Electricians in combat: the changing IP contexts of telecommunications during the First World War

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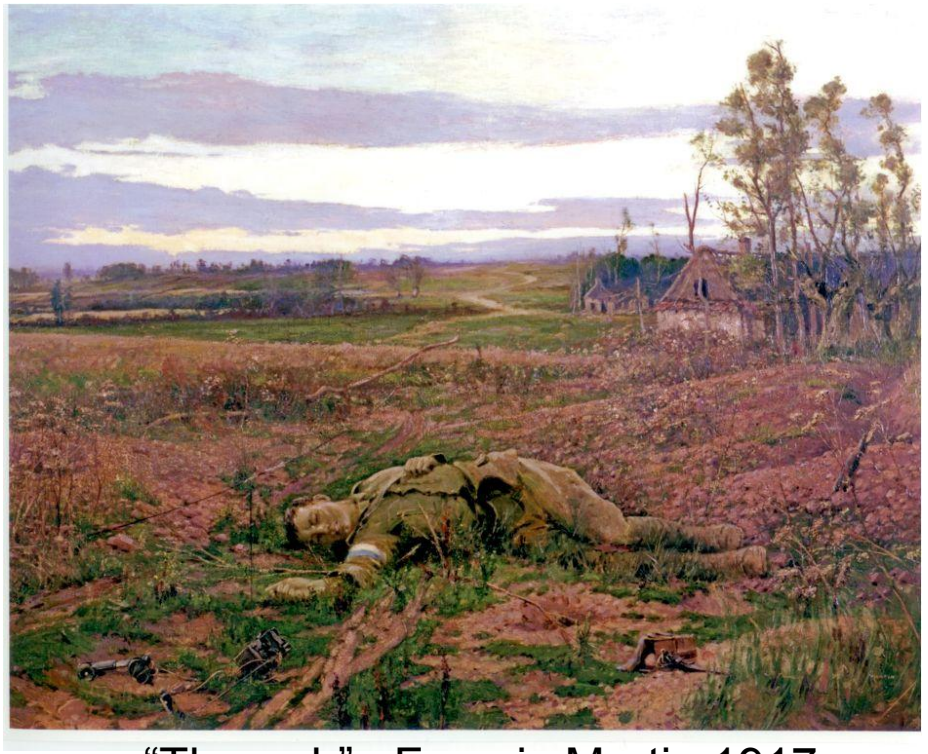
Draft chapter for MacLeod & Radick (eds.) Owning and Disowning Invention



"Through" , Francis Martin 1917

Overview

- Complexities of British IP relations in Edwardian military context - patent claims for telecommunications in Great War
- Rights of “Service” & civilian inventors vs. government claims within context of 1883 and 1907 Patent Acts
- 1915: State management of invention, purchase, appropriation or compensation by Royal Commission.
- Military telephony: E.J.Stevens’ field /trench telephone – patented by brother , & successful textbook.
- ‘ Fullerphone’ - buzzer telegraph – major trench warfare innovation in 1916. .. Major Algernon Fuller’s IP claims
- Government appropriation of wireless telegraphy during war - long-lasting claims by Oliver Lodge and Guglielmo Marconi

1. **Military IP issues – patenting and inventions submitted to military**

- MacLeod: military hero & inventor on a cultural par by 1870s
- But 1852 Patent Act gave no formal wartime rights to inventor
- 1875: Army tries to prevent Service inventors from patents
- 1883 Patent Act formalizes compensation arrangements
- Choice for militarily useful invention: patent or sell to state?
- 1914: Royal Society Committee on inventions – Oliver Lodge
- 1915: Navy Board of Invention & Research – inc. Lodge, J.J. Thomson, C.Parsons, W.Crookes, W.H.Bragg etc.
- Awards focussed on 6 headings, inc. wireless telegraphy
- Also for Army (War Office) Inventions Munitions Department
- From 1919 Royal Commission on Awards to Inventors.

