

they have improved with practice. A standard installation, with a "split aerial," designed to overcome the weakening of signals when both tunes are kept connected, should still further improve them.

It has now been approved to supply magnetic detectors to all installations, and it has been submitted that a new rating of "Wireless Telegraphist" be introduced into the Service.

The Staff in the "Vernon" are becoming insufficient to meet the growing requirements, and a considerable increase has been asked for, which it is hoped will lead to still greater progress in the future.

LEGISLATION.

Wireless Telegraphy Act, 1904.

This Act lays down the regulations concerning licences granted by the Postmaster-General with regard to Wireless Telegraphy.

Under this Act no person is permitted to establish any Wireless Telegraphy station or instal or work any Wireless Telegraphy apparatus in any place or on board any British ship except under a licence from the Postmaster-General. This does not, generally speaking, refer to purely experimental stations.

No person is permitted to work any apparatus for Wireless Telegraphy installed on a foreign ship while that ship is in territorial waters, otherwise than in accordance with regulations made by the Postmaster-General.

The Act extends to the whole of the British Islands and to all British ships in the territorial waters abutting on the coasts of the British islands, and will continue in force until July 31st, 1906, and no longer, unless Parliament otherwise determines.

Abstract of—

"Heads of Agreement between the Postmaster-General of the one part and Marconi's Wireless Telegraph Company, Limited, and the Marconi International Marine Communication Company Limited, of the other part." Dated 11th August 1904.

For a period of 15 years from the 11th August 1904, the Postmaster-General will grant to the Companies facilities, subject to certain conditions, for the collection, transmission and delivery in the United Kingdom of messages to and from places in Newfoundland and North America.

For a period of 8 years from 11th August 1904, similar facilities will be granted for messages exchanged between ships and the following stations in United Kingdom:—Lizard, Rosslare, Crookhaven (or Brow Head) Withernsea, Caister, Niton, Holyhead, North Foreland, Haven.

The last six stations are to be closed if the Admiralty find that working at such stations interferes with Admiralty stations, in which case other specified arrangements will be made.

Should similar facilities be granted to other systems of Wireless Telegraphy, suitable conditions for securing non-interference will be required.

Generally subject to these Heads of Agreement the Companies will act in agreement, as to conditions of working, with the Admiralty for the purpose of avoiding interference.

Subject to specified conditions, the Government will, if necessary, control any of the Companies' stations in the event of any emergency.

Only British subjects shall be employed as operators at the Companies' stations in the British dominions.

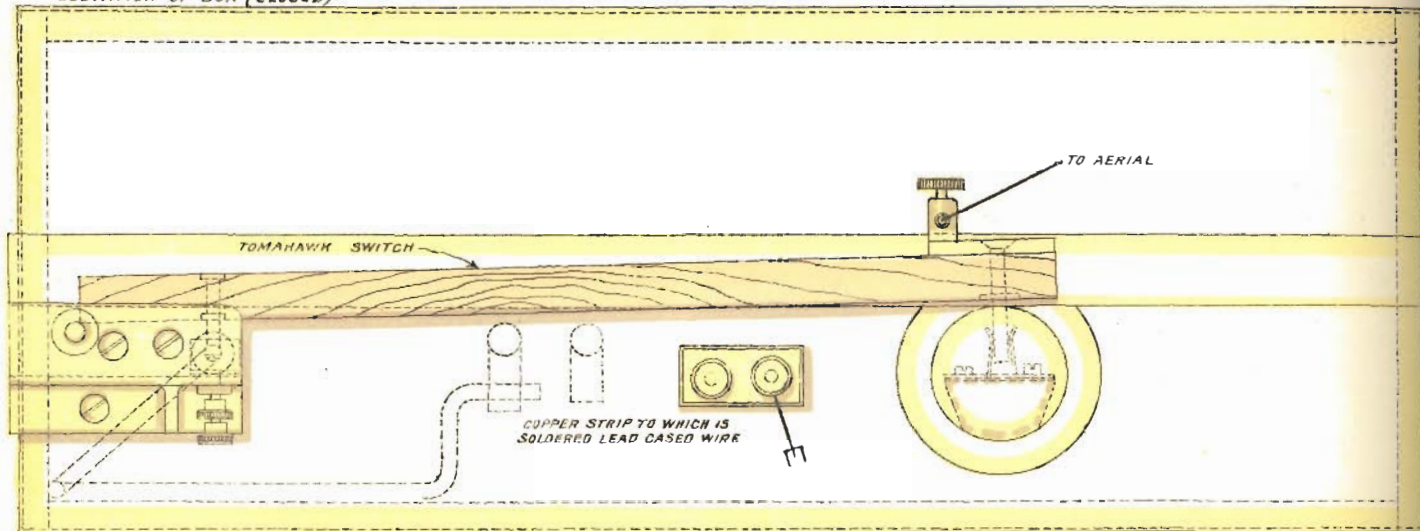
Government messages shall be transmitted with priority over all other messages at rates not exceeding half those charged to the public.

