CHEMISTRY

Tung Oil Replacement

Pentaerythritol, that puts the bang in bazooka, will have major peacetime use in varnishes and resins. Much less expensive than tung oil.

➤ THE same stuff that puts such a "bang" in the bazooka's tank-killing rocket projectiles, given different chemical handling, becomes an excellent material for varnishes and other coating resins, at least partially replacing the war-scarce tung oil.

The compound's name is pentaerythritol. Although it is a dry white powder at ordinary temperatures, it is chemically classified as an alcohol. It is made synthetically from formaldehyde and acetaldehyde, which themselves are synthetic compounds, so that its supply is not so likely to be diminished or disturbed by either war or weather as are supplies of imported natural products like tung oil.

Moreover, it is relatively low-priced. In 1940, drying oils based on pentaerythritol could be bought for 11 to 15 cents a pound, while tung oil was selling at 18 to 24 cents a pound. Since war demands have brought about a great increase in pentaerythritol production, it is likely that this favorable price differential can be increased when it is no longer needed for loading rockets, shells and mines.

As used in bazooka projectiles and other military missiles, the compound has four nitrogen-containing atomic groups attached to it. These convert it into pentaerythritol tetranitrate, referred to as PETN for convenience; this is an explosive so violent that TNT is usually added to it to slow it down a little, and make it less "touchy".

For use as a varnish, pentaerythritol is combined with rosin acids, fatty acids or other organic chemicals. Thus treated, it is said to be able to hold its own in competition with the older coatings made with tung or other vegetable oils.

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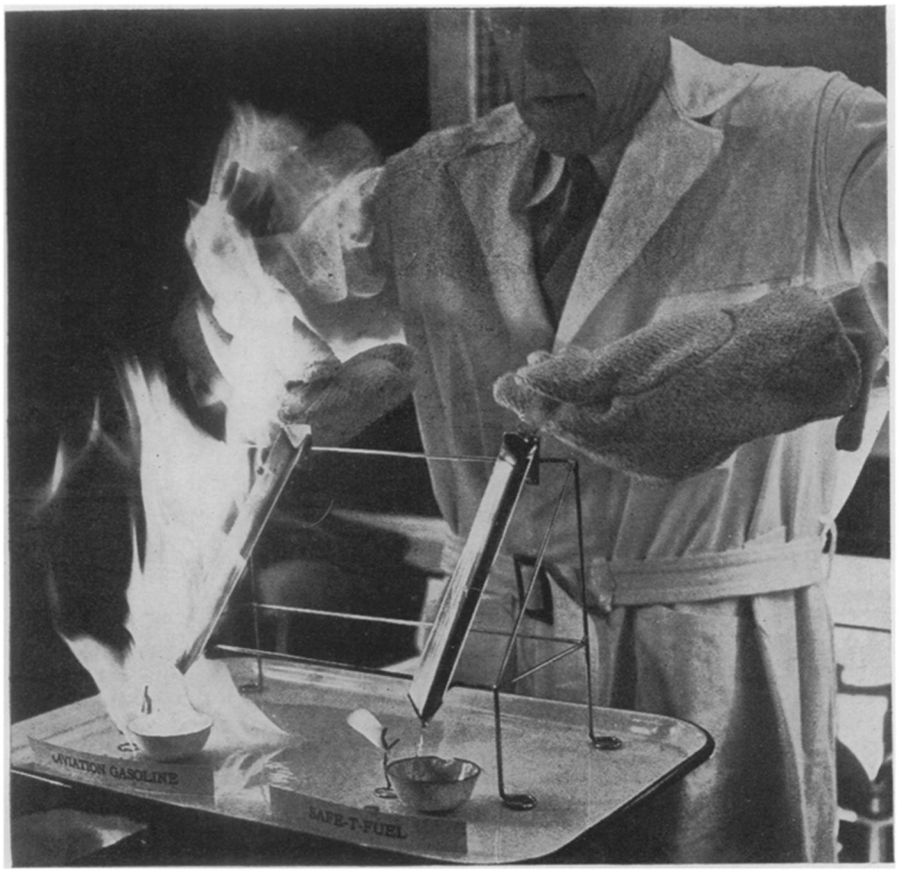

SAFETY GAS—On the right is the new fuel produced by the Standard Oil Company, New Jersey. The safety feature is due to the fact that inflammable vapors are not produced in large quantities in the air. When a match is dropped into ordinary gas (left), a fire results.

CHEMISTRY

Lighted Match Can Be Put Into New Safety Fuel

➤ A NEW safety fuel for aircraft, so resistant to accidental ignition that a lighted match can be dropped into it without causing a fire, was announced and its properties demonstrated to a group of scientists in New York. It has all the power of 100 octane fuel, extended tests in a high-powered airplane engine show.

The new safety fuel is a development of the Standard Oil Company of New Jersey, and the demonstration was made by technical men of that company and of Pan American World Airways. The chief engineer of the latter company pronounced it to be "an important technical advance in aviation."

The safety feature of the new fuel is due to the fact that it does not form inflammable vapors in the air in great enough quantities to ignite, unless it is at temperatures above 100 degrees Fahrenheit. Ordinary motor and aircraft gasolines do, and they ignite readily and burn rapidly because of the vapors formed.

The new fuel, however, must be fed into the engine by direct injection rather than by ordinary carburetion such as is used with conventional gasolines. Unless suitable carburetors are developed, engines now in use will have to be converted for fuel injection if the new fuel is to be used. After the fuel is injected in the cylinder, it is vaporized by the heat developed during compression. The fuel mixture is fired by the conventional spark plug.

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Gallium, a little known chemical element, is 150 times as abundant as silver.

Expansion spaces between the ends of the rails on a railroad are not necessary if the rails are welded and rigidly confined against buckling; the rails merely develop compression in heat and tension in cold, but both within safe limits.