

battery is re-sealed ready for shipment. Batteries thus treated have been found to retain 75% of the original charge after being in storage for more than a year.

The battery can be used immediately at the battle-front after distilled water and acid have been added.

The new method reduces the danger of loss of electrical charge from spilling

the acid mixture in transit. Freight charges are lower too, because of the reduced weight due to elimination of the acid and water mixture.

This new battery development will make possible large shipments of batteries in the postwar world without the weekly recharge that is now necessary.

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robot plane reached its predetermined destination. The electric motor and the explosive units were separate. When the plane was over the target, the explosive charge was released, as a modern bomber now drops its load.

Foreseeing that the robot plane might be shot down by enemy aircraft, Sperry included a special mechanism which would cause the entire plane to explode if brought down before it reached its destination "so that the chance of doing damage to the enemy is greatly enhanced." U. S. patent 1,670,641 was granted on Mr. Sperry's invention on May 22, 1928.

A second patent application was made April 25, 1919, by Dr. Charles F. Kettering, now chairman of the National Inventors Council and Vice-President of General Motors Corporation, for an aerial torpedo.

Dr. Kettering's aerial torpedo is described in the patent application as, "... carrying a large charge of explosive, and having control mechanism adapted so to direct its movement that it may be caused to travel over a desired path and land upon a predetermined objective."

The mechanism had a biplane type fuselage, and was thrust through the air by a two-cycle gasoline motor operating a propeller. A gyroscopic compass controlled the altitude and direction in flight.

The Kettering aerial torpedo carried several hundred pounds of explosives. Like the modern German robot planes, it was launched from an inclined plane, or from a catapult. The torpedo was held to the catapult by a thin wire, just sufficiently strong to keep it from jumping off when the motor was turned on. As soon as the motor had developed suffi-

AERONAUTICS

Robot Planes Not New

Two decades ago, the Army had unmanned, bomb-carrying planes that were, on the whole, successful. They did not have jet propulsion.

► OVER TWO decades ago the U. S. Army had experimental models of unmanned, gyroscope-steered, bomb-carrying planes that as a whole were successful, but the experiments were discontinued because of the plane's inaccuracy in reaching specific targets.

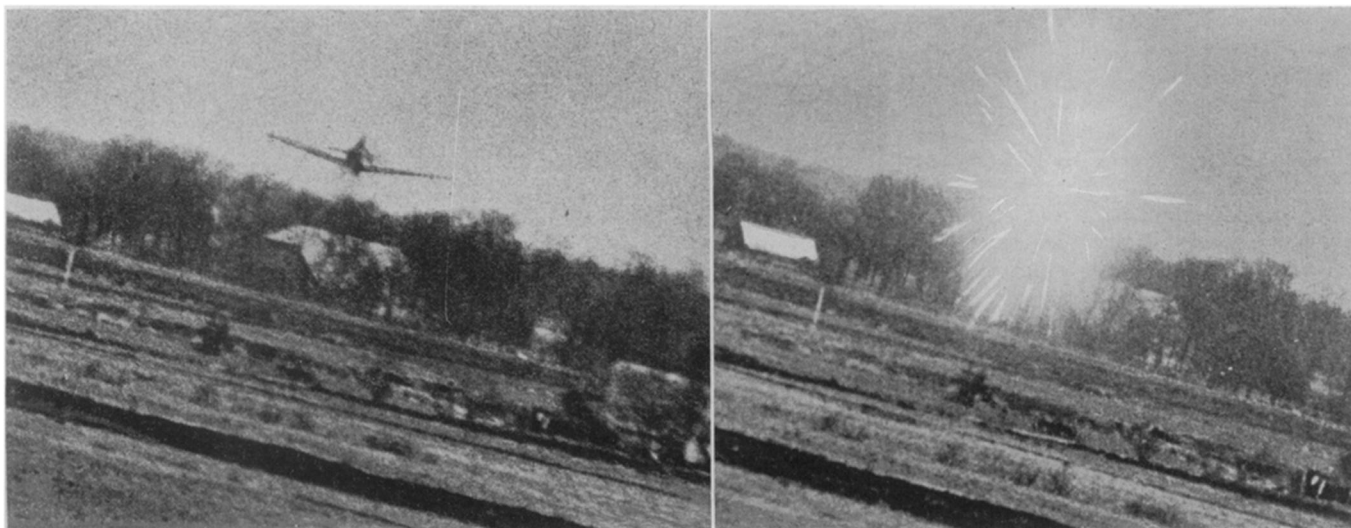
An Army photograph of one of these models published a few months ago (see *SNL*, Jan. 1, 1944) shows that its appearance was not unlike the reported

German pilotless planes now being directed at England. The early American flying bombs were propelled by a propeller driven by an engine, not by jet propulsion. It was a biplane, not a monoplane.

