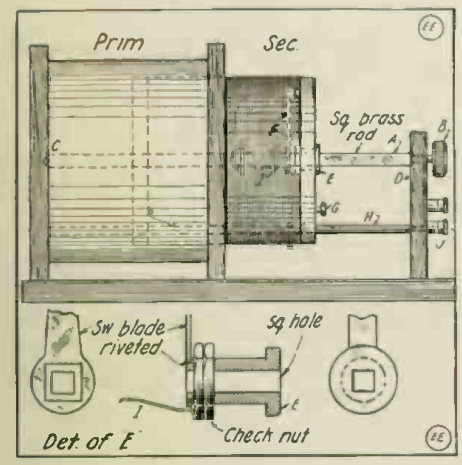
A DUST-PROOF COUPLER-SWITCH.

Herewith is a sketch of a dust-proof secondary switch for loose couplers which has proven highly satisfactory, besides greatly improving the appearance of any



A Good Way to Build Dust-Proof Coupler Switches. The Square, Revoluble Shaft Turns the Sleeve to Which the Switch Blade Is Attached.

coupler. It also does away with expensive switch points as any old ones will do, as they are not seen. The blade is swung by turning the square brass rod A by means of knob B. This square rod goes thru bushing E or a counter bushing inside of E, which has a square opening. The switch blade is securely fastened to it. The entire switch and secondary move along the rod, but when B is turned, the switch rotates accordingly. A spring (I) may be used to make a better contact. The secondary may be moved more easily if a knob G is mounted handy as shown.

Contributed by NEVIN BRENNER.

PENDULUM OPERATED BUZZER TEST.

It may be attached to any clock, but one tector buzzer test by other means than a hand or foot-operated key, thus leaving the operator entirely free to manipulate the instruments. By utilizing the pendulum movement of a clock a very reliable automatic tester can be had and the operating expenses are nil.

It may be attached to any clock but one having a pendulum speed of about fifty to seventy beats per minute is preferred. If the clock is in the operating room it will operate the buzzer direct, otherwise a relay should be used.

Secure a piece of silver foil around the pendulum. Obtain a very thin spring several inches long (about No. 32 B & S gage) and wrap silver foil at one end. The other end is secured to the woodwork of the clock in such a manner that the pendulum just barely makes a contact on each swing. This can be ascertained best after the buzzer has been connected. Two leads are taken from the buzzer circuit, one is grounded to the metal frame work of the clock, the other is connected to the spring. Care must be observed that the spring is not too short or it will interefere with the proper working of the clock.

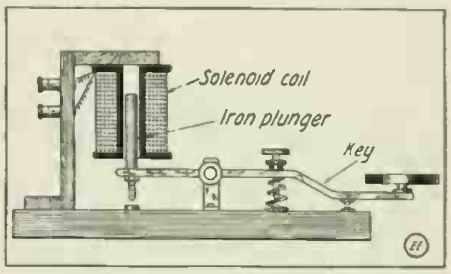
I have used an arrangement as described and found it "always on the job" when switched on. It also can be connected to your own radio transmitter to give imitations of NAA, etc. Of course a relay should always be used where heavy currents are to be handled.

Contributed by CHARLES M. FITZGERALD.

MAKING AN OMNIGRAPH OPERATE STUDENT'S HAND.

Train the hand as well as the ear to learn the code rapidly and proficiently. Receiving the dots and dashes thru the hand opens a new path. Rig up a telegraph key so that the lever may be worked up and down by a solenoid or sucking coil as per diagram. The solenoid is connected with a code machine such as the Omnigraph and the key adjusted to work like a sounder; then grasp the key as for sending, but let the key operate the hand instead of the hand operating the key. Combining this operation with regular sounder or buzzer practise enables one to become expert on the double-quick. Try it, "hams."

Contributed by FRANK COPEMAN.



