A ‘DIFFERENT’ ANTENNA.

Por Luiz Amaral
PY1LL/AC2BR

I had an inverted-V antenna for 40m at a height of approximately 12m, in its apex, from the top of my garage. With it, from the city of Rio de Janeiro I contacted with my friend in São João de Meriti, another close city in the same state. My signal there, at any time, was about 20 to 30dB over S9.

On a Saturday morning, calling him, I received a report of only S7, with all looking well, in spite of a little difference of the knobs positions of my antenna coupler. As I was in a hurry to go out home due an appointment, I couldn’t verify the state of the antenna till night, when I arrived, and I didn’t remember about the morning happening nor I could see the antenna for any verification.

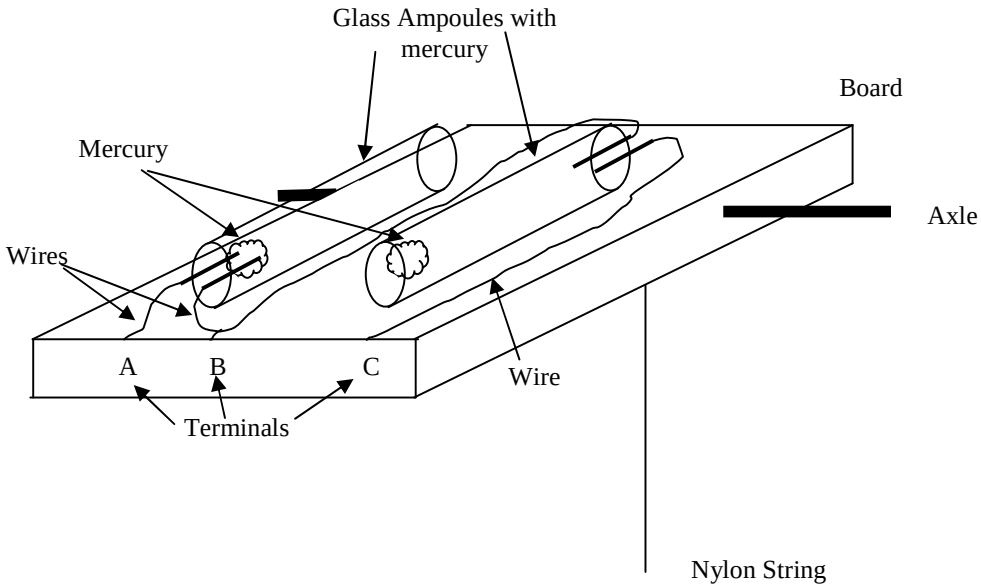
I became very surprise, however, when turning on my receiver, I could hear very strong (and I also worked them) tens of japanese stations. After turning off the radio, I forgot this fact too.

In the morning of the day after, observing my antenna, I could see that one of the inverted-V legs was down, with a broken nylon string (after the end insulator). Having fixing that, my signal at São João de Meriti came back to its normal level, but the japanese disappeared.

Reasoning, I understood that what happened was in perfect agreement with the results got in my QSO’s: the antenna, with one broke leg, became a ‘half-sloper’, an antenna with top central feeding, that is, it got e very strong component of low angle radiation with one leg in the vertical position, which increased my signal in Japan and decreased those of the local QSO’s. The central pole was 12m high and, therefore, the fallen leg didn’t touch the garage top.

A new idea arose: to create a 3 legs antenna, two making an inverted-V and the third in the vertical position. A switching system between the vertical leg and the normal one of the inverted-V would change the radiation angle for me to choose between short and long distance.

That was done. As my shack was just beneath the antenna, I used a very original switching system. On a little wood board of 15cm by 7cm, I put two mercury switches, those used in old water pump systems, in such a way that with the board was bent to one side, we got one mercury contact closed and vice-versa, forming an SPDT switch. With a nylon string, from my shack, I controlled the board position, as the figure below.



As we can see in the figure, the mercury, in that board position, through the left ampoule, closes the contact between terminals A and B and opens the contact between terminals B and C in the right ampoule. Pulling down the nylon string, the board is bent turning around the axle and closes the right ampoule contacts B and C and, going to the bottom, the mercury of the left ampoule disconnects the terminals A and B. As the axle is off center, releasing the string is enough for the board to come back to the original position by its own weight.

Connect the coaxial cable shield to one of the inverted-V normal legs, its central conductor to terminal B, the other inverted-V leg to terminal A and terminal C to the vertical leg of the antenna. At the steady position, the antenna will be a normal inverted-V and, with the string pulled, it will become a ‘quasi’ half-sloper.

I haven’t measured the peak power for the mercury ampoules secure operation when they are opened, that is, the rupture voltage of the ampoules inner conductors. Also I haven’t made any experiment in other frequencies.

It is necessary to remember that, depending on the height of the inverted-V and its construction material (conductors or not), the length of the vertical leg must be adjusted experimentally for minimum VSWR at the preferred frequency, in such a way that, when pulling the string, we don’t have great changes in the antenna coupler adjust and the losses kept as low as possible.

This switching system with mercury ampoules may be used in several types of antennæ switching: the imagination is the limit.