The records in the U. S. Patent Office also show that robot planes were invented here in America as early as 1918 at the time of the first world war. The Office of War Information issued information supplied by the National Inventors Council and the U. S. Patent Office of the U. S. Department of Commerce which details two early inventions.

On April 18, 1918, the late Lawrence Burt Sperry, of the Sperry Gyroscope Company, filed an application with the U. S. Patent Office for a gyroscope robot plane. Sperry's plane was driven by an electric motor, and was so controlled that it could change course in flight. It carried a heavy load of explosives which was automatically detonated when the

FLAMING PLANE—*These pictures, taken by a camera installed under the guns in the nose of a plane (see SNL for June 10, p. 371), tell the death story of one Nazi plane. The left picture shows the aircraft skimming the tree tops before the hit. To the right, the Nazi craft is seen exploding in mid-air from shells shot from the same gun that was synchronized with the camera.*



cient speed to sustain the torpedo in air, the launching wire would break and the plane take to the sky. U. S. Patent 1,623,121 was granted for the aerial torpedo on April 5, 1927.

It seems that the only new thing that

the Germans have done with their robot bombs is to replace the electric motor and gasoline motor with jet propulsion, which, by the way, was first developed by an Englishman.

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ties of better synthetics within two to four years.

The current tire shortage will be offset, so far as commercial vehicle needs are concerned, by growing production of increasingly better synthetic tires which will give good service but which will demand better care, curtailed vehicle operating speeds in warm weather, and reduced loads, Mr. Hale predicted.

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ENGINEERING

Fast Vulcanizing

A new electronic device for tire-repair does the process in only 10 minutes in combat areas. Expected to make postwar tires give 100,000 miles of service.

► A NEW tire-vulcanizing device employing electronic principles has been developed which makes it possible to complete major tire repairs in 10 minutes in combat zones.

This device, which promises to aid in extending the service life of postwar tires to 100,000 miles, was announced by Lt. Col. C. W. Vogt, Chief, Technical Staff of Supply, Transportation Corps, U. S. Army, at the meeting of the Society of Automotive Engineers in Philadelphia.

The 500-pound mobile military unit, designed to effect repairs at any time and replace Army tire-repair equipment weighing tons and taking hours to operate, was developed after reports from overseas revealed the existing equipment was too slow and unsatisfactory.

The device consists of a press ram equipped with an electrode connected with a high-frequency generator, and a press frame. The electronic energy develops internal heat within the tire, similar to the heat created by short-wave dia-

thermy equipment used in medicine. Spot patches can be made in a matter of minutes.

The ram and frame, fitted with cloth bags, which adjust themselves under pressure to the contour of the tire, eliminate the use of heavy, costly molds, and enable repairs to be made on any size tire. The use of internal heat obviates present vulcanizing hazards such as destructive over-heating of the rest of the tire when making a patch.

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Better Synthetic Tires

► WARTIME manufacturing methods promise to produce synthetic rubber tires in the postwar world that are low in cost, and of better quality than those which are being made today, J. E. Hale, of the Firestone Tire and Rubber Company, told the meeting.

He expressed the opinion that engineering and chemistry will develop the use of synthetic rubber, and new varie-

Engine Sludge Prevented

► FOUR STEPS to avoid dangers resulting from the formation of hot engine sludge in motor vehicles were recommended by H. C. Mougey, of Research Laboratories Division, General Motors Corporation, at the national transportation and maintenance meeting of the Society of Automotive Engineers.

The four steps include the application of oil filters to remove the sludge as it forms; adequate temperature control to prevent excessive heat which causes oil oxidation and sludge formation, without permitting engine temperatures to get so low as to form low-heat sludge; frequent crankcase draining to prevent sludge accumulations from becoming too large; and the use of high quality, heavy duty oils that have good resistance to oxidation.

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FINAL DESTRUCTION—An instant after the explosion, the right tip of the Nazi plane is visible (left); and then a few moments later, nothing is left but a flaming ball of fire plunging to the earth.