Subject to certain conditions, the Companies will transmit messages to and receive messages from ships or shore stations fitted with other systems of Wireless Telegraphy, when required to do so by the British Government.

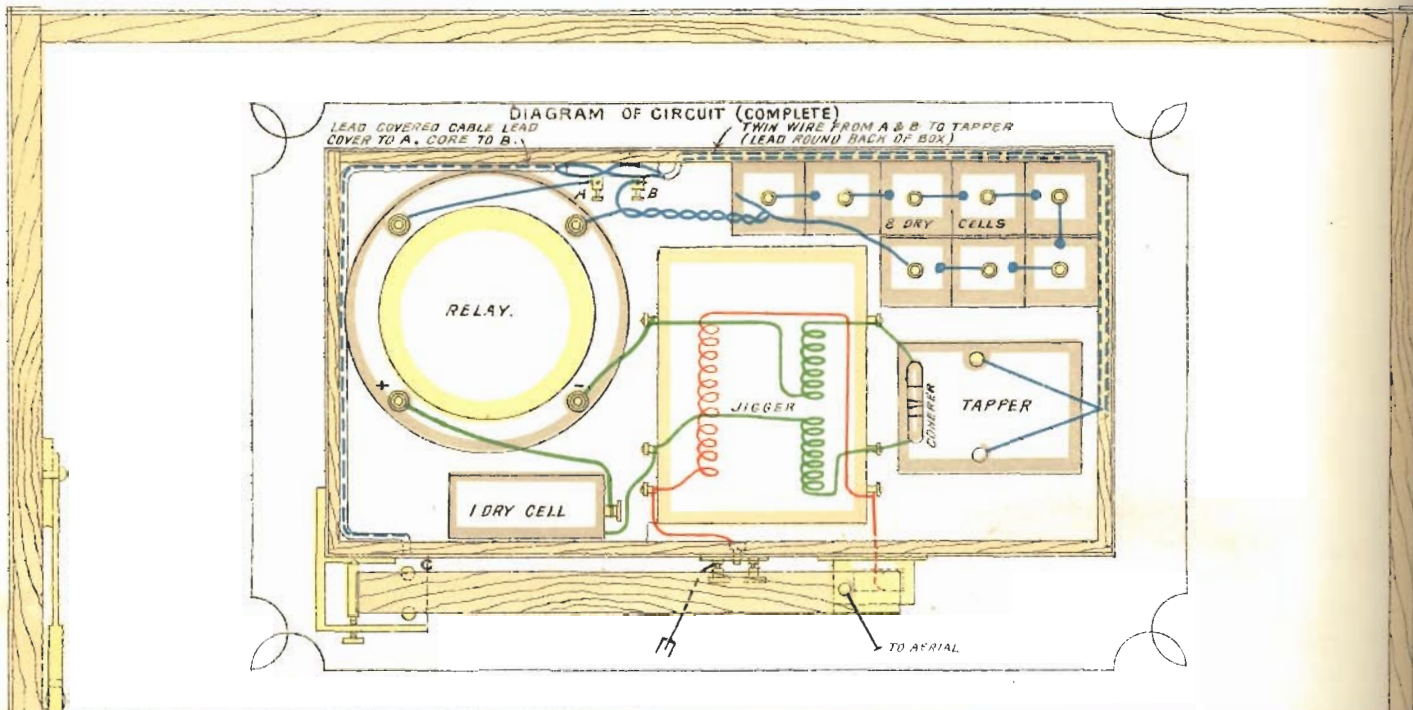
With specified provisos, every licence or permission granted by the Government shall contain suitable conditions as to non-interference with other wireless telegraph stations.

