



#### MOST UNCONVENTIONAL

*A rear engine drive chassis and air-cooled power plant incorporating many aviation features and eliminating 551 wearing mechanical parts used in the conventional truck chassis. Engineered by White Motor Co., Cleveland, it is adapted to milk, bread and other home-to-home delivery trucks.*

#### AERONAUTICS

## 500 M.P.H. Airplane Wing Forecast in Research Tests

### New Wind Tunnel Tests of Army Wing Point to Greater Reliability of Tests on Models in Laboratory

**B**EHIND a wall of secrecy engineers of the National Advisory Committee for Aeronautics at Langley Field, Va., are working on the design of an airplane wing suitable for speeds of 500 miles an hour, that will keep the United States in the forefront of military aviation.

With high speed wind tunnels and intricate apparatus the NACA engineers will test models of this wing to determine its drag, lift and other characteristics. Months of work and thousands of dollars will hinge on whether these wind tunnel data give a true indication of the wing's performance in actual flight.

While the NACA is giving out no information about its 500-mile-an-hour wing, its newest report on the flight testing of wings contains the implied assurance that what wind tunnel tests

tell about the new wing will be closely confirmed in real flight.

This new report shows that flight tests on the wing drag of an Army Northrop A-17A attack monoplane checks closely the previous wind tunnel tests. Most important, the tests were carried out at very high Reynolds numbers (an aeronautical term depending on air speed, size of the plane and the viscosity of the air) far beyond those obtained in wind tunnel experiments.

This means that American aeronautical engineers can now be much surer of the accuracy with which they can carry over data on models in the laboratory into real plane conditions in actual flight. It thus gives more assurance to current laboratory work on the 500-mile-an-hour wing. *Science News Letter, October 28, 1939*

#### PHYSICS

## Thermal Pump Uses Heat Not Mechanical Energy

**A**N INGENIOUS "pump" that can compress gases, create vacuums or transfer heat against its normal direction of flow and thus be useful as a refrigerating mechanism, has been invented by the new president of the Carnegie Institution of Washington, Dr. Vannevar Bush.

A patent just issued (No. 2,175,376) describes the new apparatus which Dr. Bush developed while at Massachusetts Institute of Technology in collaboration with Edwin L. Rose, chief engineer of the Waterbury Tool Company.

In contrast to other devices doing a similar job, Dr. Bush's machine uses not mechanical energy but heat energy to accomplish its "pumping" of either gas or heat. Patent rights have been assigned to the Research Corporation, non-profit corporation of New York City, founded to control the proper exploitation of important scientific discoveries.

When used to compress a gas, or transfer heat from a lower to a higher temperature, a substantially constant volume of gas is alternately heated and cooled, thereby alternately raising and lowering its pressure, says the patent.

"In the case of a compressor," continues the patent, "these fluctuations in pressure are utilized to effect the transfer of gas between two regions of different pressure by admitting gas to the system from a region of low pressure when the pressure is low and ejecting gas from the system to a region of high pressure when the pressure is high."

"In the case of the thermal pump, the fluctuations in pressure are utilized to effect corresponding fluctuations in pressure in another but communicating body of gas from which heat is ejected to a region of high thermal potential when the pressure is raised and which is caused to absorb heat from a region of low thermal potential when the pressure is lowered."

Heating of the working substance (a gas) is accomplished by a small burning flame. The system contains a blower to make the working substance flow in the proper directions at the proper times but the patent emphasizes that this blower is used only to control the thermal cycle and does not do mechanical work in compression.

*Science News Letter, October 28, 1939*

Florida has the longest coastline of any State.