

AVIATION

# Slot in Plane Wing Prevents Dangerous "Dead" Air Space

## Better Lift at High Angles, Reduction of Stalling Hazard Expected Through Adoption of Simple Device

**G**ETTING rid of stalled "dead" air by use of an aerial vacuum cleaner system promises to increase materially the rate of climb of aircraft, lessen the danger of stalling in attempts to climb too fast, and decrease the landing speed of airplanes.

How hazardous "dead" air on the upper surfaces of airplane wings is sucked away through a narrow slot on the front upper surface by a vacuum was demonstrated before the meeting of the Institute of Aeronautical Sciences by Eastman N. Jacobs, scientist of the National Advisory Committee for Aeronautics.

By motion pictures made at Langley Field, Va., in an experimental wind tunnel Mr. Jacobs showed with smoke streams how the system of vacuum slots gets rid of the dead air stalled on the top of the wing if an airplane tries to climb too fast.

Using a high speed camera peering through a hole in the wind tunnel, Mr. Jacobs obtained a reel of film showing at what angles of attack of the wings stalling would occur and how much greater this crucial angle becomes when the vacuum cleaner system is used.

Technically the angle of attack is that angle between the horizontal line through the wings as the plane rests on the ground and the line in the direction of the oncoming air stream. The angle of attack varies as a plane climbs or dives. For high angles of attack, the more the nose of the plane points upward the faster it will climb.

### The Stall

Attempts to head upward, increase the angle of attack, and hence climb more rapidly reach a stage, however, where the smooth air streams flowing over the upper wing surface break in turbulence as the oncoming stream rides over "dead" air stalled on the upper wing surface. At this point the lift on the plane is lost and the plane stalls.

In the motion pictures exhibited by Mr. Jacobs it was shown that for high angles of attack where this separation of

the air stream occurred and the model theoretically "stalled," the condition could be removed by the use of the front edge slot with its partial vacuum. Dead air causing the condition was dragged into the slot and the smooth air flow over the wing was resumed.

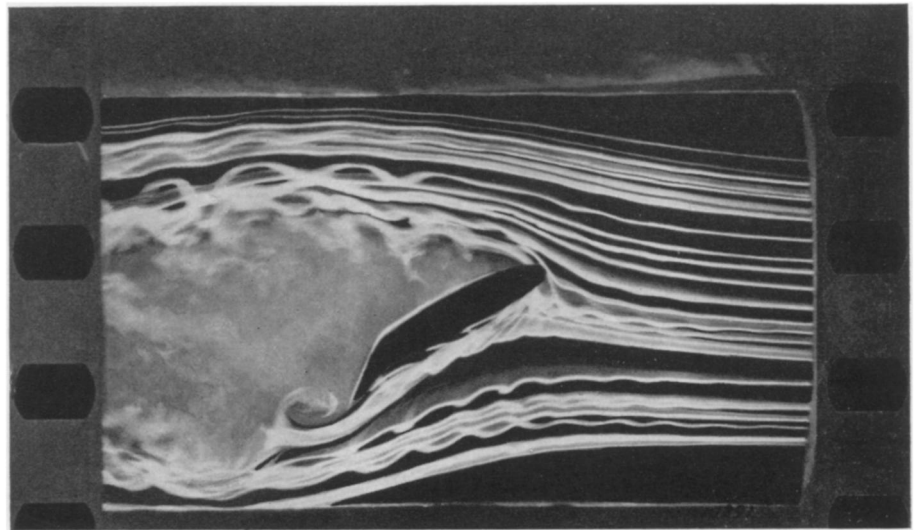
The two accompanying views show how use of this aerial vacuum cleaner

system breaks up dead, trapped air on airplane wings which leads to stalling in aircraft. The upper picture shows the splitting of the air stream over the upper wing surface as the stream overrides the stalled, dead eddies formed when a plane tries to climb too fast.

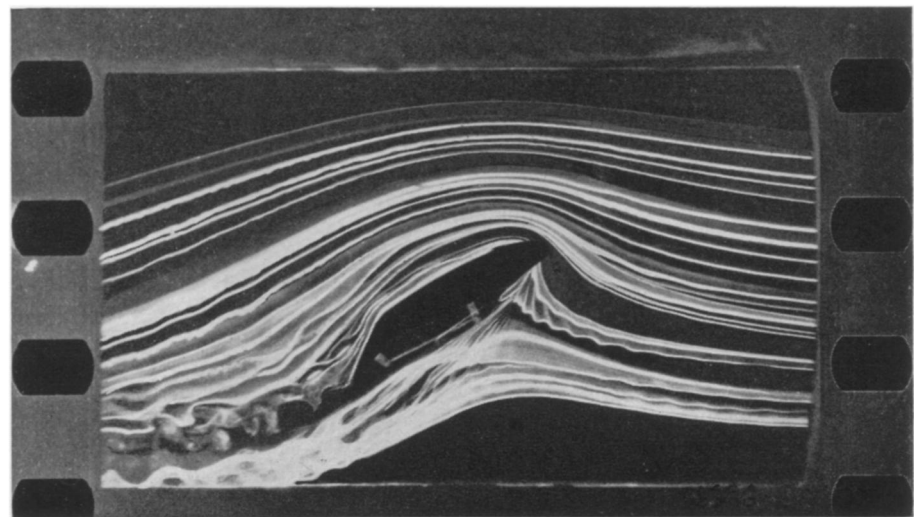
The lower picture shows smooth air stream formed again when a narrow vacuum slot on front upper edge of wing sucks away the stalled air. The pictures were taken by Eastman N. Jacobs, scientist of the National Advisory Committee for Aeronautics at Langley Field, Va.

*Science News Letter, February 9, 1935*

Winds traveling 100 miles an hour have been registered by the wind gauge on top of the Empire State building, 1,265 feet above New York's streets.



WHEN A PLANE STALLS



STALL PREVENTED