# Wireless World

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IN THIS ISSUE: RADIO AIDS TO CIVIL AVIATION : A Survey

# Wireless World

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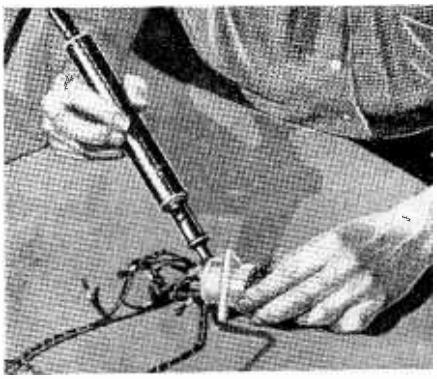
*As many of the circuits and apparatus described in these pages are covered by patents, readers are advised, before making use of them, to satisfy themselves that they would not be infringing patents.*

# MINIATURE SPOT-WELDING TOOLS

## For Jointing in Radio Assembly

By R. W. HALLOWS, M.A.Cantab., A.M.I.E.E.



HAVING noticed a mention in the *Wireless World* of a miniature spot-welding tool which was brought out in Germany during the war, I determined to obtain particulars of it by hook or by crook. Thanks to the good offices of "F.I.A.T." and "B.I.O.S.," I have at length succeeded in so doing. Readers will remember that the use of the "Smallweldpencil," as it was called, was suggested as a possible alternative to soldering in radio assembly work.

The tool, which is made in the two forms illustrated in the figures, is about 10in. in length overall by one inch in diameter. The vibro-electrode welder (Schwing-elektrode) is intended for joining wires up to 0.8 mm in diameter; say, No. 21 S.W.G. and smaller. The Welding Pencil (Kleinschweissgriffel) is designed for larger jobs. It will, in fact, tackle almost any kind of spot-welding, provided that the surface area of the joint does not much exceed 10 square millimetres — say $\frac{1}{8}$in × $\frac{1}{8}$in.

The construction of the welding pencil is illustrated in Fig. 1. A hollow body made of insulating material serves as a grip for the tool. Fixed to its business end is the steel welding head, also hollow. The actuating knob allows a rod lying centrally within the handle to be pushed forward, thus carrying the carbon electrode into the aperture at the end of the welding head. Mounted on the rod is the iron core of a solenoid. The tool is worked from 110 V or 220 V 50-cycle mains by means of a transformer. As the voltage for welding does not exceed 35V there is no risk of shock.

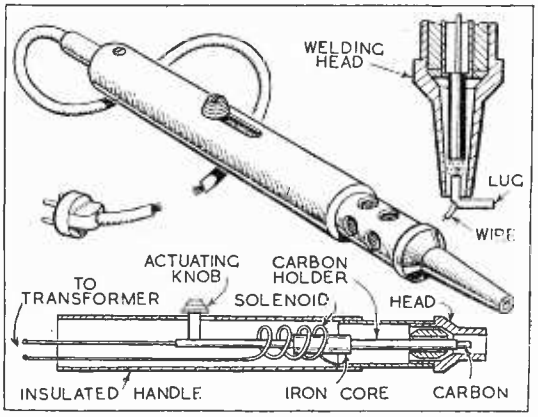



**Fig. 1. The welding pencil, with details of its construction.**

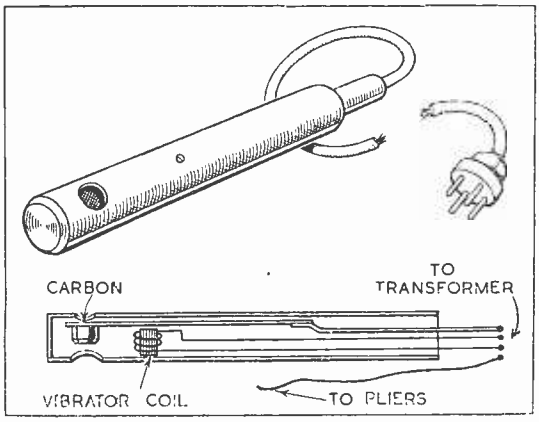



**Fig. 2 (right). "Vibro-electrode" welder; the sectional sketch shows the vibrator.**

A simple example, such as the fixing of a lead to a tag, will serve to explain the action of the welding pencil. The wire having been positioned on the tag, the aperture of the head is placed over both and the tool is so held that the walls of the head make good electrical contact with at least one part of the "work." The actuating knob is now pressed gently downwards with the forefinger until the carbon makes contact with the work. The circuit is: transformer secondary — carbon — work — head — solenoid — transformer secondary.

As the "making" of the circuit brings the solenoid into play the carbon is slightly retracted and an arc is formed. The actuating knob rebounds off the cushion of the finger tip (it is emphasized by the makers that the pressure on the knob *must* be gentle) and so the process continues for $\frac{1}{4}$ sec to 2 secs, according to the nature and cross-section of the work. The finger then releases the knob, which returns to its "off" position under the pull of the solenoid. The head is left covering the weld for $\frac{1}{2}$ sec or so to minimize oxydation.

