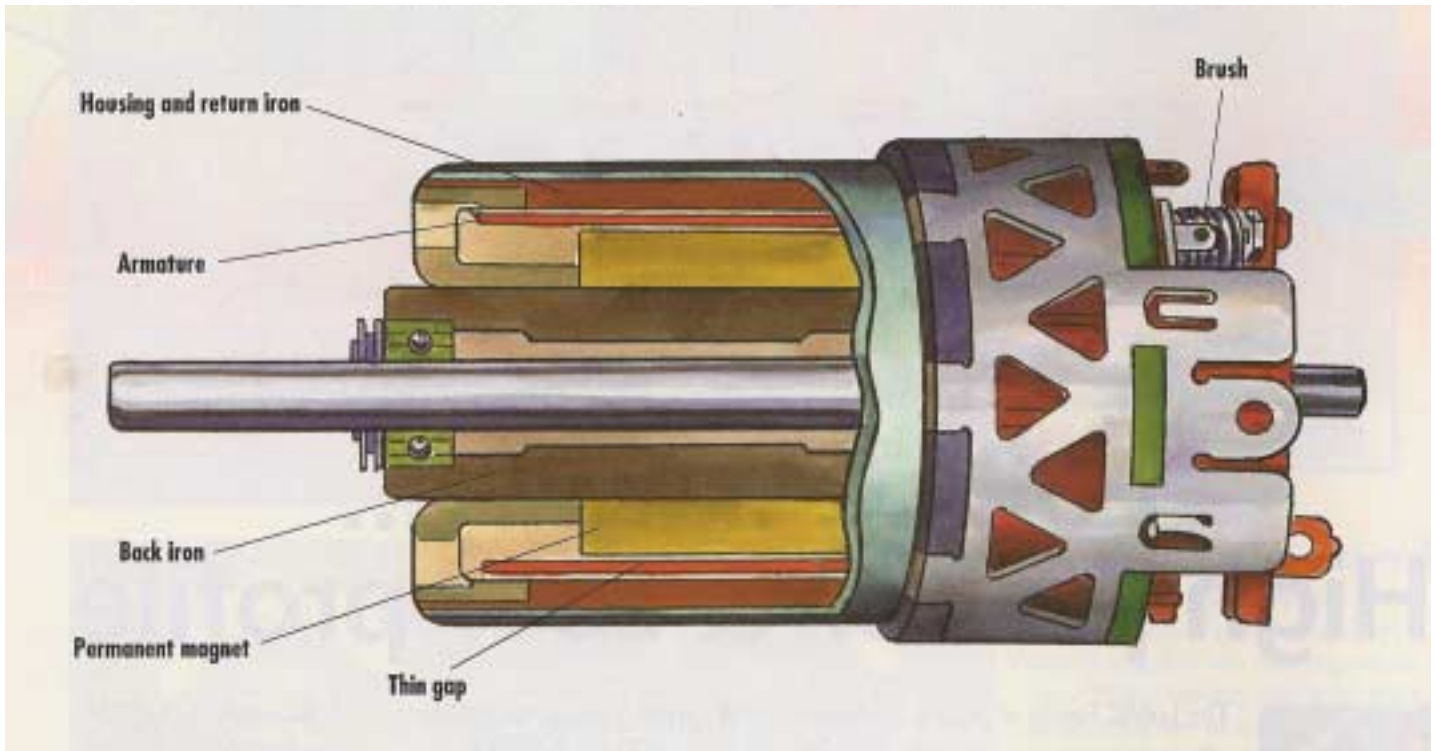


Copper sheets replace motor windings



Electric dc brush motors have traditionally used wire-wound armatures that move through a magnetic-flux air gap. Engineers at **ThinGap Motor Technologies**, Santa Barbara (www.thingap.com), have come up with an alternative, precision-machined copper sheets. It gives motors a higher copper-packing density and a higher ratio of copper to total volume. It also puts more copper in the magnetic field, which translates into better motor performance and efficiency. ThinGap indicates the technology can be used to build motors that are more than 90% efficient.

Since there are no windings or slots, the motor generates no slot harmonics and no ac excitation of any noise, so they run quiet. There is no iron in the coil, so there is no cogging or hysteresis, and torque ripple due to harmonics is minimal. Both sides of the coils are exposed to airflow, so heat dissipates quickly. And the coil lets designers narrow the air gap between the permanent magnet and the magnetic return structure, allowing better use of the available magnetic-flux density. The motors also have higher power-to-weight ratios. The TG3300-35B brush motor, for example, weighs 35 oz but puts out 700 W continuous power, 71 oz-in. of torque, and can spin at up to 30,000 rpm.

