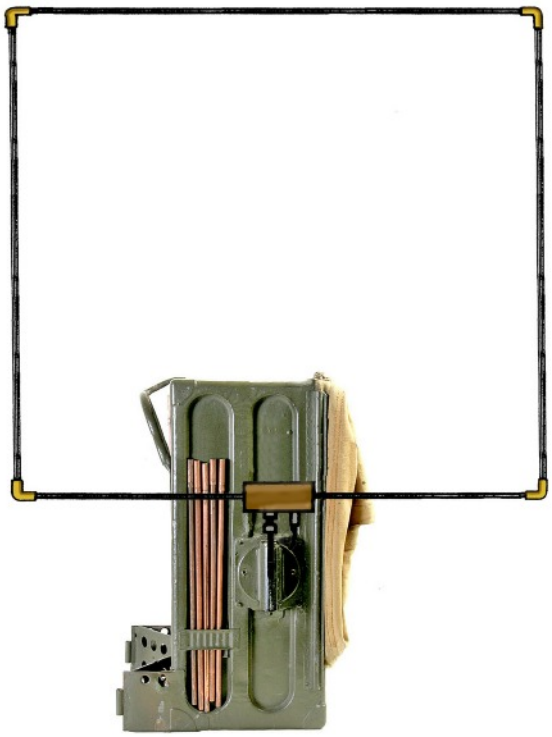
Volume 2 AMENDMENT No. 11

Date of issue: December 2022.

After the publication of 'Wireless for the Warrior' Volume 2 'Wireless Sets of WW2', a small number of minor (typing) errors and incorrect data was spotted. Corrections, additional photos and newly found items are published in 'Volume 2 Amendments'.



The improvised homing loop (in the mock-up illustration above) plugged into the aerial socket of a No. 18 Set as suggested in the description and drawings.

Homing loop for Wireless Set No. 18.

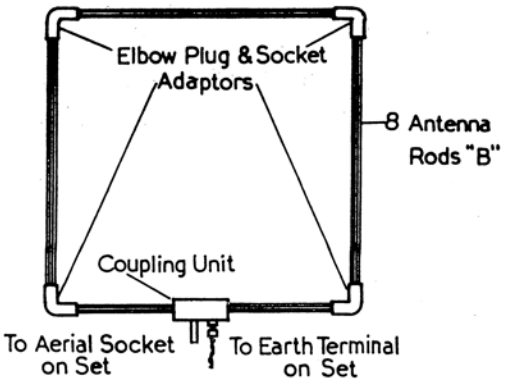
Remarks

In the early days of desert warfare a requirement arose of navigation by day and night, and for guiding (armoured) patrols back to harbour in darkness. This was met by a DF attachment (officially known as Aerial, Special, Loop), locally developed and produced by Philips in Cairo.
Similar DF attachments were developed by SRDE for WS No. 11, 18, 19 and 22 (See WftW Compendium 2 pp 281-284).
A Middle East Command (probably REME) workshop devised a simple direction-finding or homing loop which was sufficiently straightforward in construction to be readily improvised by unit workshops.
It comprised a small unit consisting of a transformer with screened windings, and four metal elbows which were used to assemble 8 standard Antennae Rods 'B' into a loop. This improvised homing loop was reputed to be accurate to +/- 4 degrees.

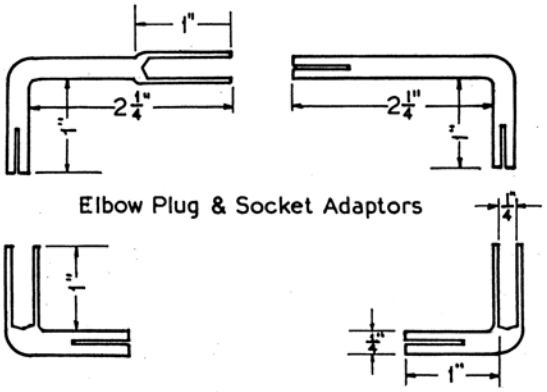
Coupling Unit

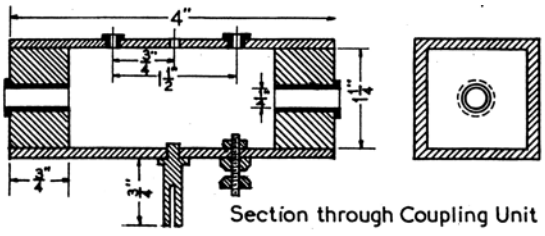
The Coupling Unit was a 3-ply or similar board box with ¾in thick hardwood ends. Brass bushings were on each end to accommodate the loop, with a centre pillar and earth terminal. The top carried two brass sockets on either side of a small hole in the centre which accommodated a flex lead and wander plug. The electrostatically screened RF transformer housed in the Coupling Unit was wound on a former with a copper foil screen, terminated to earth. The frequency range of 6-9MHz was covered in three ranges, avoiding a bulky variable condenser.