A Clever Scheme for Learning the Code Easily and Quickly. A Magnetic Solenoid Connected to an Omnigraph and Battery, Works the Key. Thus the "Telegrapher's Touch" Is Acquired Unconsciously.

Development of Aircraft Radio in the Navy

By BENJAMIN F. MIESSNER
Expert Radio Aide U. S. N.

That the Navy realizes the necessity of organized scientific research of its special problems and the development of special apparatus to meet its peculiar requirements, is clearly manifested by the establishment of an excellently equipt radio laboratory at the Navy Aeronautic Station, Pensacola, Fla.

While radio signaling over the earth's surface is largely a standardized art now, aircraft radio, altho already an accomplisht feat, has thus far been largely a matter of cut-and-dry guesswork unguided by accurate scientific data. This laboratory, in addition to its work of testing aircraft radio apparatus submitted by commercial manufacturers, under both laboratory and service conditions, is gathering valuable scientific data pertaining to the peculiarities involved in radio signaling between isolated points above the earth's surface, and between such points and the earth's surface, as distinguished from the usual over-land or over-sea signaling. It is also developing special radio and other apparatus for naval aircraft. Being in extremely close touch with the actual aircraft conditions and requirements, this laboratory presents unusual opportunities for thoro study and development.

The naval officers having jurisdiction over this work are Lieutenants E. H. Loftin, District Communication Superintendent, stationed at New Orleans, La., and P. N. L. Bellinger, Head of Experiment and Test Division at this station.

Altho the laboratory has been in existence but a few months and is not yet fully equipt, several important problems have already been attacked and satisfactorily solved. Among these may be mentioned:

(1) The development of a simple inter-seat telephone for pilot-student or pilot-observer conversation on airplanes under the conditions of full power flight. This work was undertaken because commercial apparatus had proven entirely unsatisfactory. Two types have been developed, the first of which requires no external battery or power source, and which incorporates extreme simplicity and ruggedness in its construction, is suitable for use under the moderate noise conditions encountered on low powered airplanes; the second of these, which requires an outside battery, may be used under the most severe noise conditions obtainable on present airplanes without exhaust mufflers. These telephones, which are in daily use for instruction purposes, reduce by nearly one-half the time required for qualifying student pilots, by permitting constant coaching from the instructor, and are invaluable for pilot-observer communications for reconnaissance, spotting, or other flying in two-passenger airplanes.

(2) An exhaustive study has been made of the noise conditions affecting radio reception on airplanes. A special instrument, called the *Noisemeter*, was devised with which accurate measurements of various airplane noises have been made. Thousands of measurements have been made in determining the noise-making qualities of various aeronautic motors, the efficiencies of muffling devices, the intensity of the noises at varying distances and at varying motor speeds, the distribution of the noises in different directions, the efficiencies of radio headgear for eliminating airplane noises, the effects of airplane noises on the ears, the noise-making qualities of air at varying velocities, etc.

(3) Exhaustive measurements and tests are being made on every conceivable form of airplane antenna to determine the advantages peculiar to each type.

(4) The most recent development is an entirely new type of radio transmitter, which constitutes what is perhaps the greatest advance thus far made in aircraft radio. With an outfit having a total weight of only *five pounds*, designed particularly for spotting work, a signaling range of from *ten to twenty miles* is easily attained. The space considerations are negligible. With another larger outfit, weighing only about *ten pounds*, a range of from *fifty to seventy-five miles* is obtainable. These weights include the antenna system necessary for radiating the radio energy. The full significance of these statements is not realized unless it be added that the very best commercial apparatus now obtainable weighs from one to two pounds per mile of range, and occupies a space of from one to two cubic feet per twenty-five miles of range, making necessary the removal of the forward controls.

(5) The establishment of radio instruction classes for officers undergoing pilot training has not been neglected. Group instruction in operating, and the functions and care of the various parts of radio apparatus, is given on such days as are unsuitable for actual flying.

(6) Other devices being experimented with are aircraft and submarine detection apparatus and radio direction-finders for aircraft.