

UNITED STATES PATENT OFFICE

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SPONTANEOUS IGNITION OF GASOLINE AND NITRIC ACID

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This invention relates to reaction type motors and more particularly to novel materials for initiating combustion therein.

Gasoline and fuming nitric acid react violently, once the mixture has been ignited, to produce large quantities of gaseous products. When the reaction is carried out in an open-ended chamber, the gas so generated may be expelled from the open end with considerable force. This force, in general, can offer at least supplementary propulsion means to any vehicle, such as an airplane, to which the reaction chamber is attached. Various methods and materials have been used to initiate the reaction between gasoline and fuming nitric acid. One such method utilizes the reaction which occurs on mixing turpentine with fuming nitric acid. However, turpentine has not proven altogether satisfactory for this purpose, since it tends to build up to a certain extent in the reaction chamber before ignition with the acid occurs. This gives rise to a rough and rather violent explosive action which is not of the type desired, for the unit becomes more efficient when the reaction proceeds smoothly and with instantaneous ignition of the reaction elements.

It is therefore an object of this invention to provide a means of improving the combustion of gasoline by fuming nitric acid. A more particular object is to bring about a better reaction between fuming nitric acid and a turpentine solution by increasing the efficiency and smoothness of the ignition of these materials.

I have found that the operation of a reaction type motor employing gasoline and fuming nitric acid as fuels may be greatly improved by initiating the ignition process by bringing together a quantity of said fuming nitric acid with a solution in turpentine of at least one of the various compounds known as Du Pont S. D. O. materials. These S. D. O. materials are synthetic drying oils made up in large part of acetylene polymers, and they are soluble in turpentine. Successful tests were made using turpentine and a commercial solution of each of the materials known as S. D. O. 80, S. D. O. 8b, and S. D. O. 61. The ignition obtained in each of these tests was smooth and instantaneous, and such ignition served to initiate a sustained good reaction, or combustion, between the fuming nitric acid and the gasoline added after the reaction had thus been started. The S. D. O. compounds are products of the E. I. du Pont de Nemours and Company, Wilmington, Delaware, though products of other concerns, of substantially the same composition, no doubt

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would give equally good results. The term "S. D. O. material" as employed herein is intended to compose all compounds of this general type and composition, whether made by the du Pont Company or not.

No particular limits can be set with reference to the S. D. O. ingredient of the turpentine solution. These materials are commercially available and, for example, S. D. O. 61 exists as a solution comprising about 60 per cent of the acetylene polymers and 40 per cent of a coal-tar naphtha ingredient. Such a solution is preferably used in about equal volume with turpentine, thereby giving rise to a solution made up of about 30 per cent of the S. D. O. ingredient, 20 per cent coal-tar naphtha, and 50 per cent turpentine. The ratio of these ingredients may be varied in considerable measure, but one skilled in the art can readily determine the proper proportions for any given conditions by observing the ignition which occurs in the reaction chamber under the particular conditions of operation desired.

The ratio of S. D. O.-turpentine solution to the fuming nitric acid introduced to initiate the reaction forms no part of this invention, this ratio being generally similar to that observed when using only turpentine as the igniting ingredient with nitric acid. However, good results have been obtained through the use, during the initial ignition step, of about 2 to 6 parts of acid for each part of the S. D. O.-turpentine, coal-tar naphtha solution described in the preceding paragraph.

In the usual practice of the invention, the S. D. O.-turpentine solution is continuously added for a short interval after combustion has begun between the gasoline and the fuming nitric acid. Subsequent cutting off the supply of S. D. O.-turpentine solution does not interfere with the combustion of the other ingredients. However, successful results have also been achieved by substantially cutting off the supply of S. D. O.-turpentine solution with the arrival of the first amounts of the gasoline.

Within the scope of the appended claims, various modifications and changes in the nature and proportions of the ingredients may be made by those skilled in the art without departing from the nature of the invention.

What is claimed is:

1. The method of initiating combustion in a reaction type motor, comprising bringing together fuming nitric acid, turpentine, and a synthetic drying oil substantially comprising acetylene polymers, said method being characterized

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by the smooth and instantaneous combustion of the materials so brought together.

2. The method of initiating combustion in a reaction type motor, comprising bringing together in said motor fuming nitric acid and a solution containing turpentine and a synthetic drying oil substantially comprising acetylene polymers, said method being characterized by the smooth and instantaneous combustion of the materials so brought together.

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