CHEMISTRY

Discovery by Accident

A new process for making smokeless powder helps keep peak efficiency in all climates. A new speed record in powder production made possible by discovery.

➤ SMOKELESS POWDER that keeps up peak hitting power indefinitely in any climate is now ready for use by the armed forces. How a laboratory accident led to a new process for making stable nitrocellulose for smokeless powder was announced by Spencer T. Olin, vice president of the Western Cartridge Company.

Hundreds of carefully controlled experiments were made by Dr. Fred Olsen, technical director of the company, and his associates in attempting to purify nitrocellulose. Their aim was to remove the tiny particles of sufuric and nitric acids which remain in wood or cotton fibers after they are treated to produce nitrocellulose in the conventional manner.

One night in the laboratory, after Dr. Olsen had run out of distilled water, he filled a test tube containing nitrocellulose with water from the tap in the sink. To his dismay the water was filled with rust that had scaled off the inside of the pipes in the water heater.

Then he noticed that impure nitrocellulose treated with rusty water produced a more stable explosive than he had ever previously obtained.

Realizing that the rust behaved like a dye and that the instability of nitrocellulose was related to how tightly certain impurities were held by it, Dr. Olsen started a new series of experiments, based on stabilization by means of dyes.

After producing nitrocellulose in every shade of the rainbow, he hit upon a colorless amine compound, called diphenylamine, which worked perfectly.

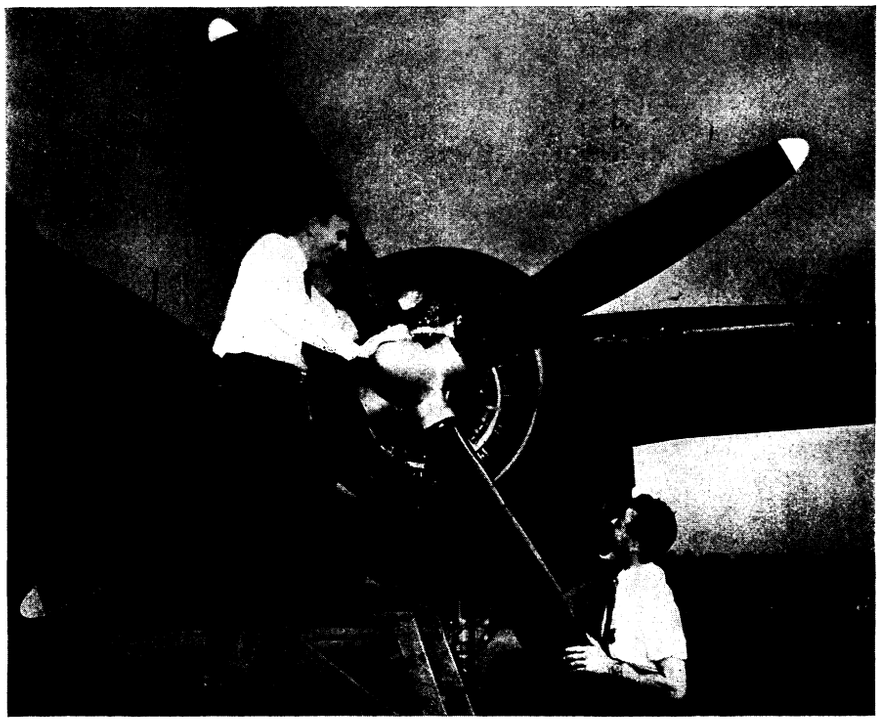
Although this chemical was always used in the later stages of smokeless powder production, it had never been used to chase the impurities out of the nitrocellulose in the early stages of manufacture.

Discovery of purified nitrocellulose in turn led to a five-fold speed-up in making smokeless ball powder.

Recently a batch of raw cotton was nitrated at nine o'clock in the morning and at three that afternoon cartridges loaded with the stable ball powder were fired on the testing range, an achievement claimed to be the fastest production of smokeless powder in history.

Now in production with the short-cut process, Western Cartridge officials report that more than a billion rounds of pistol, rifle, carbine and machine-gun ammunition for United Nations forces have already been turned out.

Science News Letter, July 10, 1943



SYNCHRONIZER—A simplified propeller control system, indicated by the Curtiss-Wright chief engineer on the left, enables a bomber pilot, by turning a single knob, to obtain the desired engine speed for maximum efficiency and at the same time automatically to synchronize all the four engines at this speed. Formerly four separate levers had to be manipulated.

PSYCHOLOGY—PHYSIOLOGY

Electrical Test Maps Area Affected by Nerve Injuries

➤ RECOVERY from war wounds and accidents in civilian life involving damage to nerves of arms or legs should be better as a result of a test reported by Dr. Curt P. Richter and Dr. David T. Katz, of Johns Hopkins Hospital (*Journal of the American Medical Association,* July 3).

The test maps the areas of the skin which have a higher electrical resistance than normal. A high electrical resistance over the skin area affected by a nerve shows that that nerve has been cut. If the surgeon performs the test before he starts to repair a wound, he can determine which nerves have been injured and how badly. Without such knowledge, the surgeon may not know that certain nerves have been cut. The wound may heal, but the patient be left with no feeling in part of a hand or foot and, worse still, without the use of fingers or toes.

Besides being "simple, accurate and practical," the test has the advantage of not requiring the patient's cooperation. This is important in case of war wounds and civilian accidents because the patients are usually too shocked to be able to tell accurately where they can feel a pin prick or the touch of a bit of cotton and where they cannot. The pin prick and cotton tests are common methods of trying to determine areas affected by peripheral nerve injuries.

The method of electrical skin resistance mapping is, roughly, to fasten an electrode on the lobe of one ear and