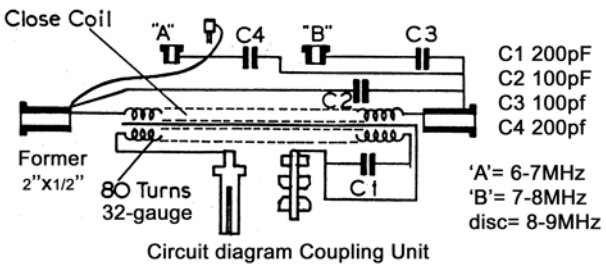
The construction drawings suggested that the whole assembly was plugged into the No. 18 Set aerial socket, with the earth lead connected to the existing terminal of the set.
It should be noted that (compared with the homing loop described on the next page) if a 'null' bearing was made the set should be turned 90 degrees.
Although never officially adopted, it showed the ingenuity and improvisation talents of local (REME) workshops.



General view of homing loop for Wireless Set No. 18





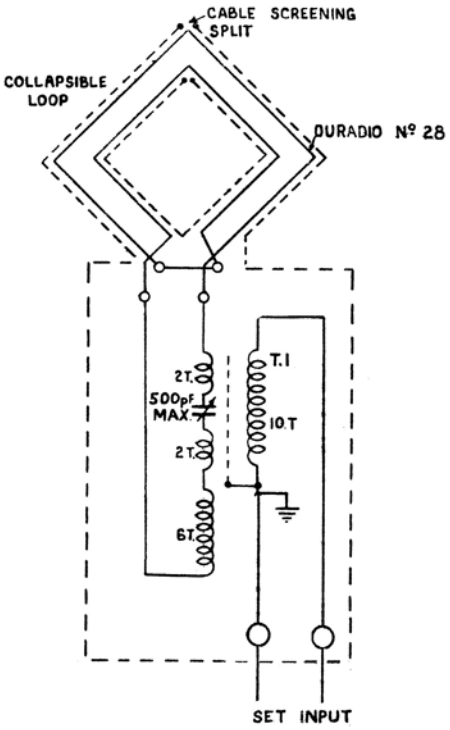


DF Attachment for WS No. 18.

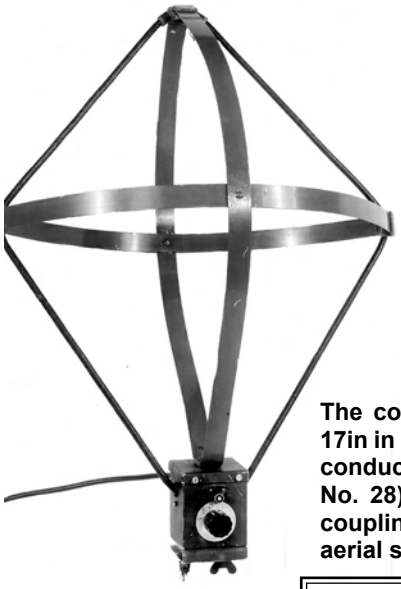
Remarks

An earlier approach to a homing loop for Wireless Set No. 18 was developed by Signals Experimental Establishment based on Loop Aerial DF No. 1 of Homing Equipment No. 1 (WftW Amendment No. 12) .

The experimental collapsible direction finding loop for use with Wireless Set No. 18 was a homing device used during movement for the line of advance of infantry to an object in particular under conditions of darkness. The cable loop was supported in a diamond shape by two vertical lengths of spring steel which are fastened down to the coupling unit, and two similar steel strips brought into horizontal position. The coupling unit with the loop was attached onto the raised upper flap of the Wireless Set No. 18, and secured by tightening up the wing nuts. Since the metal cage formed by the support structure was symmetrical, no significant bearing error results from the proximity of the metal strips which are furthermore broken up by insulating slings, preventing short-circuits. Wearing a metal helmet was not found to appreciably impair the performance. When walking directly away (or towards) a transmitter the signal in the phones was at a minimum. It was considered that in practice the swing of the body was convenient such as to continually sweep through the minimum thereby simplifying course keeping.



Circuit diagram of WS No. 18 DF attachment.



The collapsible loop aerial was approximately 17in in height, comprising two series connected conductors of twin screened RF cable (Duradio No. 28) with screening broken at the apex. A coupling unit connected the loop to the set aerial socket and chassis terminal.

Collapsed DF loop and Coupling Unit in canvas transport carrier.