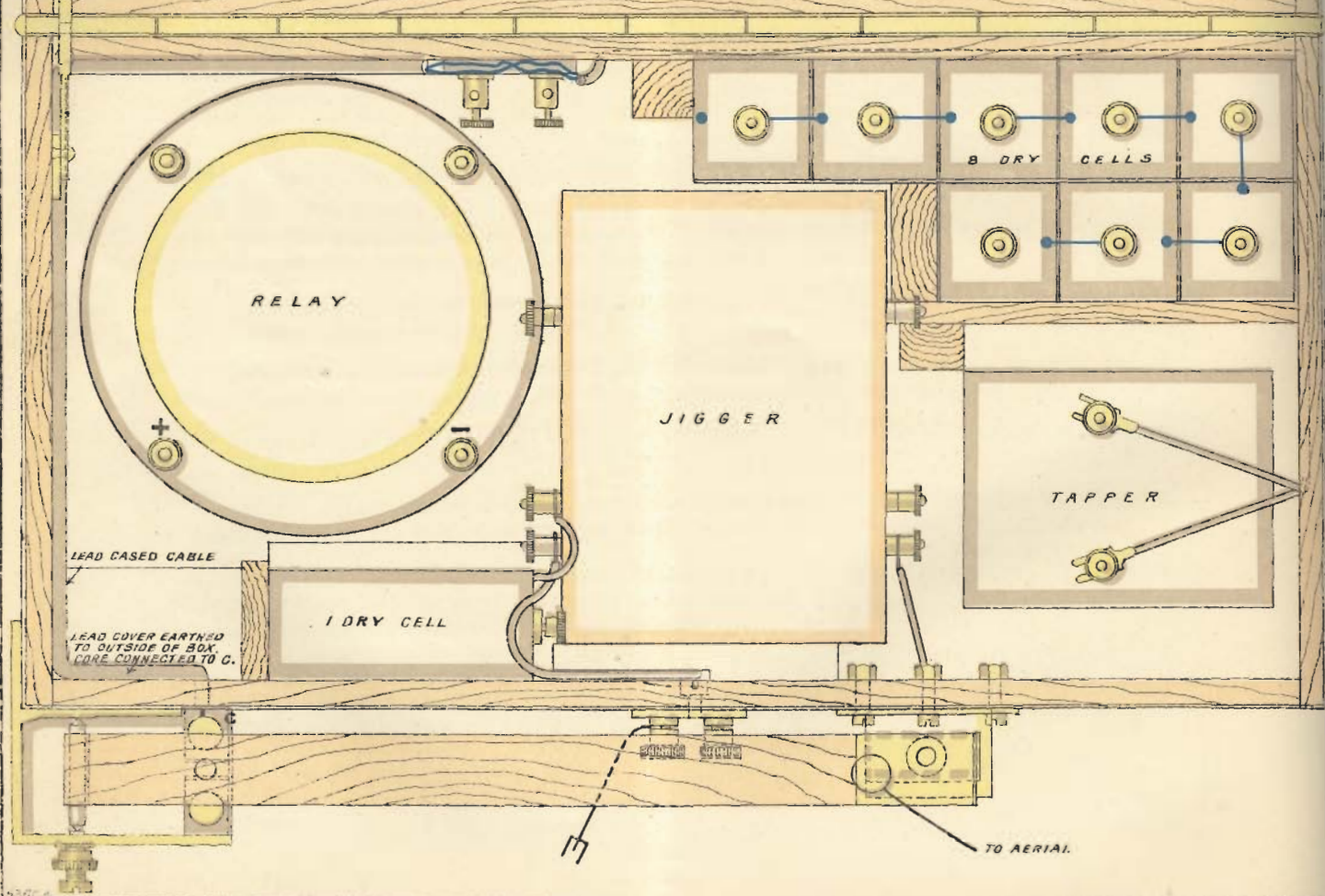
BOX SCREENING (PATT. 1779)

