July 21, 1953 B. T. BOGARD 2,645,999

NOZZLE CLOSURE-CONTACT RING ASSEMBLY FOR ROCKETS

Filed July 18, 1947

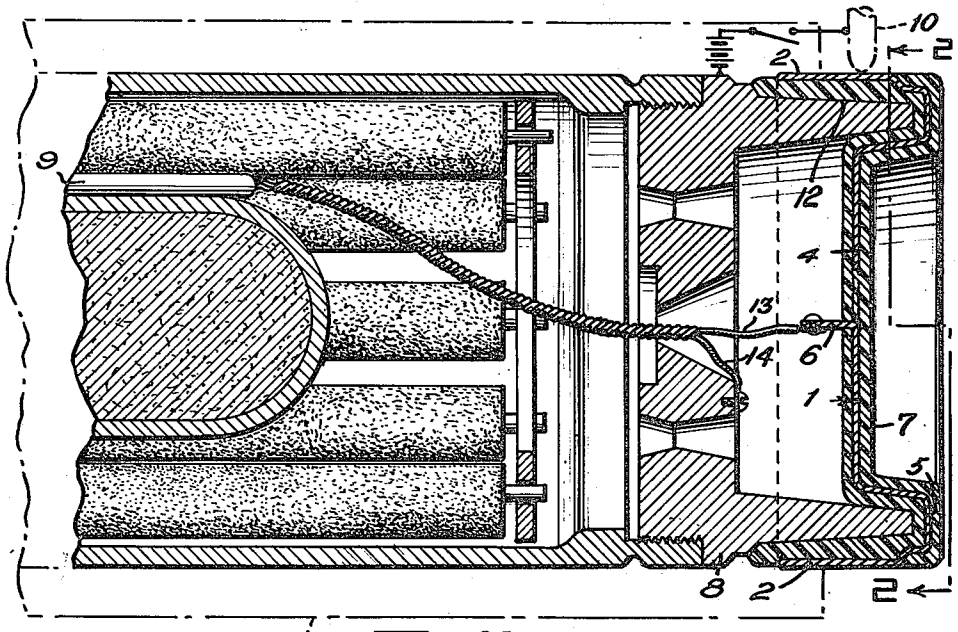


Fig. 1.

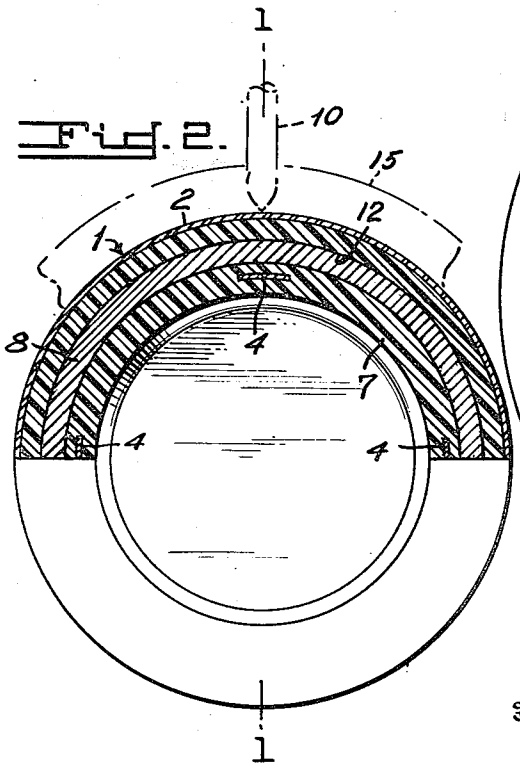


Fig. 2.

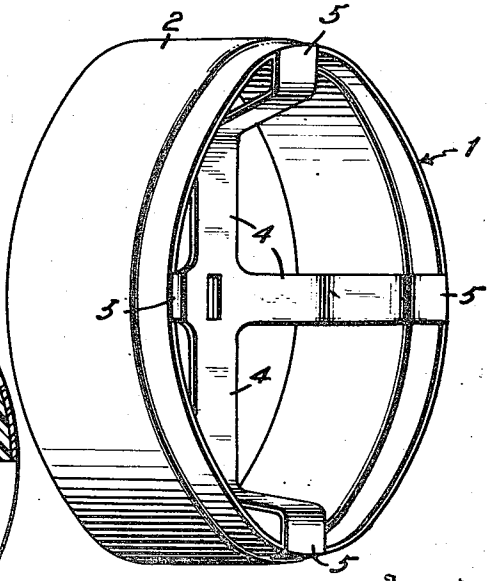


Fig. 3.

