ABSTRACT: In order to obviate the necessity for using firing pins or electrical probes for initiating ammunition, a cluster of conductors are enclosed within a mass of pyroignition material, and means are provided to subject the cluster of conductors to control electromagnetic radiation such that they are heated into an incandescent state to ignite the pyroignition material.
INITIATION COMMAND

POWER SUPPLY (MODULATOR)

POWER OSCILLATOR

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A cluster of conductor sections 14 is generally centrally disposed within the pyroignition material 10 as best shown in FIG. 2. Typically, the cluster comprises a plurality of metallic wires, for example, aluminum or pyrofuse wires, cut to substantially the same predetermined length. Their function will be described below. It may also be observed at this point that the upper portion 15 of the parabolic and consists of a material, such as carbon or metal, which efficiently reflects electromagnetic waves.

Referring again to FIG. 1, as well as FIG. 2, to initiate the pyroignition material 10, the initiation command device 7 is activated to energize the power supply 6 thereby bringing the power oscillator 5 into operation. Electromagnetic energy from the power oscillator 5 is coupled through the wave guide 8 to the antenna horn 9 from which it is directed through the window 10 and the cover 13 to the ignitor. The electromagnetic energy passes through the pyroignition material 10 and is reflected from the parabolic surface 15 of the inner casing 11 to focus on the conductor cluster 14. The resulting currents developed in the individual conductors of the cluster quickly heat them into an incandescent state to initiate the pyroignition material 10 which, in turn, initiates the propellant.

For maximum efficiency, it will be understood that the conductive wire cluster 14 will be centered at the focus of the parabolic reflector 15. Further, each of the conductors in the cluster 14 will have been cut to a length which is nominally one-half wavelength at the frequency of the electromagnetic energy directed at the cluster. For example, for a frequency of 43 gigahertz, this length is approximately 0.5 inch. Adjustment of the sensitivity of the conductor cluster can be changed by varying the wire diameter and/or the material. The dimensions of the parabolic reflector 15, the antenna horn 9, etc., may also depend upon the frequency, but these are matters well known in the radar engineering art and need not be described at length here.

While the principals of the invention have now been made clear in an illustrative embodiment, there will be immediately obvious to those skilled in the art many modifications of structure, arrangement, proportions, the elements, materials, and components used in the practice of the invention which are particularly adapted for specific environments and operating requirements without departing from those principals.

I claim:
1. Apparatus for igniting pyroignition material comprising:
   A. a cluster of electrical conductors disposed in heat-conducting relationship with the pyroignition material;
   B. a source of electromagnetic energy;
   C. means for exposing said cluster of conductors to said electromagnetic energy;
   D. said electrical conductors are of predetermined substantially equal lengths; and
   E. said electromagnetic energy has a frequency such that the predetermined lengths of said conductors is substantially one-half wavelength.

2. The apparatus of claim 1 which further includes means for selectively activating said course of electromagnetic energy.

3. The apparatus of claim 2 in which the pyroignition material is contained within a housing, said housing including a first side composed of a material exhibiting the properties of an electromagnetic window.

4. The apparatus of claim 3 in which said housing further includes a second side disposed opposite said first side, said second side comprising a paraboloid of electromagnetically reflective material whereby the electromagnetic energy is focused on said cluster of conductors.