ELEVATION OF BOX (CLOSED)



PLAN OF BOX WITH LID OPEN (SHOWING CONNECTIONS SUPPLIED WITH BOX.)





To face page 3

ALTERATIONS IN INSTRUMENTS AND ESTABLISHMENT.

Every effort has been made to reduce the cost and number of stores allowed, and to have them as far as possible of a uniform pattern. The "Marconi set" as given in last establishment has been abolished, and there is now only one type of apparatus issued, viz., the "Service set"; which, however, may be supplied with either the Service or the Marconi receivers, until the latter are worn out.

The following list gives the main alterations :—

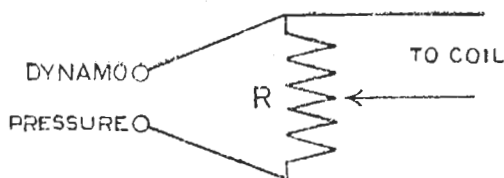
Article.	Remarks.
Accumulators and all appurtenances -	Abolished afloat; reserves kept for shore stations and landing party purposes.
Isenthals and all appurtenances -	Abolished.
Series Resistance - - - -	Introduced in lieu of above, <i>see</i> p. 56.
Spark coils - - - -	Re-wired; spark balls abolished.
Spark silencer - - - -	Introduced in lieu spark balls on coil.
Service receivers - - - -	Re-wired; tomahawk switch incorporated, also minor improvements, <i>see</i> Plate I.
Inkers - - - -	Alarm switch abolished.
Shielded wire leads with their 2-way switches.	Self-starter introduced, <i>see</i> p. 4.
Service jigger - - - -	Abolished.
Cowtails - - - -	Abolished (in lieu Marconi A and B jiggers).
Signalling keys - - - -	Now supplied in 10, 20, or 30 feet lengths alone.
Coharers - - - -	Small Marconi pattern now becomes the standard type. The Service keys have been brought into line with this by alterations afloat.
A and B tunes and appurtenances -	Are now all marked with identification numbers.
Magnetic detectors - - - -	Introduced for all installations.
H. W. voltmeters - - - -	Introduced for flagships, for tuning up and measurements.

Spark Coils.

The instructions for the use of the series resistance are given on p. 57.

Before deciding on this method, experiments were made with "potentiometer" methods of reducing the voltage.

FIG. 1.



It was found that the resistance R absorbed 2 K. W. of power before the coils worked satisfactorily, and as it then became very bulky and costly this method was given up.

The series resistance method was then tried, and found useless until the coils had been re-wired; but when this had been done it was found satisfactory, and has therefore been adopted.

Longer sparks can be got with this method than with the old connections; and for equal sparks the contacts do not wear away so quickly, provided the condenser is in good condition. A bad condenser has, however, more detrimental effect with the new connections than with the old.

Another point which has been noticed is that the length of the key leads makes a small difference, both in the spark length and in the wear of the contacts; consequently the key leads should be kept as short as practicable, and experiments with anti-inductive leads are in progress.

Sticking of Key-Contacts.

Trials have been made to overcome this cause of bad sending and spacing by replacing the platinum contacts by larger steel ones, but without success.

Isentals.

The oil supplied by the Dockyard is unsatisfactory.

Common paraffin oil (the *cheaper* grades which have higher flash points) is more satisfactory; but the flash point is too low to allow of its use on board ship.

