Dec. 13, 1960 C W. MUSSER 2,963,975

CLOUD SEEDING CARBON DIOXIDE BULLET

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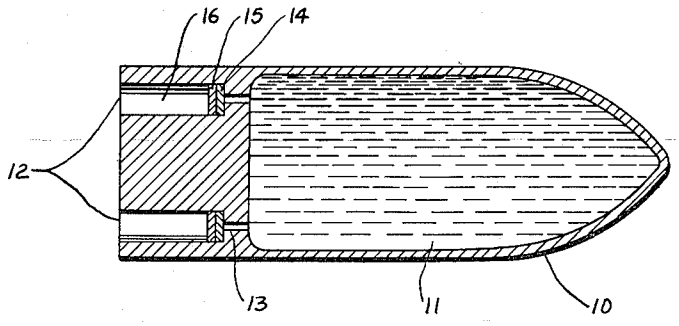

FIG. 1.

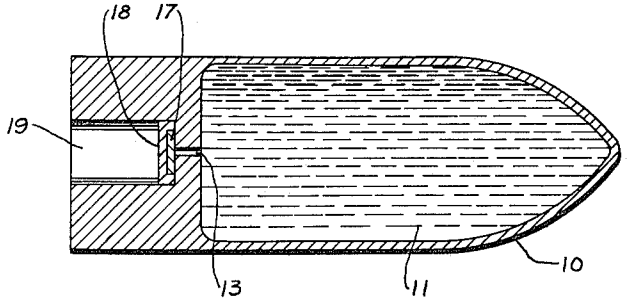

FIG. 2.

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CLOUD SEEDING CARBON DIOXIDE BULLET

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4 Claims. (Cl. 102—90)

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

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to cloud seeding bullets, and more particularly to a cloud seeding bullet of the type wherein liquid carbon dioxide under pressure is released through one or more metering holes at some time after it leaves the gun from which it is fired.

In a cloud seeding operation of this character, it is desirable to know the location of the seeding material with respect to the cloud. The cloud seeding bullets heretofore available have not included any means for making such information available. The present invention overcomes this difficulty by the provision of a tracer compound seal which functions to visualize the course of the bullet and eventually to release the seeding material.

The invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope is indicated by the appended claims.

Referring to the drawings:

Fig. 1 illustrates a preferred form of the invention, and

Fig. 2 illustrates a modification wherein a single metering aperture is provided for the exit of the seeding material.

The cloud seeding bullet of Fig. 1 includes a casing **10** which has at one end a chamber **11** containing liquid carbon dioxide under a pressure of the order of 1000 pounds per square inch. At the other end of the casing **10** is a chamber **12** in the form of an annulus. Interconnecting these two chambers are a plurality of metering apertures **13**. In the manufacture of the bullet, these apertures are closed by a seal which includes an annulus **14** of steel or other non-plastic material, an annulus **15** of an elastomer or plastic material, and an annulus **16** of a tracer compound compressed to a pressure of the order 80,000 pounds per square inch.

The modification of Fig. 2 is similar to that of Fig. 1 in several respects as is indicated by the reference numerals common to these two figures. It differs from that

of Fig. 1 in that it includes a single metering aperture and certain elements of the seal are different. Thus the seal of Fig. 2 includes a metallic member **17**, a neoprene layer **18** and a plug **19** of tracer compound compressed as previously indicated.

Of the two above described forms of the invention, the first is to be preferred if the liquod carbon dioxide is to be sprayed into the cloud.

Both the described modifications have the advantage that the seeding material is released at a predetermined time after the bullet is fired and the course of the bullet is clearly indicated so that the position of this material with respect to the cloud is immediately known. The time delay between the firing of the bullet and the release of the liquid carbon dioxide is determined by (1) the axial length of the annular chamber **12**, and (2) the pressure to which the tracer compound annulus **16** is subjected. The tracer compound starts to burn when the bullet is fired. As it burns, its pressure withstanding ability decreases. Finally its ability to withstand pressure is reduced to a point where the liquid carbon dioxide is ejected through the metering orifices **13**.

I claim:

1. A cloud seeding bullet having in its front end a chamber and in its rear end a longitudinal recess, means forming a metering aperture between said chamber and said recess, liquid carbon dioxide compressed in said chamber at a relatively low pressure, and sealing means including a tracer compound compressed in said recess at a relatively high pressure, said tracer being ignitable upon the firing of said bullet and having a burning time dependent on a desired time delay between the firing of said bullet and the release of said liquid carbon dioxide.

2. A bullet according to claim 1 wherein the pressure of said liquid carbon dioxide is of the order of 1000 pounds per square inch and the pressure of said sealing means is of the order of 80,000 pounds per square inch.

3. A bullet according to claim 1 wherein said sealing means includes a metallic disk adjacent said aperture and a layer of neoprene between said disk and said tracer compound.

4. A bullet according to claim 1 wherein said sealing means includes an inner layer of non-plastic material and an intermediate layer of soft plastic material.

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