Inventor

Ben T. Bogard

By J. H. Church + W. E. Thibodeau

Attorneys

Patented July 21, 1953

2,645,999

UNITED STATES PATENT OFFICE

2,645,999

NOZZLE CLOSURE-CONTACT RING ASSEMBLY FOR ROCKETS

Ben T. Bogard, Ruston, La.

Application July 18, 1947, Serial No. 761,897

1 Claim. (Cl. 102—49)

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

1

The invention described in the following specification and claim may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to rockets, generally, and, in particular to a nozzle closure therefor incorporating an electrical contact ring.

In the past development of rockets the problems of a contact ring assembly and of a satisfactory nozzle closure have been matters of some concern. The greatest difficulty encountered with the contact ring assembly was the decrease in range of the rocket occasioned thereby, amounting to as much as one-fifth of the maximum obtainable range. Nozzle closures have been unsatisfactory due to the characteristics of the materials used and the ease with which the closure could be dislodged from the rocket nozzle during ordinary handling, shipping and storage.

The present invention obviates these difficulties while combining in a unitary structure the contact ring and the nozzle closure.

It is therefore an object of the invention to provide a nozzle closure for a rocket which is secure and reliable and to improve the performance thereof with respect to its contact ring.

To these and other ends, reference is had to the accompanying specification and to the drawings in which:

Fig. 1 is a longitudinal section along the line 1—1 of Fig. 2;

Fig. 2 is a view along the line, 2—2 of Fig. 1; and

Fig. 3 is a perspective view of the metal spider including the contact ring.

The novel closure comprises a generally cup-shaped metallic member 1 having a cylindrical wall 2 and a reentrant bottom preferably of open-work form and comprising spiders 4 having coplanar portions 5. A portion 6 is struck at the intersection of the spiders to provide an electric lead.

The unit is completed by placing the stamped metal ring or cup, which is preferably of the order of 0.022 inch in thickness, in a pressure mold and molding plastic 7 around it in a manner to leave exposed the side portion 2 and to provide a trough 12 in a tapered form. The plastic will cover the hole left by the struck portion 6 but will leave a portion of 6 exposed. The plastic is preferably of high impact strength. Thermoplastic or thermosetting plastic may be used, the former being easier to mold and otherwise satisfactory even though its expansion coefficient is extremely great in comparison to the steel of the rocket. The framework around which

2

the plastic is molded tends to hold the plastic tightly against the surface of the nozzle plate 8 on which it bears. The closure is cemented to the nozzle plate over the entire bearing areas.

The ungrounded side of the electrical circuit from the source of E. M. F. to the ignitor squib 9 is made through the exposed section 2 of the member 1 through a contact 10 thence to the struck portion 6, to which one squib lead terminal is riveted or otherwise fixed before the assembly is cemented to the nozzle plate, through the lead 13, and from the squid and through return wire 14 to ground. A projector tube is shown in phantom at 15.

It is thus seen that the novel assembly combines the nozzle closure and contact ring, into one unit which is blown off at the time the rocket is fired. The contact ring having been cleared of the rocket cannot add drag which so materially reduced the range of rockets which carry the contact ring with them. An additional advantage is that a plastic closure which gives a better and more permanent fit is made possible by the additional strengthening function of the contact ring. The closure can withstand greater mistreatment in handling and storage and is not as likely to be dislodged due to contraction and expansion forces caused by temperature variations, a factor which has caused the greatest trouble in the use of purely plastic closures.

Having thus described my invention, what I desire to claim as new and secure by Letters Patent is:

A nozzle closure for rockets comprising a plastic cup of generally cylindrical outer walls, an opened end and a closed bottom, a central inwardly elevated portion in said bottom having tapered walls, and tapered inner portions on said outer walls to provide an annular trough of downwardly diminishing width to snugly encompass the rim of a rocket nozzle, and a metal skeleton embedded in said cup having an outwardly exposed band portion peripherally of said outer walls, and having a struck portion centrally of said bottom exposed within the cup.

BEN T. BOGARD.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,299,466	Coffman	Oct. 20, 1942
2,335,763	Imber	Nov. 30, 1943

FOREIGN PATENTS

Number	Country	Date
14,000	Great Britain	1896
540,559	Great Britain	Oct. 22, 1941