No more of these instruments will be purchased.

Service Receivers.

These have been re-wired to suit the tomahawk switch, which is now incorporated in the box, and to allow of the introduction of the Vernon jigger.

It is proposed to introduce a "relay test" push similar to that in the Marconi box, and also one to disconnect the coherer when testing the relay for "running away."

Inkers.

Lieutenant Ryan's automatic inker attachment is shown on p. 18. Before introducing this improvement, however, it was ascertained that Siemens had for many years manufactured a commercial article somewhat on these lines; and as this appeared somewhat more convenient than Lieutenant Ryan's form, it is being introduced in lieu.

Space does not allow a description of this article this year.

Establishment for "Scout" Class.

This has been drawn up and approved. It practically consists of a half service set.

Standard Installation.

A pattern has now been got out with all latest improvements (*see* Plate II), and the following are remarks on the drawing:--

Remarks.

Receiving Circuit.—The "A" and "B" switches should not be placed on the face of the oscillators. Bare wires should be stretched across the office for both tunes, so that they can be tapped off to the magnetic detector through the tuner, which latter should be triced up overhead.

Transmitting Circuit.—The Leyden jars should be joined up as shown, using flexible wire; Patt. 600 bared is suitable.

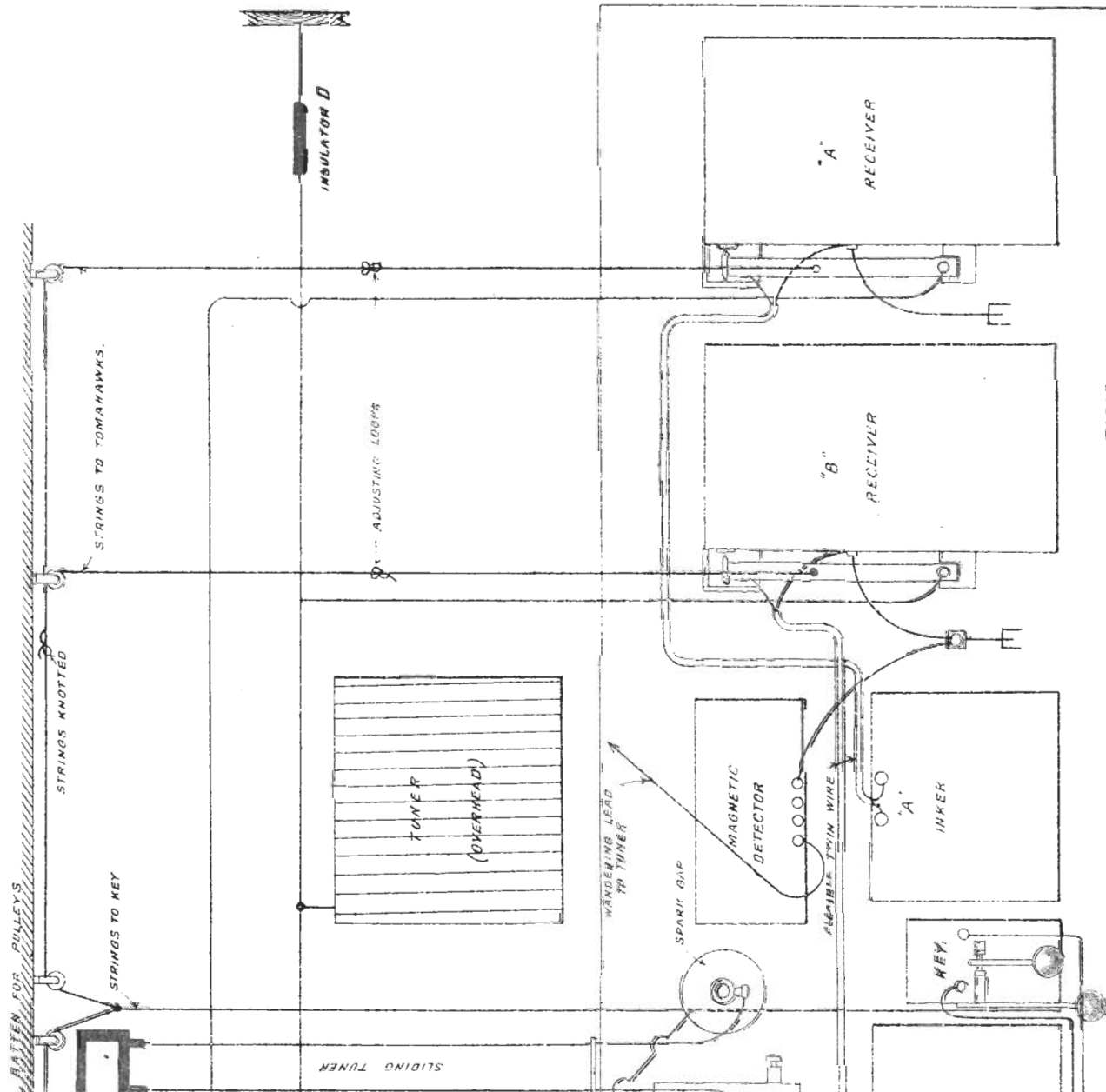
To use either Tune.—Hook the wandering lead from the coil to the required jars, and plug the same oscillator at "A" and "B" switch. The wandering lead from the coil should be triced up moderately taut with an india-rubber band to keep it insulated. The sliding tuner shown for "A" is convenient for tuning, but may be dispensed with when the apparatus is perfectly tuned.

