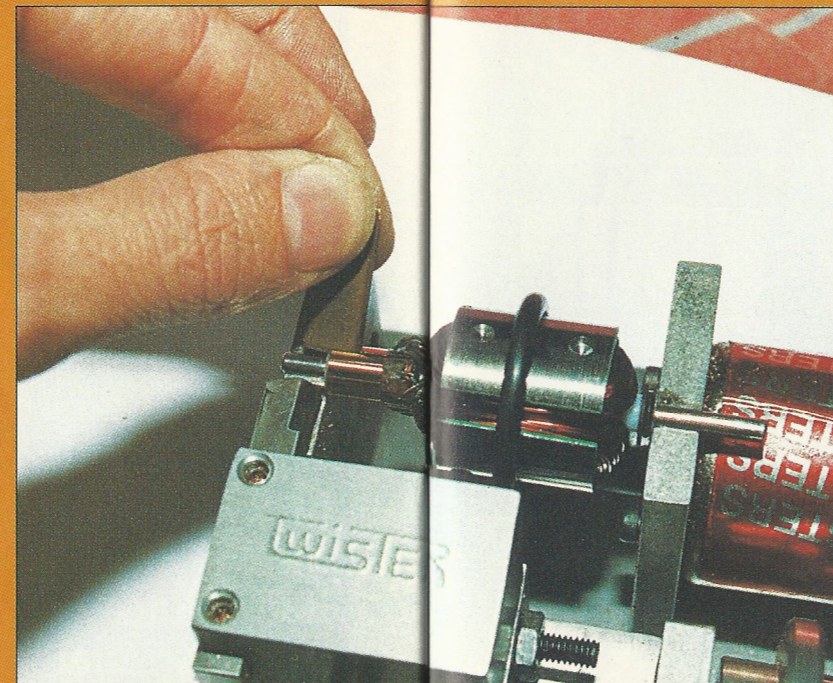
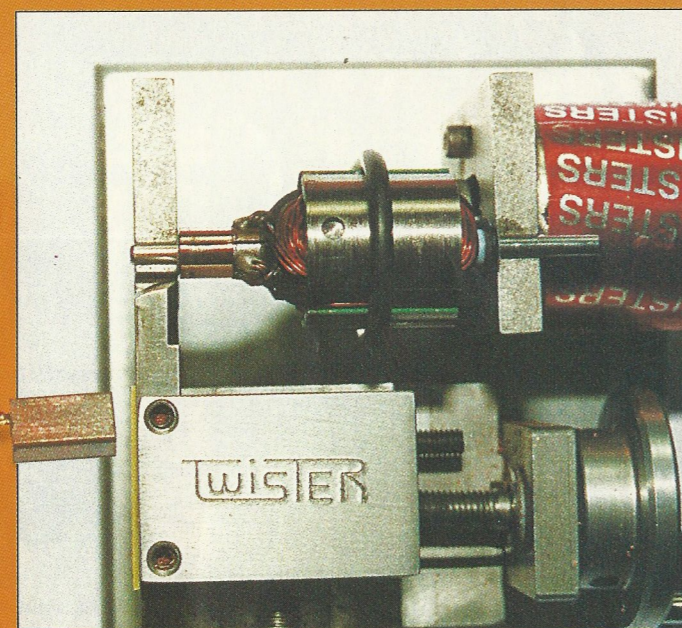
Before you start taking your motor apart, you should be sure you can put it

back together again. To this end mark the can and endbell so that you don't alter the timing when re-assembling the motor. It is also a good idea to mark positive and negative on the can, otherwise you could end up with the motor going backwards, which would be embarrassing for you and highly amusing to those watching. Now remove the springs, putting them somewhere safe, and take the brushes out of the brush hoods. Loosen the two screws that secure the endbell to the can (these are situated between the brush hoods), rotate the endbell until you feel it come

### Always clean the slots out

loose and then remove it (the timing ring should come with it). If the endbell doesn't rotate freely, then you will have to remove the screws and then ease the endbell off. You'll see some washers/shims on the end of the armature, remove them and put them safely to one side. Check inside the endbell for any washers that may be stuck to the bearing and put any you find with the other washers. If you haven't already done so, remove the timing ring. The armature can now be

The Armature in a comm lathe - even after one cut the comm still needs another skim



removed from the can, but be careful as there will be some more shims at the bottom of the armature and these sometimes become stuck to bearing and/or the magnets. Keep these shims separate from the ones you have already removed.

The commutator can be skimmed (also known as truing or cutting) on a comm lathe, there are a number of shops that offer a rebuilding service. Otherwise, there is nearly always somebody trackside who is open to offers (food, drink, money, etc.) to skim a comm for you. Always make sure that slots between the segments are clean from any carbon and/or copper cuttings. It's a good idea to

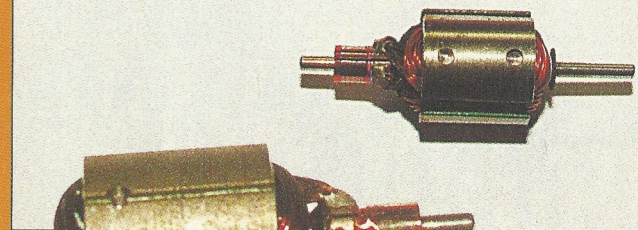
burnish the edges of the slots, as they tend to develop sharp edges which can eat up your motor brushes. You can do this by running a ball-point pen (used ones with no ink in them are best) lightly up and down the slots to slightly round the edges. Use some motor cleaner ensure that there is no residues left on the comm. Now put the armature to one side.

