Fig 2 : General view of a Turnstile antenna.

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4.

Experiment with an AFC circuit

During the design of this receiver described in [2, 3, 8] experiments were made for AFC. This tuned the frequency of the reference oscillator using the DC component of the voltage from the quadrature demodulator at pin 13 of the IC1. This was connected to the inverting input of an operational amplifier TL071 with it's output connected to a pair of varactor diodes, KB105G, which replaced the trimming capacitor C21 in the circuit of reference oscillator. Thanks to the very good stability of PLL we did not notice any change in quality of the final image when AFC was used, that is why we decided to exclude the AFC circuit in order to make the design as simple as possible. For people interested in AFC, the circuit diagram is available at the authors homepage.

In relation to the use of AFC, it is appropriate to mention Doppler shifting of frequency. This phenomenon is observed if a signal source, in our case a meteorological satellite, is approaching, you perceive it's frequency as higher, and when it moves away, you perceive its frequency as lower than it in fact is. The magnitude of the Doppler shift for orbital satellites is a maximum of 5kHz which is still in the pass-band of the filters and does not cause visible distortion of final image.

5.

Antenna

A requirement for assuring high quality reception of signals from meteorological satellites is the use of a high quality antenna. Polar meteorological satellites are rotation stabilised and transmit circular polarisation. It is therefore impossible to use ordinary Yagi or ground plane antenna. When you listen to the signal from the loudspeaker it seems to be noise free, however when you observe the picture after it is decoded you will see that it is unusable. Anyone can build high quality antenna. Two basic types are used: Turnstile and Quadrifillar Helix.

The turnstile consists of two crossed dipoles (Fig. 2) phased for circular polarisation. This antenna should be situ-