Aerial Wire.—The aerial wire should consist of two single parts 180 feet in length, insulated and well separated from each other throughout. The bottoms should be lead as

Note.—The following differences will be observed between this plate and that accompanying A.L. 6.1.05:--

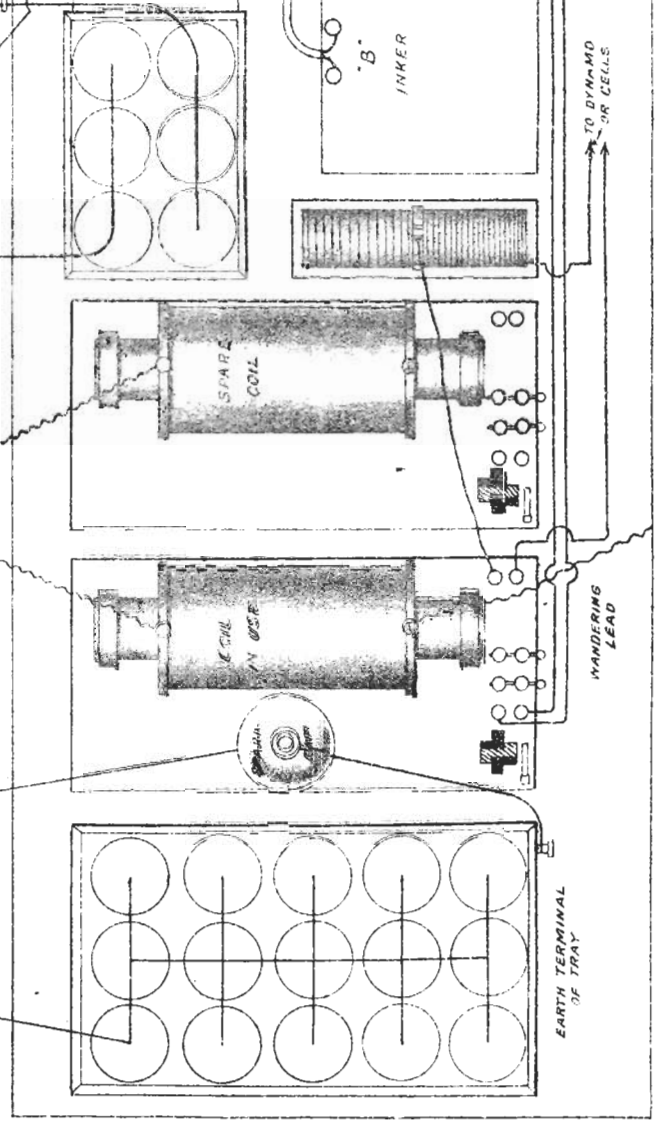
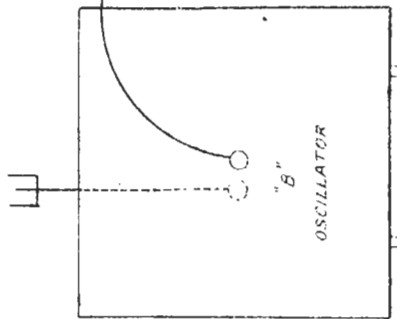
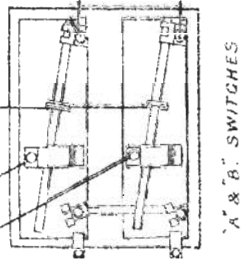
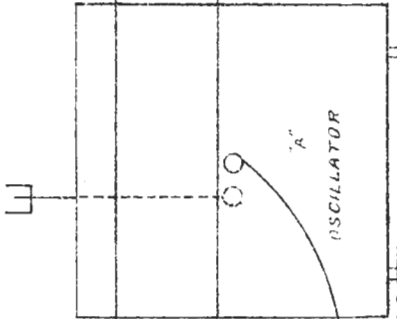
- (i) The lead from the Sliding Tuner goes direct to the three jars nearer to the inker. There is no lead to the box terminal at all.
- (ii) The plugs connecting up the condensers of both coils are pushed home.
- (iii) The horizontal part of the receiving Aerial for "A" tune is stayed in a similar manner to that for "B" tune.

