



# RADIO DEPARTMENT



## New 500 Watt Military Radio Pack Set

THE wireless sets used for military purposes, and particularly those now in use by the United States army, consist of the very best instruments that can be purchased. These sets must work under every possible condition. The accompanying illustration shows one of these

The condenser bank for this 500-cycle transmitting set is composed of six condenser units of practically .002 micro-farad each. The resulting capacity of the whole bank, after the condensers are connected in series-parallel, is .013 micro-farad.

The step-up transformer, of the resonance type, is of the open-core pattern and is mounted within the case. Back of the micarta panel containing the measuring instruments, etc. Silk-enameled magnet wire is used in winding the secondary of same, which is of the dry form, not requiring any oil for its insulation. Various transmitting wave lengths may be quickly arranged for by means of calibrated inductance control handles and scales mounted on the front of the upright panel of the set. A regular Morse key is perceived at the right of the cabinet.

The receiving set is very compact and may be observed resting on the drop front of the transmitter cabinet, at the left of the illustration. The head phones are the well-known adjustable-magnet type supplied to the United States army and navy, and in which the distance between the pole-pieces and the diaphragm may be varied as required for different strengths of signals by means of an adjusting screw at the back of the receiver case. The receiving set is a beautiful piece of apparatus, which includes a Pyron detector. The primary coil of the loose coupler is wound with 170 turns of No. 22 enameled copper wire, divided up into two sections, one of 10 turns and one of 150 turns. These are suitably connected up to switches, so that any combination of turns, from one to maximum, may be obtained rapidly.

The whole receiving set is installed in an oak cabinet with hard rubber top and end, upon which the switch points are mounted. It also contains a series condenser for short wave lengths, but which unit is normally short-circuited by a special switch. The secondary is also adjustable as to the inductance, and as it slides out of the primary cabinet its graduated tubular covering indicates the percentage of coupling. Photo courtesy Wireless Specialty Apparatus Co.

### A NOVEL RADIO INDUCTIVE TUNER.

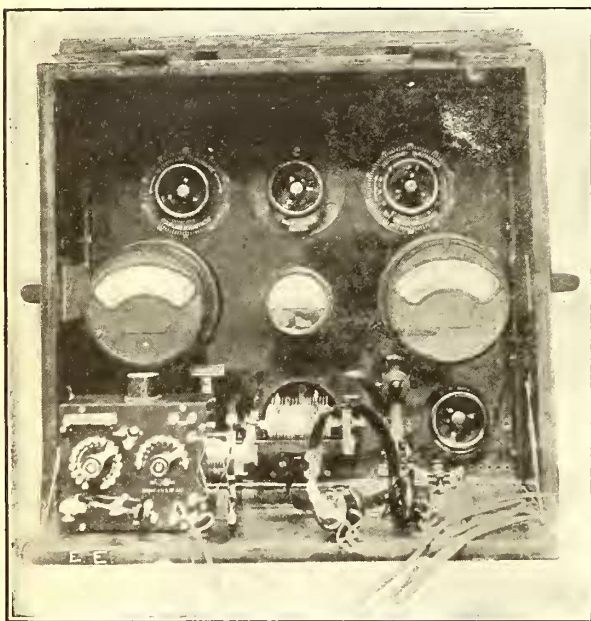
Since the introduction of the loose coupler there have been few, if any, radical changes in the design of same. The change from sliders to tapped coils was so slight as to make very little improvement, so it remained for a radio engineer of a later

day to devise the apparatus shown herewith.

The old type of inductive coupler was adjusted in steps, which did not give very close tuning, and the presence of large amounts of unused wire created the bugaboo of all previous tuning apparatus, namely, "dead-end" effects, which absorb considerable energy and destroy the efficiency of the apparatus. To offset the above defects it was the general practise to use variable condensers to secure accurate tuning, and many complicated switches were devised to prevent the dead-ends. The coupler illustrated herewith does not require any taps or variable condensers, all the wire on same being in use at all times. A brief resume of the principle of this instrument will not be out of place.

The primary consists of two coils, one permanently fixed in the box, shown in the illustration, and the movable one shown at the left. These two coils are wound to have an equal amount of inductance, but in opposite directions, so that when the movable coil is slid entirely into the fixed coil the sum of their inductances will be zero, because they oppose and counteract each other.

The same principle is used in the construction of the secondary, which consists of two coils shown protruding from the end of the box to the right. These coils also have the same amount of inductance, and they also counterbalance each other when the inner coil is entirely within the outer coil. It will be apparent that when withdrawing the inner coil the exact balance of the two inductances is upset and the circuit will possess an inductance depending upon the relation of the two coils. By this simple means it is possible to adjust the active inductance in either circuit, thus

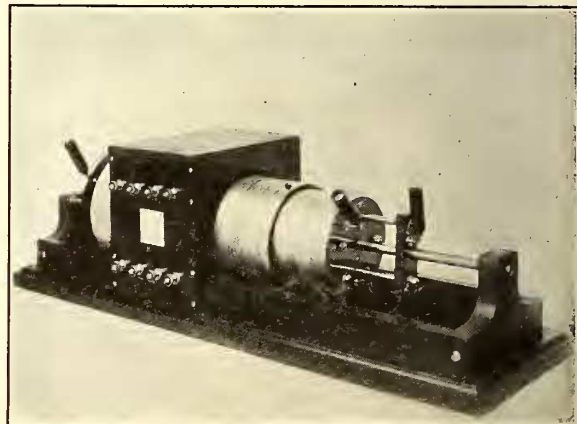


Extremely Compact 500 Watt Military Radio Set.

extra sturdy pack outfits, which at the same time combines extra high efficiency in both the transmitting and receiving ranges attained, as well as in small space occupied.

These sets are of the portable style, equipped with generators of the 500-cycle alternating current type fitted in a separate case, so that it is thoroughly portable and may be carried on separate trucks. The cases are unique in construction, consisting of a substantial wooden frame or base, so to speak, which is covered both on the inside and outside with a 1-16 inch layer of gray sheet fiber. This is glued to the wood under hydraulic pressure. The cabinets are protected by hard fiber angle strips riveted on and further protected from damage by iron bumpers at the corners.

The apparatus, such as volt-meters, ammeters and hot wire meter, as well as transmitting inductance control handles, etc., are all mounted on the micarta panel. The quenched spark gap of special design, perceived at the base of the panel, is cooled by a small electric fan placed behind it, so as to blow a draft of air directly over the gap. The gap plates rest in micarta guides. Their sparking surface, which is at the center, is of pure silver. This surface measures 3-64 of an inch in thickness, with a diameter somewhat larger than that of the metal plates supporting them and on which they are soldered. The silver is then spun over and riveted down.



New Loose Coupler, Adjusted Without Sliders or Switches.

doing away with all taps or sliders. The secondary coils may be moved inside of the primary coils, so that by varying the inductance relation between the two sets it is possible to vary the coupling.

The many advantages of this apparatus will now be readily understood, for it gives  
(Continued on page 667.)