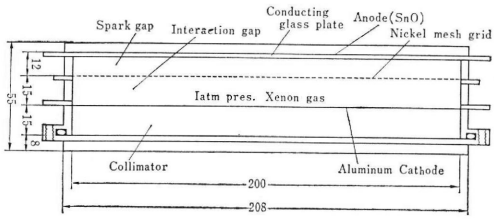
3.2 Spintharicon (Horwitz 1965)

3.3 Cross-wire chamber (Pullan & Perry 1965)



Cross-section view of the spark chamber

Studies on the Autofluoroscope

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The autofluoroscope is radioisotope imaging instrument designed to visualize and record the distribution of gamma emitting isotopes within the human body.

We tried to manufacture an autofluoroscope with a small sized detector. The detector consists of a matrix of 30 sodium iodide crystals 12×12 mm in section and 58 mm thick. These were packed in 5 files and 6 ranks in a 60×72 mm array. Each of the 30 crystals were optically coupled to two light pipes with 5 light pipes from a given rank going to one phototube and 6 light pipes from a given file going to another phototube. The collimator was composed of two 25 mm thick slabs of lead which were superimposed to provide a single collimator aperture for each crystal. If a decreased resolution with an increase in efficiency is required one of the lead slabs can be removed. Pulses occuring simultaneously in any pair of phototubes uniquely identifies the crystal in which the interaction occurred. The position signals derived from the phototubes are applied to the matrix of magnetic core and stored at the position corresponding to each crystal, and the distribution of radioactivity is shown on the oscilloscope with subsequent nondestructive continuous read out, and printed out numerically for quantitative analysis.

In the patient with goiter that contained 3.0 μCi of ^{131}I, a good contrast picture was taken in 5 min. exposure with a polaroid camera over the oscilloscope face. After intravenous administration of 30-50 μCi of ^{131}I-hippuran and 100 μCi of ^{197}Hg-neohydrin to the patients with various renal diseases, radioactivities in pelvis, medulla and cortex regions in the kidney were read out every 40 minutes, and it was very useful for fractional analysis of renal function.

The autofluoroscope produced the images in a shorter time and with a smaller amount of radioisotope compared with the conventional scanner, and was continuously sensitive to all areas within their field of view. Therefore, it was considered that the autofluoroscope is well adapted to measurement of dynamic processes and measurements with isotopes having short physical or biological half-lives.