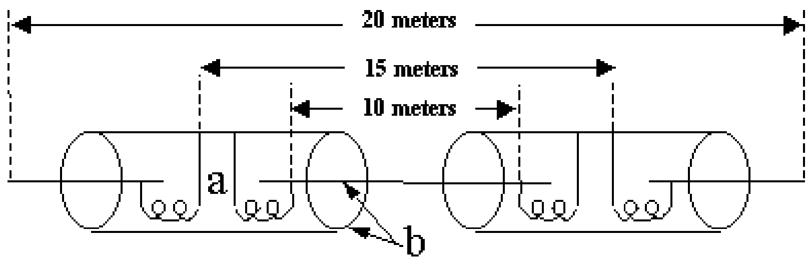
MOSLEY ELECTRONICS, INC.

TRAP DESIGNS

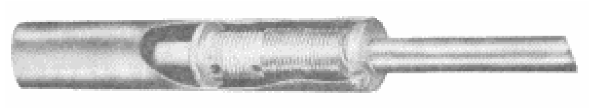
The Importance of Good Trap Design...

An antenna trap can be described as being an application of a resonant circuit. Such a trap, utilizing a parallel resonant tuned circuit, offers very high impedance at or near resonance and simply acts as an insulator to effectively cut off the element to a length resonant to the band being used. See Fig. 1.



A trap can properly be considered the "weak link" in the chain of components that comprise a multi-band antenna. Any failure or malfunction of one of the traps will put the antenna out of operation or, at least seriously effect its performance capability. Thus, it is of paramount importance that the trap design be such as to assure stability of resonance in wide extremes of temperature and humidity and to exclude or inhibit dirt and moisture formation which could cause malfunction or breakdown.

Any variation in capacity or inductance in the trap's tuned circuit will cause the resonant frequency to shift. Therefore, each of these components must be firmly fixed and this can best be accomplished by winding the coil on grooved forms and by making the capacitor sections immovable with respect to each other. Traps used in MOSLEY TRAP MASTER antennas follow this good basic design as can be seen in the cut-away model photo, Fig. 2.



The coils in MOSLEY traps are space-wound of No. 10 wire on grooved forms molded of high-impact polystyrene. Ends of each winding are firmly secured to ensure solid contact. The coil form is molded directly on the aluminum element and this element along with the outer aluminum trap casing comprise the capacitor. Because of this construction, the capacitor "plates" are completely fixed and cannot move in relation to each other.

MOSLEY traps "breathe" and, thus, cannot collect condensate. Traps that are tightly sealed encourage condensation and, since there is no place for the water to go, it accumulates and sooner or later ruins the performance of the trap. It is possible to put into each trap an absorbent such as silica gel which will reduce free moisture content for awhile. This is but a "stop-gap" measure, though, since a given amount of such material can absorb only a limited amount of water and any additional condensation is free to collect and to wreak its havoc with the beam's performance.

In order to achieve long service life from your trap antenna, it is important to consider material from which the traps are constructed. Unlike some traps which are either open or enclosed in some soft plastic, or other relatively short-lived material, MOSLEY traps are encased in aluminum which is not only completely impervious to weather, itself, but provides lifetime protection for the entire trap assembly!

Structurally, the configuration of MOSLEY traps promotes greater strength and rigidity of the entire array. Weight of each trap is distributed over a greater length of the element and the resultant slimness of the trap reduces wind resistance and, to some extent, torque.

HOW THE TRAP ANTENNA WORKS

The multi-band trap antenna is not a new concept. Reference to such a design can be found in a 1940 issue of Electronics. However, many Hams are not completely familiar with the design principle of such antennas and so a brief description of this principle may be of interest.

Fig. 3 diagrams the circuitry of a 3-band trap type antenna. Length of section 1 is equal to a half wave length at the highest frequency band to be used. Parallel resonant circuits (A) and (A*) are then added at the ends of this section, these circuits being resonant at the frequency for which 1 is a half wave length. Operation at the next lower band is achieved by adding element sections so that the equivalent electrical length of 2, when the reactance introduced by the resonant circuits is taken into account, corresponds to half wave length resonance for the next lower band. These added sections are inoperative for the frequency for which 1 is in half wave resonance, since they are isolated by the high impedance of the parallel resonance circuits (A) and (A*). The third band of operation is obtained in the same manner; i.e., adding resonant circuits (B) and (B*) and element sections so that 3 is a half wave length at the lowest band.