References

- Information courtesy Royal Signals Museum, Blandford Forum, U.K.
- Homing loop for Wireless Set No. 18, D Signals Monthly Liaison Notes No. 15, pp 10, 429, Sep. 1944.
- Homing loop -Manpack Type, for Wireless Set No. 18, SRDE Specifications No. 580, Mar.1944.
- Homing Equipment No. 1, Working Instructions, SRDE Pamphlet No. 361A, Nov. 1943.
- Wireless for the Warrior, Vol. 2, Chapter WS18, L. Meulstee, 2001, isbn 9789081827109.
- Wireless for the Warrior, Compendium 2, Chapter DF Sets, L. Meulstee, 2012, isbn 1898805 10 5.
- Working instructions, Wireless Set No. 18, Mk.I, II and III, ZA 3207, n.d.
- Collapsible Loop, Inventions Register SRDE, F.Fletcher, April 1943.
- Direction keeping - Use of ground aerials. D. Signals Monthly Liaison Notes No. 6, pp 13, Dec. 1943.

COLLAPSIBLE LOOP.

The Invention relates to a collapsible form of D.F.Loop consisting of a screened cable construction with the screening broken at the apex and the conductors so connected as to form a loop circuit of complete turns in series, or as required for the particular application.

The "cable" loop is supported by two vertical lengths of spring steel strip fastened down to a common base plate and of such a length that when freely extended the "cable" is fully taken up and passed round an insulating sling or 'hinged' platform, fitted between the two free ends of the supporting strips.

Bolted internally onto these vertical strips near their centre, are two similar strips, free to move in a vertical plane (i.e. being slightly shorter than the fixed strips, so that they can fit right between for the 'folded' position). The corresponding ends of these moveable members are joined together by an insulating sling such as webbing, or a hinged platform such as ebonite.

To open the loop from its collapsed form; rotate the moveable members from their vertical position within the fixed strips, and rotate them into the horizontal plane, then applying pressure to the top of the fixed strips, they will bow out on each side, thereby causing the horizontal limbs to do likewise. Due to the reduction of vertical height by this operation sufficient loose cable is available to place the sides into the two slings at the ends of the horizontal members. In this way the spring strips keep the 'cable' in tension and a symmetrical loop structure results.

Since the metal cage thus formed by the supporting structure is symmetrical with respect to the loop, no bearing error results from the proximity of the metal which is furthermore broken up by the insulating slings so that no shorted circuits results.

Where the screening is split at the top of the loop it is usual to reinforce the cable and also render it weatherproof by covering the point with such as a close fitting exterior rubber tube and tying its ends down tightly on either side.

This loop construction can be applied to replace any conventional loop construction and represents an easily serviceable and stowable system since standard cables can be used. A long thin bag (c.f. Bags Aerial rods) is convenient for transport.

(Sgd) H.Fletcher
August, 1942.

HF/BH.

Submitted 13/4/43 H. Fletcher S.O.

Appendix 1 Inventions register

A page from the SRDE Inventions Register which was created for claiming an idea or invention for future use. H. Fletcher submitted his invention of a collapsible loop aerial in April 1943.

Appendix 2 Direction keeping - Use of ground Aerials.

Investigation has been proceeding on methods of guiding Infantry and Armoured Fighting Vehicles by radio under conditions of low visibility, and one of the objects throughout the investigation has been achieved the desired end with the minimum of extra equipment.

Most promising results have been achieved by the use of two ground aerials laid out a wide 'V' (approximately 90º), in conjunction with standard Army Wireless senders. The basic principle, corresponding to the 'split' used in radar to got accurate bearings, is that the signal is transmitted first to one and then to the other of these ground aerials, The receiving station compares the strength of the signals and moves laterally until the signals are equal.

For guiding Infantry the No. 18 and 38 Sets have been used with a two way switch from one ground aerial to the other, the operator saying 'left-right' in synchronism with with the movement of te switch. The receiving station adjust his position relatively to the line of advance until both 'left' and 'right' are heard at equal intensity.

For more accurate results and for use with AFVs the same principle is applied but the controlling operator uses a Morse key on which he sends the letters A or N using CW or MCW. The body of the key is connected to the output of the sender, the back stop of the key to one aerial and the front stop to the other. When the receiving station is proceeding on the right line the symbols sent on the key merge into one continuous dash, while it is diverges from the line the operator hears either A's or N's and can correct his position until he hears the continuous dashes again.

For special purposes, such as the guiding of Flail tanks, where an extremely high degree of accuracy is wanted, experiments are now proceeding with the use of two keyed tones. One tone is sent out on each of the aerials and the receiving station will be provided with a visual indicator, the type of which is not yet firm. This requires special equipment but as these special purposes are limited in extent, it is not considered to be a grave drawback. Experiments so far conducted are incomplete

As soon as the experimental work has been completed to the satisfaction of the War Office full details will be circulated of the systems to be adopted.
(D. Signals Monthly Liaison Notes No. 6, pp13, Dec. 1943.)

(No further information on this topic has been found to date.)