Why Does A Squirrel-Cage Motor Have So Many Nuts?

TO answer this question intelligently, let us first consider the theory of this motor. First we shall take a simple analogy. During recent years there has been much discussion of the theory of evolution. William Jennings Bryan and others to the contrary notwithstanding, evolutionists say that man sprang (or sprung) from monkey. In like manner, the squirrel cage motor has sprang (or sprung) from the squirrel cage. In this respect the two are similar, except that it is a question whether in certain cases the motor hasn't sprung (or sprang) quite a bit further (or farther) than man.

As previously stated, the theory of the squirrel cage motor is simple—very, very simple. The squirrel cage, which is a cylindrical frame, resembling a Sigma Xi pin, is mounted on a shaft (See Figure 1, page 211, Lyceum Theatre Program, week of December 22, 1922). The periphery of this squirrel cage forms a path around which a number of squirrels travel, thus imparting motion to the cage and shaft.

Early experimenters suspended before each squirrel an attractive California walnut, to inspire the rodents to greater activity in their travel around the cage. "Ha! Ha!" little Freddie and Myrtle chirp at once and in unison, "We see now why they have so many nuts on the squirrel cage motors, papa. It is to make the squirrels run faster." "No, no, my children," replied the father, "you are wrong. That is the reason not yet."

This combination squirrel and nut motor was not sucessful because it was not reversible, for while it

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ran satisfactorily forward, when the squirrel was chasing the nut, it was simply impossible to make the nut chase the squirrel and obtain a torque in the reverse direction. In 1865 a reversible motor was perfected. It was found by using a red squirrel and a fox squirrel, alternately placed on the cage, that the motor ran equally well in either direction, because it was only necessary, by a process of autohypnosis, to cause either one to chase the other.

The foregoing discussion all leads up to the vital point of our presentation, and now we shall see why a squirrel cage motor does have so many nuts. Numerous theories have been advanced by different writers. Here are a few.

One authority states: "One cannot be too sure of this, but if we let K (a constant) represent the number of nuts, K′ will represent the reason."

Another states: "It would take a 16-place log table and a slip stick a yard long to figure it out, so we will use friction tape instead of nuts to hold the thing together."

The writer has arrived at the following conclusions: If we were to plot a graph of the squirrel cage motor, with the nuts for ordinates and noise for abscissa, we would find that an approximate hyperbolic parabola will be obtained. This indicates that the noise is an inverse function of the number of nuts. This is very readily explained when we consider that if we do not tighten the nuts, they will develop sufficient noise to drown out the noise of the motor. Hence, we have a noiseless motor. This is the reason we use so many nuts on the squirrel cage motor.