

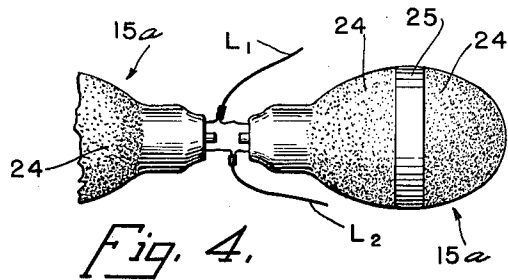
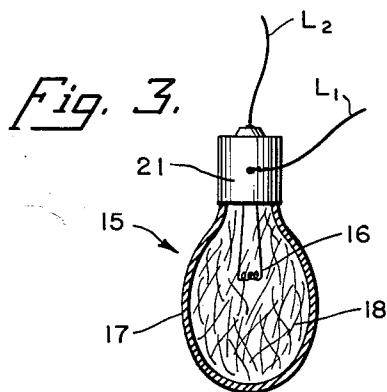
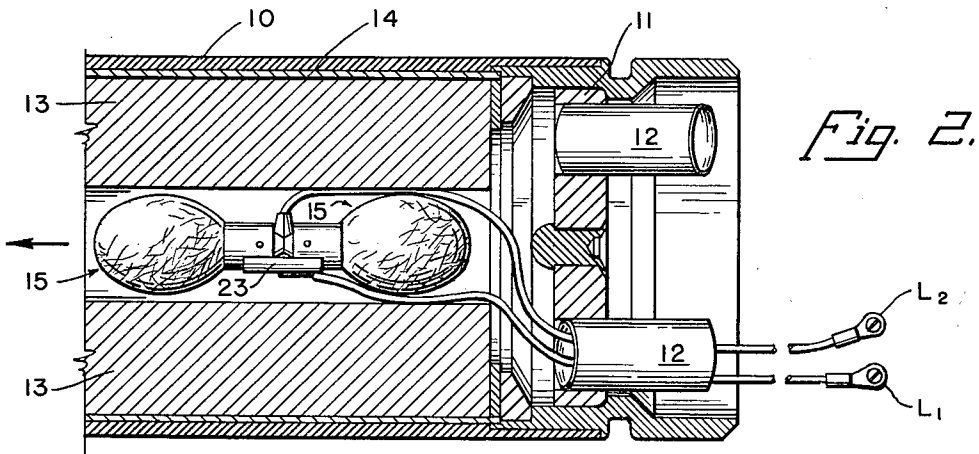
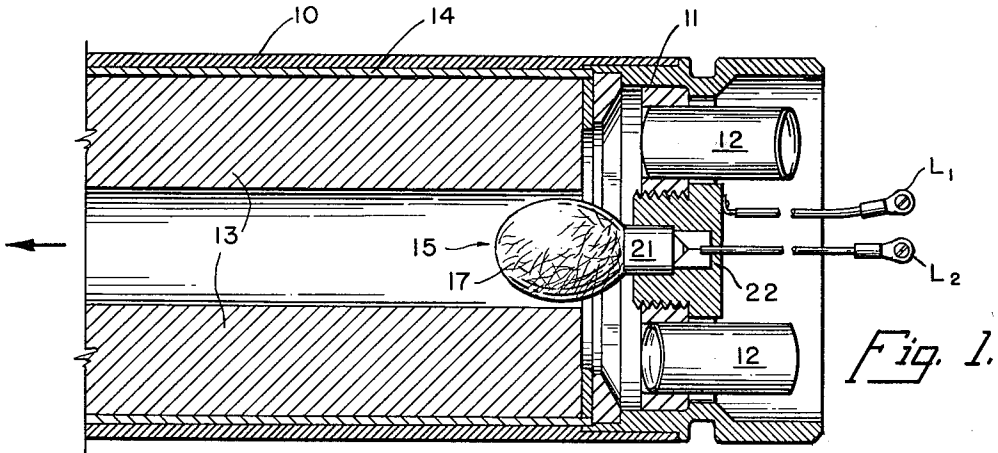
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B. SMITH ET AL

3,167,015

FLASH LAMP IGNITED ROCKET

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FLASH LAMP IGNITED ROCKET

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4 Claims. (Cl. 102—49)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to improvements in the art of igniting propellants, and more particularly to novel methods and apparatus for igniting rocket propellants by radiant energy.

