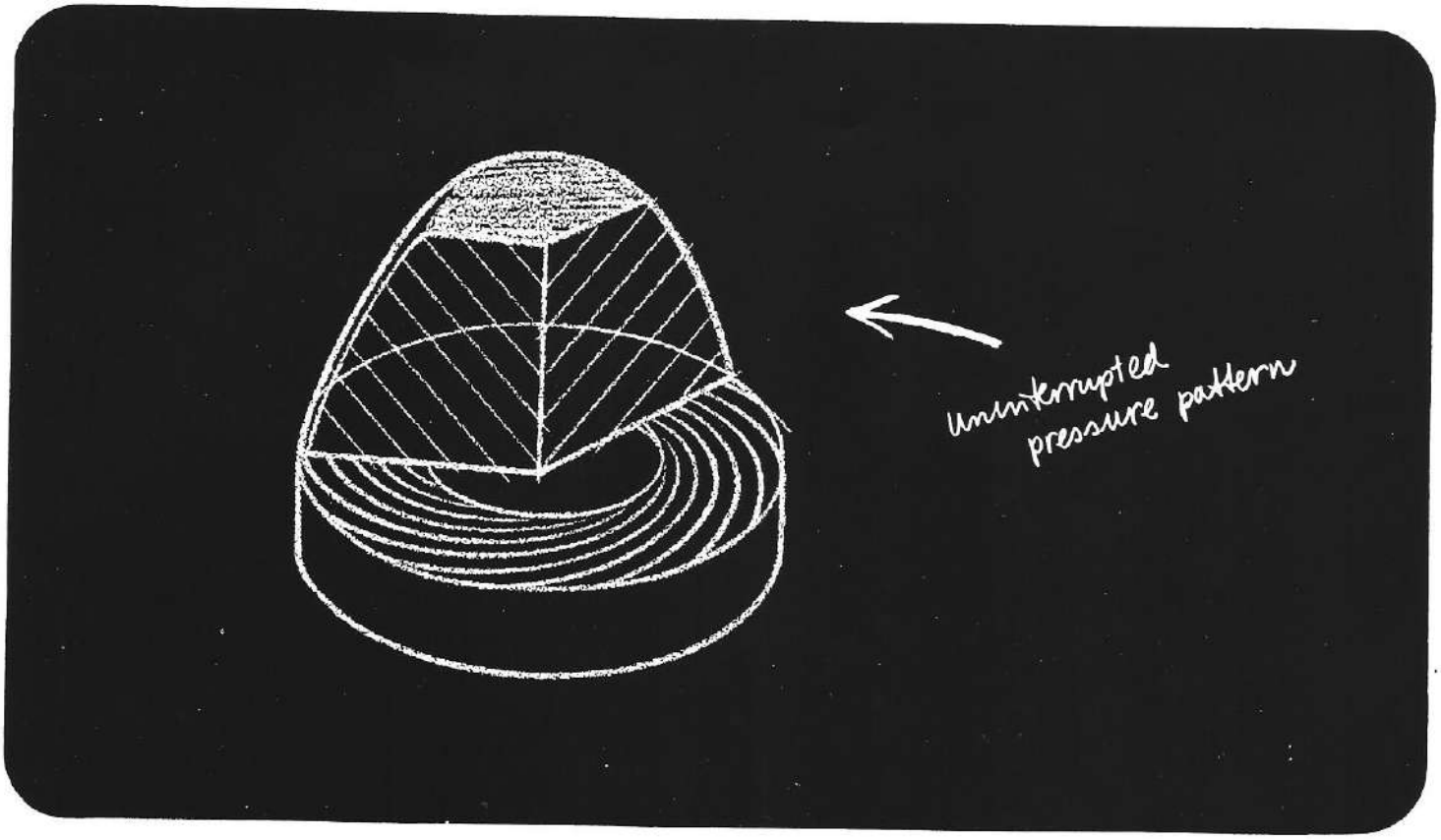

Spiral Bearings and their possible utilization

Wherever, in this dynamic world, a mass moves in relation to another with which it is in contact - there is the need for a bearing. And when masses become heavier, speeds higher, contact surfaces smaller, there is the need for bearing research and technology.

We believe we have designed and calculated improvements that are both significant and practical. (Described in Philips Research Reports supplements - No. 2 1964.)

We can now make, for example, a wear-resistant thrust bearing able to take a load of 900 grams rotating at 60.000 rpm. without incurring a power consumption of more than 2.8 watts. We do this with a one millimetre conical spiral-groove bearing, oil lubricated within which a pressure of about 135 atm. is generated. The bearing is simple: shallow, spiral-grooves on a tapered spindle, fitting in a conical cup. How do these spiral-grooves bearings work?

As in other self-acting bearings, pressure arises from two effects. The first is the pumping action: the fluid will be pumped - in this particular type - towards the centre. Secondly, due to leakage: the piled-up viscous medium in the centre leaks back towards places of ambients pressure.

Over and beyond other bearings the spiral bearing builds up an uninterrupted pressure pattern. The practical value? First off; as a self acting gas thrust bearing, no other equals it at the present time. And in oil-lubricated bearings we are testing flat spiral bearings, carrying loads of several tons. Spiral bearings can be of every required shape: flat, round, cylindrical, conical.

A finding of great practical value, because it opens a wide range of applications, was that when grease is used as intermediate agent spiral-groove bearings are self-acting full-film lubricated bearings. In our special designs they too can take up high axial, radial loads. During the service life of the bearing, there is no lubrication problem; there is no leakage problem; the bearing can be used in all positions in space. It is silent in operation. Spiral bearings can support large thrust loads; they cause little friction, negligible wear and no trouble with fatigue. They can replace other bearings simply because they are cheaper. Also, under extreme conditions, they can perform satisfactorily where others can not.

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