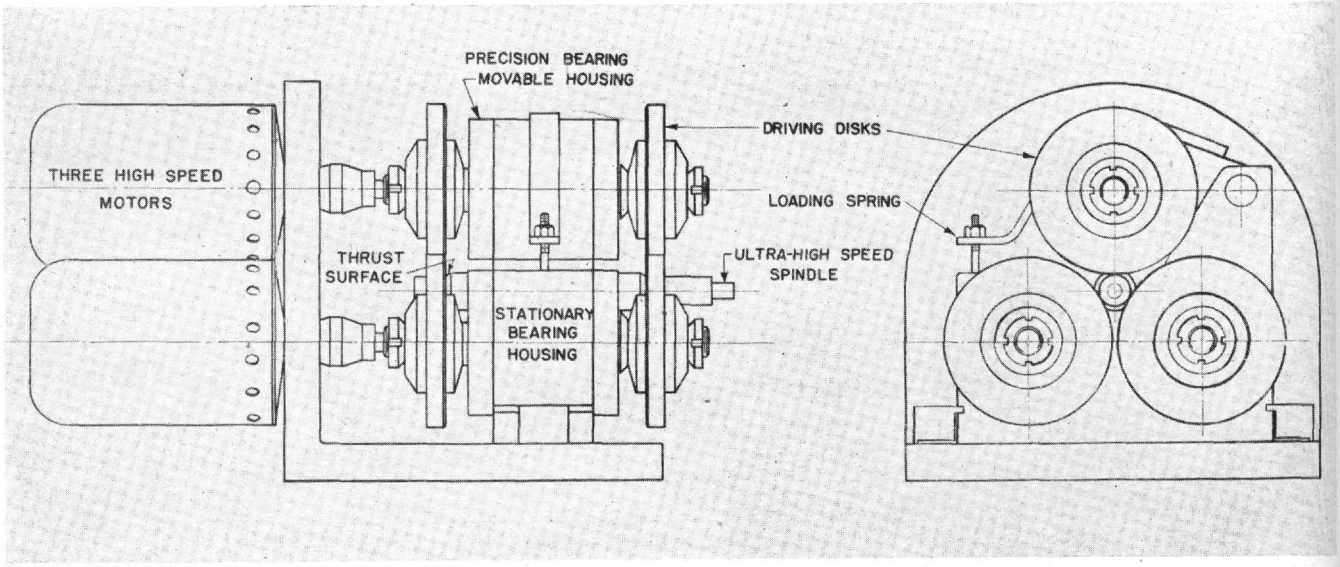
250,000 RPM

By GEORGE SINES, M.E. IV



Pilot Model of an Ultra-High Speed Machine

THE whirling dervish was a piker. A quarter of a million revolutions per minute will soon be attainable after a further refinement by a new high-speed drive developed by G. N. Krouse and J. F. Hall of Krouse Testing Machine Co. The unique design of this drive eliminates bearing and journal wear which is usually a serious problem in high speed drives. The drive is by high speed electric motors so it is possible to control the speed and power without fluctuation.

A drawing of one pilot model is shown above. The machine shown was designed to operate in a vertical or horizontal position and to take end thrust of the high-speed shaft. The three 30,000 rpm, series wound, a-c motors drive the bakelite disks through rubber couplings. The two lower motors and disk assemblies are fixed with the upper one pivoting so that a normal pressure between the shaft and disks can be furnished by the spring. In the model illustrated, where the disks are in the same plane, the maximum speed-up ratio is 6.48. In the previous model the disks were in different planes so that a much higher ratio was possible. The three driving disks were placed in the same plane in the latter to increase the thrust load that the shaft could carry. The disk shafts are supported on preloaded precision ball bearings, designed to run at the high motor speed.

The first pilot model reached a speed of 175,000 rpm. A test run at 90,000 rpm for 75 hours showed no sign of wear on the disks, shaft, or shaft bearings.

Possible applications for this drive are in ultracentrifuges, rayon spinning machines, centrifugal testing of small parts, rotating-beam fatigue machines, and other places where high speeds are necessary. The model shown was designed as an experimental drive for the ultracentrifuge of the Chemistry Department of The Ohio State University. Its advantage over an air turbine in this case is that it is extremely difficult to maintain an air turbine at the exact speed required in this precision work.