It has been common practice in the prior art to ignite solid propellants in rocket motors by explosive igniters such as black powder. Igniters of this type have not been completely satisfactory since they presented hazards in handling, storing and assembly of the motors, were subject to deterioration, and, due to their explosive nature, in some cases effected injury to the propellants. Additionally, the handling and transportation of such igniters has been subject to certain legal limitations which have necessitated unusual safety precautions.

One of the objects of the invention is to obviate the foregoing disadvantages of igniters of the type referred to by igniting a rocket propellant with an improved radiant energy igniter.

Another object is to provide a hermetically sealed igniter which is constructed to radiate its energy to adjacent surfaces of the propellant.

Another object is to employ conventional photo flash bulbs as rocket igniters.

Another object is to employ conventional photo flash bulbs which have been modified to restrict the radiation therefrom through desired areas of the bulbs.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same become better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a longitudinal cross-section of the rear end of a rocket motor embodying the subject of the invention;

FIG. 2 is a similar section of an alternative form of the invention;

FIG. 3 is a longitudinal section of an igniter employed in FIGS. 1 and 2; and

FIG. 4 is a fragmentary side elevation of an alternative form of igniter.

Referring in detail to the drawing, a conventional rocket motor is illustrated, comprising an outer casing 10, nozzle plate 11 at the rear end thereof, nozzles 12, and a solid propellant grain 13, in the form of a cylindrical tube, encased in a suitable inhibitor 14, all as well understood in the art.

The igniter which is employed with the motor just described comprises a photo flash bulb 15 having a pyrotechnic coated bridge wire 16, connected in series with electric leads L_1 , L_2 , and enclosed in a hermetically sealed glass closure 17 containing air or oxygen and ignitable material 18, such as fine aluminum wires. Bulbs of the type described are commercially available, examples of which are the "Synchropress No. 5" and "Focal Plane No. 6" manufactured by the General Electric Co. of Schenectady, New York.

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FIG. 1 illustrates one adaptation of the invention wherein the metallic base 21 of a bulb is secured to a plug 22 threadedly engaging nozzle plate 11. The igniter is applied to the rocket when desired by applying the plug and its attached bulb to the nozzle plate.

FIG. 2 illustrates another adaptation wherein two bulbs are secured together by a bridge plate 23 soldered to the bases of juxtaposed bulbs and wired in parallel.

FIG. 4 illustrates a modification of FIG. 2 wherein the bulb bases are omitted and the leads L_1 , L_2 , secured directly to the projecting ends of the wires leading to the bridge wire. This construction is preferred in rocket installations wherein discharge of the bases through the rocket nozzles would cause undue restriction of the latter.

FIG. 4 also illustrates a further modification in that each bulb 15a is provided with reflective coatings 24, either on the inside or outside surfaces, to provide a circular transparent band 25 through which the radiant energy of the bulb must pass. As will be apparent, all of the bulb energy emanates through the transparent band and is confined to a disc-like space, the peripheral edge of which is disposed as an annulus on the inside surface of the grain. With this construction the intensity of the radiant energy received by the grain per unit of area of the latter is considerably greater than in the absence of the reflective coating. It will be apparent that the type of bulb just described, with an attached base, such as base 21, may be employed singly in the construction shown in FIG. 1, or in pairs as shown in FIG. 2.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What we claim is:

1. Apparatus comprising; a rocket grain of a material adapted to chemically react and decompose after being ignited, and a photoflash bulb disposed adjacent the grain adapted to ignite the latter, the bulb being provided with a restricted zone through which substantially all of its energy must radiate.

2. Apparatus comprising; a material adapted to chemically react and decompose after being ignited, and means for igniting the material comprising, a photoflash bulb enclosing a space and having a restricted zone through which substantially all of its energy must radiate, the bulb being disposed relative to the material so that the latter receives a greater amount of energy per unit area of same than would be received through the entire area enclosing said space.

3. Apparatus in accordance with claim 2 wherein the bulb is provided with light reflecting surfaces except at said zone.

4. Apparatus in accordance with claim 3 wherein said zone is a circular band around the bulb.

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