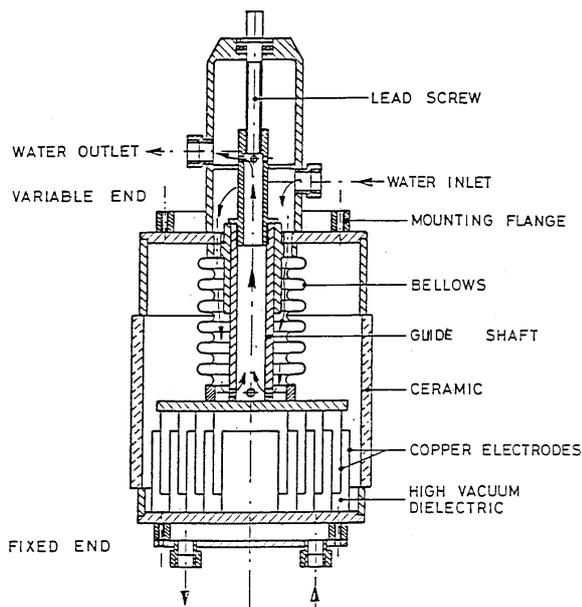


## Variable Capacitor Water Cooling

A variable capacitor consists of two (2) electrodes, one fixed and one movable. The movable electrode is held by a hollow tube (the guide shaft) which in turn slides inside a fixed tubulation, representing a sliding bearing. This arrangement assures the concentricity of the electrodes required. The bellow connects the movable electrode to the fixed position of the sliding system. The bellow serves two functions. One is that it maintains the vacuum on the inside of the capacitor. The other is to conduct the current to the movable electrode. For certain applications high current loading is required, which without special cooling, be it forced air-cooling or water-cooling, would lead to the destruction of the thin bellow material.

The standard water-cooling design is shown in fig. 1. The water passes through the water chamber holes around the fixed guide shaft tubulation, the inside of the bellows and returns through the inside of the movable tubing (guide shaft) and the output side of the water chamber. This system **operates only in the vertical position**. This is due to the fact that the water does not completely fill the convolutions of the bellows. This problem is enhanced when the bellows are compressed at the C-min. point. The air bubbles stay in the convolutions and are a point of overheating. The problem is enhanced if one intends to operate the capacitor in the horizontal position leading to premature failures.

In fig. 2 we show a different system called the **turbulence water cooling system**, covered by the patent CH656740 A5. The principle is based on the centrifugal effect imposed onto the water flow. This is done through special designed injectors in the plate attached to the variable electrode. In this way the water is forced against the bellow wall forcing any air bubbles present towards the centre. There they are expelled with the out flowing water. It is important to note that **this system functions either horizontally or vertically or any other position** desired. The system assures that no air pockets can collect at the bellow wall or in the convolutions which may adversely affect the cooling process.



1.1.1 Fig. 1 Variable Capacitor Standard Water Cooling

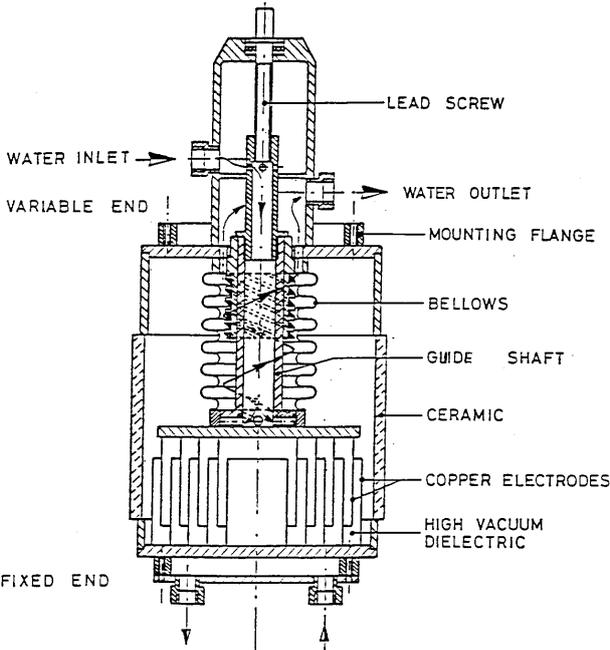


Fig. 2 Variable Capacitor Turbulence Water Cooling