OPTICS

Electronic "Brain"

A new computing gunsight increases the effective range of the Air Forces machine guns, giving them an accuracy approaching that of stationary guns.

➤ A NEW electronic computing gunsight that increases the effective range of the Army Air Forces' .50-caliber machine guns, making it possible for gunners to shoot down the fastest enemy planes with an accuracy approaching that of stationary guns firing at stationary targets, was revealed by Erwin Hale, engineer in charge of airborne fire control instruments of the Fairchild Camera and Instrument Corporation, New York, at the meeting of the Institute of the Aeronautical Sciences, held in Dayton.

The newest of the "electronic brains", designated by the Army as the "K-8" gunsight, was invented jointly by Mr. Hale and Irving Doyle, another Fairchild engineer. It extends the effective range of .50-caliber machine guns mounted on aircraft to more than 1,000 yards. As much as 50% to 90% as many hits have been obtained with the K-8 as when firing at a stationary target from a stationary platform, Mr. Hale reported.

"When it is realized that a pursuit ship must come within 200 to 400 yards of a bomber in order to score effective hits, it is readily apparent that the K-8 provides a really deadly defense against pursuit attack," Mr. Hale remarked.

Installed in aircraft gun turrets, the K-8's provide the correct deflection between the line of sight and the guns to insure hits on enemy aircraft. It is only necessary for the gunner to keep the ring of light in the sight lined up with the target to set up the correct deflection of the gun to compensate for all factors which affect the course of the bullet in flight and to provide the necessary lead to compensate for the enemy aircraft's relative velocity.

All computations are made electrically, and the final voltage representing the desired offset between the line of sight and the gun is then sent to an electronic servo system, which adjusts the guns to the desired offset.

In referring to the differences between the Fairchild sight and the similar type of gunsight developed by the British and now in production in this country, Mr. Hale stated that because development of the British sight began at a later date than the Fairchild sight it "does not provide as complete a solution to the problem."

Electronic gunsights cost less to manufacture than mechanical gunsights, Mr. Hale pointed out, since many parts of the electrical computer are standard radio equipment and a large part of the assembly work consists of wiring up the various units in proper combination, requiring less skilled help than is needed for mechanical sights.

Another advantage of the electronic gunsight is that computations are made instantaneously, a matter of great importance when the gunner is dealing with enemy aircraft moving at speeds of 300 to 400 miles an hour, and bullet velocities of 2,700 feet a second.

Predicting a postwar use for electronic gunsights, Mr. Hale pointed out that they are adaptable for solving complex mathematical problems involving several variables which are difficult or impossible to handle by mechanical means. These gunsights can be adapted to obtain accurate solutions to such problems without time lag and with a minimum of equipment and expense.

Science News Letter, November 18, 1944

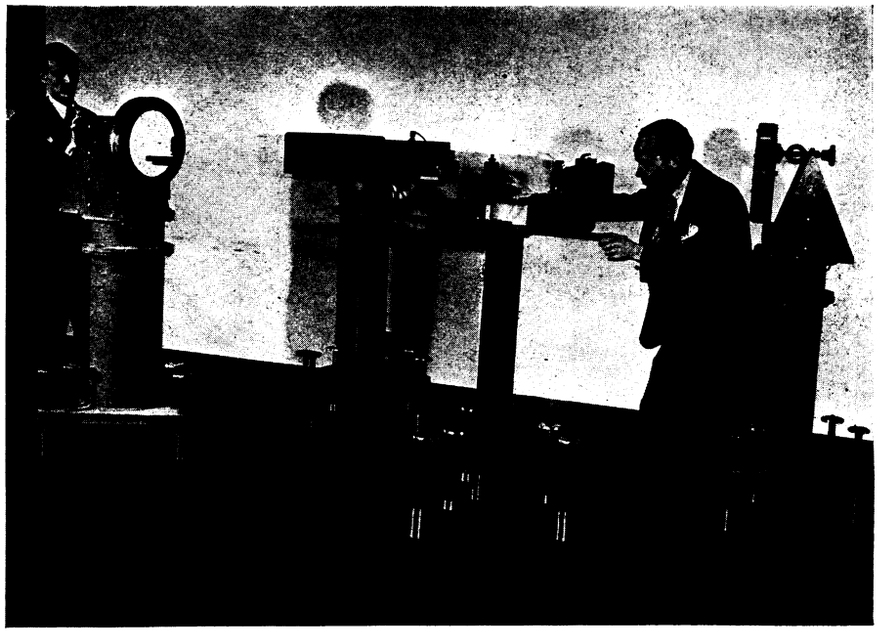
ORDNANCE

New Explosive Bullet Is Subject of Invention

➤ A NEW type of explosive or incendiary bullet is the joint invention of an officer and a civilian, Col. W. T. Moore, U. S. Army, and Richard N. Nelson of Black River Falls, Wis., employed in the Ordnance Division. The core of a jacketed bullet is made hollow, to receive the explosive charge. Between the core and the nose of the jacket is a small hollow space, through which a small metal capsule containing a detonating cap can move. When the bullet strikes, this detonator snaps forward, strikes the inside of the jacket, explodes and sets off the main charge.

Rights in the patent, No. 2,361,955, are assigned to the government.

Science News Letter, November 18, 1944



PICTURES THE INVISIBLE—Such invisible things as sound waves, heat and the flow of gases are photographed by the apparatus shown here being adjusted by the two General Electric engineers who developed it. S. Lawrence Bellinger (left), focuses one of two telescope-type, extremely precise mirrors used, while Norman F. Barnes synchronizes the knife-edge assembly which cuts off from the camera all light except that affected by heat and pressure. The process, called the Schlieren photographic process, was used in taking the picture on the opposite page.