In the vibro-electrode tool (Fig. 2) the movements of the carbon electrode are not brought about by opposing the pull of a solenoid by light fingertip pressure; instead, a small electro-magnet is used to produce the necessary vibration. As this tool is generally employed for joining one lead to another the work is held in a special pair of pliers connected by a flex and a plug to an earth socket on the terminal board of the transformer.

For the larger tool interchangeable welding heads with

**Miniature Spot-Welding Tools**—apertures of various diameters are available and 2mm, 3 mm or 4mm carbon electrodes may be used according to the work in hand. Besides the joining of wire to wire and wire to tag, small metal parts and sheet metal of the gauges normally used in wireless construction may be firmly fixed by means of a series of welded joints. The following direct welds are possible; it is necessary to use heads and carbons of the smallest sizes for those marked with an asterisk.

Iron to iron, nickel and brass*.

Copper to copper, silver and bronze.

Nickel to nickel, brass,* iron.

Silver to silver, copper and bronze.

Brass to brass*, nickel and iron.

Bronze to bronze, silver and copper.

In most cases where welding is impossible (e.g., iron-copper, silver-nickel, copper-brass) hard-soldering can be done with the aid of the welding pencil, silver, bronze or copper being used as the medium. Zinc does not lend itself to either welding or hard-soldering. Aluminium can be welded to itself and to iron, copper or bronze by the use of a special carbon electrode.

Both tools are, or at any rate were, made by the Siemens-Halske A.G. of Berlin.

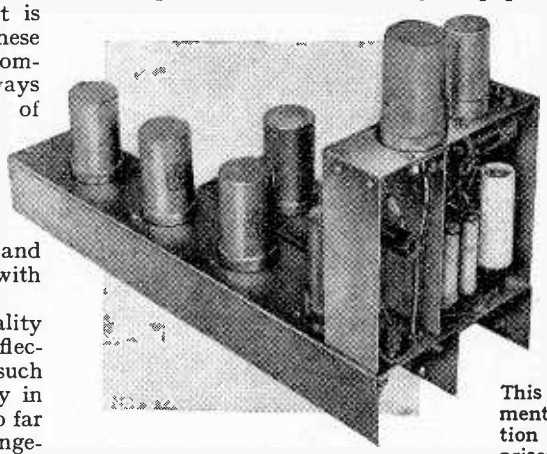
# Television Receivers

## *Publication of Constructional Articles*

THEORETICAL explanations of the individual parts of a television receiver are now being given regularly in *Wireless World*. But, although these articles make clear the requirements of individual stages, it is not always apparent how these stages fit together to form a complete equipment, nor is it always obvious how the integration of the parts to form a whole reacts on the design of the stages themselves. It is thought that these difficulties are best removed by the study of a complete design, and a receiver is being developed with this end in view.

The set will be of a high-quality type with electromagnetic deflection, and the design will be such that a good deal of flexibility in construction is permissible. So far as possible critical circuit arrangements will be avoided, even if this entails the use of more valves, and a unit construction will be adopted. This last offers many advantages, for the smaller size of the individual chassis makes the construction easier, and with careful arrangement the accessibility for adjustment and maintenance is improved. More important, perhaps, is the flexibility which it gives, for widely differing conditions can easily be catered for by the use of alternative units. Thus alternative receiving units can cater for long- and short-range reception, and the requirements of both 9in and 12in tubes are easily met.

The presentation of the design in the pages of *Wireless World* will be in the form of circuit diagrams and detailed photographs rather than as mechanical drawings and practical wiring diagrams. There are various reasons for this. One of the chief of these is the present component supply position. As one cannot guarantee the availability of any particular part, a rigid mechanical design is impossible, and it is necessary for any individual constructor to modify the layout and dimensions to suit those parts which he can obtain.



**This photograh shows a development model of the receiver portion of the equipment. It comprises vision and sound R.F. channels and detectors together with the V.F. stage.**

The photographs will indicate a layout which has been found satisfactory and will illustrate important points of detail, and so amplify the text. In the case of some components, which are not purchasable at all at the moment, rather greater detail will be given. These components are mainly special coils and transformers.

The present plan is, first, to continue the articles on the theory of the individual stages; secondly, to describe the construction of special components; and, thirdly, to describe the various units comprising the complete receiver. These stages will actually overlap and merge into one another, and the plan is not a rigid one, but is open to modification as circumstances dictate.

It will be appreciated that the development of high-quality television apparatus and of the special components is quite a lengthy business. It will be clear, too, that the description of all this must occupy quite a large amount of space in *Wireless World*. The paper supply position is likely to improve soon, but it will still be impossible to devote very many pages in each issue to the one subject of television. Consequently the description of the set and components must necessarily take a good many months to complete.

This explanation of the television plans for *Wireless World* is being given largely because it is impossible to provide a fully detailed description of a receiver within any short period, and it is felt that those readers who are keenly interested in this branch of electronics should understand the position. For their guidance it may be added that it is hoped to start dealing with the special components—probably deflector coil construction—in the January, 1947, issue.