Spray some motor cleaner onto some tissue (Lighter fuel will also do) and wipe it round the can until all the carbon is removed. For the endbell put some cleaner onto a cotton bud and wipe it round until it is clean. It is better not to spray straight into the can or endbell as this can force dirt into the bearings. Add a drop of good quality bearing oil to each bearing, wiping off any excess with a cotton bud. Now spin the armature in each bearing to check if its running smoothly. If it feels notchy then you will have to thoroughly flush the bearing out with motor spray. This should be done until the bearing feels smooth, allow to dry, and then re-oil. If the bearing still feels notchy it may need to be replaced.

### Assembly Point

You can now re-assemble the motor, making sure that you put all the spacers in the correct place and be sure that the endbell is properly aligned on the motor and that the polarity is correct. It is important that the armature is properly placed in the can to optimise the magnetic field. You can do this by: Assembling the motor with only the large fibre washer on the armature.

The armature before skimming, notice the black carbon scoring



An armature that has been trued out

Give the armature a spin, this will come to rest in the correct position, then pull on the output shaft. There will be some free play before the armature bottoms out in the can and this will give you the feel for how many spacers are needed at the bottom of the armature. You must also make sure that the windings are not rubbing on the bottom of the can. You can now add the spacers to the commutator end to take up any excessive play, always putting the large fibre washer on first, but leaving a small amount of end float (1/2 mm is about right) when the endbell screws are fully tightened. Now refit the brushes and springs and check the motor is running the correct way.

### Stock/Standard Motors

These can't be taken apart, but the same applies with the brushes

An armature that has been worn out

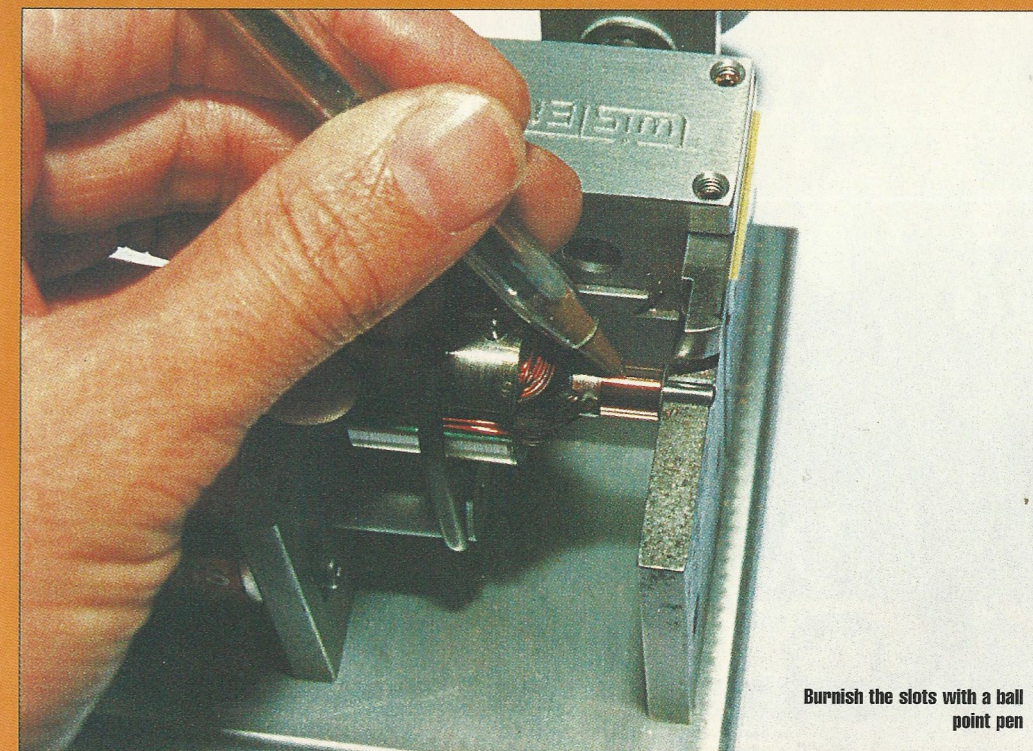
on stock motors as modified. You can easily clean the commutator by using a comm stick. Remove both the brushes and insert the comm stick through one of the brush hoods. Now apply some light pressure to the comm stick as you turn the motor over a dozen times. Leaving the pinion gear on makes it easier to turn the armature over. When you have done this, the comm should be free of any black carbon deposits. Now thoroughly clean the motor out with some motor spray and then add a couple drops of oil to each bearing, wiping off any excess. Stock motors are difficult to keep in top condition but their life can be prolonged by following the above steps. You can get comm lathes for stock motors, but in order to use one of these you have to remove the brush hoods and most organisations don't allow you to tamper with the endbell.

### How Effective is a Rebuild?

Here are the results of a motor with burnt brushes and before and after skimming:

	Before	After	Burnt Brushes
Power	72.14	78.95	68.67
Efficiency	49.67	52.92	47.65
RPM	26,621	28,724	26,738
Torque	1.124	1.204	1.038

That's all for this month, next month we will be looking at the effects of timing on motors. If there is anything you would like a further explanation on then you can e-mail me at Mike\_Haswell@compuserve.com or MHasw50833@aol.com. **RACI**



Burnish the slots with a ball point pen

Burnt brushes

# Motor Maintenance