W.T. INSTALLATION / 04



TO DOUBLE CONVANTAL THROUGH DECK TUBE

ADJUSTING LOOP



vertically as possible, consistent with their not being within 6 feet of ironwork or stays for any considerable length. The upper ends may, if necessary, be lead forward or aft as convenient, if too long for the mast.

FAILURES IN APPARATUS.

Cohereers Tested, 1903-04.

Type.	Number Tested.	Accepted.	Rejected.	Cause of Rejection.		
				Too Sensitive.	Insensitive.	Broken.
Marconi, New -	998	630	368	—	365	3
„ Survey -	639	453	186	24	118	44
Sullivan, New -	1,726	1,543	183	99	74	10
„ Survey -	584	389	195	50	94	51

This table seems to show that the Marconi coherers increase in sensitiveness with age, whilst Sullivan coherers are more stable, but tend to reduce in sensitiveness. The majority of coherers are believed to be spoilt by inefficient shielding.

Coils.

One hundred and fourteen new coils have been tested, one rejected for mechanical breakdown.

Ninety-seven survey coils tested, 57 accepted; 40 rejected, faults principally mechanical breakdowns, bad condensers, broken secondaries.

Jiggers.

Two cases of primaries of "B" tune jiggers having been joined up in "opposition" have been noticed as reported from sea-going ships.

Marconi Receivers—Principal Failures.

(a.) Connection to tapper armature is through the pivots, and is *usually* faulty. A piece of flexible wire should be soldered on.

(b.) The inker condenser also acts as spark preventer to relay contacts. If relay is tested outside its box, relay contacts soon require re-burnishing.

(c.) All terminals are *usually* lacquered all over, and fail to make contact unless cleaned with emery paper. (Particular attention required to aerial contact through auto-attachment.)

Isenthals.

Principal Failures:—

- Blades dirty.
- Mercury dirty.
- Driving band too taut.
- Pivots not oiled or want re-adjusting.
- Brushes reversed or not making contact.

Tomahawk Switches.

Contacts too strong, require easing.

A and B Switches.

Contacts too weak.

A and B Oscillators.

Frequently perforated between windings. Test with plain aerial $\frac{1}{4}$ -inch spark, between windings. Long sparks cannot be drawn off secondary with aerial off and primary excited.