Board of Invention and Research grant and expenditure up to 31 August 1917

Section II

	Grant £	s.	d.	*Expenditure* £	s.	d.
Wireless telegraphy	625	0	0	554	14	11
Mining	850	0	0	797	17	10
Vertical control	1,500	0	0	1,067	19	7
Acoustic research	3,570	0	0	3,618	6	10
Sounding device by bomb	350	0	0	345	18	9*
Non-contact mines	500	0	0	—		
Sound reflector	500	0	0	123	15	4†
Supersonics	1,000	0	0	—		
	8,895	0	0	6,508	13	3
Experiments closed						
Chain wire-cutting device	100	0	0	20	19	5

Acoustic research: According to BIR records, accounts to value of 3,618*l.* 6*s.* 10*d.* have been passed to A.G.

* Sounding device by bomb, 333*l.* 18*s.* 6*d.*
† Sound reflector, 10*s.* 10*d.*
} Other votes

Source: Holland–Skinner Report, 14.

Not entirely a chemist's war after all…?

Compare Rose & Rose

2. Military contexts of innovative telecommunications

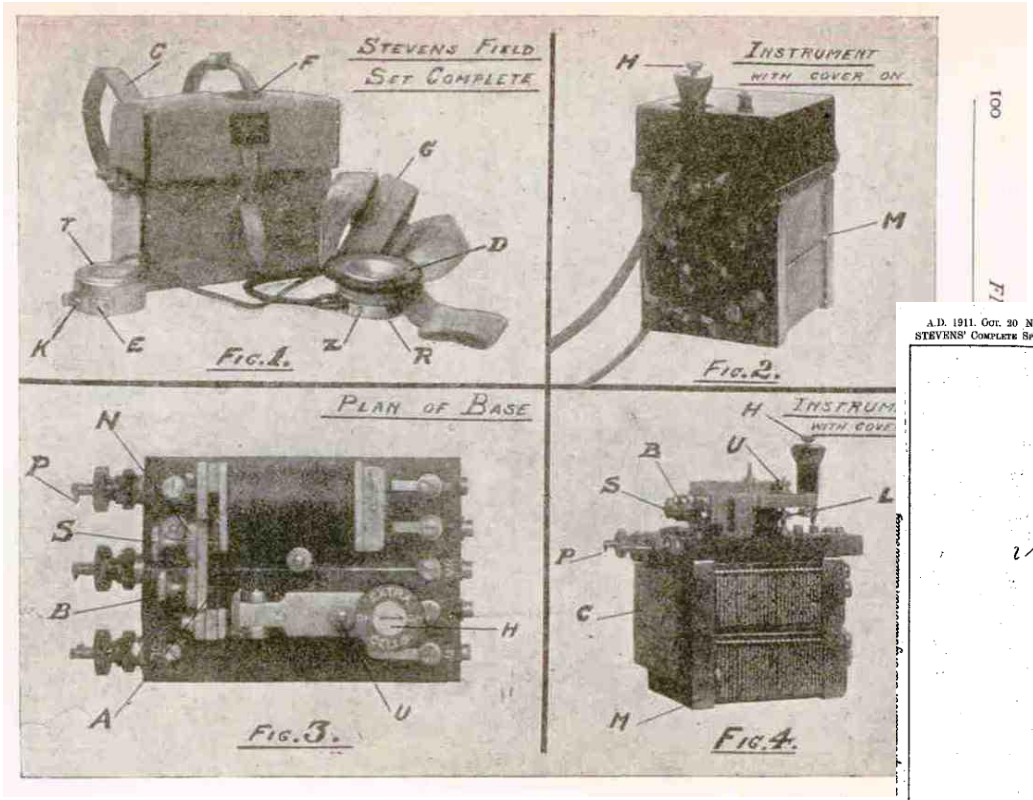
- Adas: WW1 collapse of prestige for Western techno-science
- Focused on weapons of destruction not telecommunications
- Headrick: role of telegraph in British empire building
- Military application of telegraph: Crimea - & news reporting
- Telephone adopted for lower skill operatives in from 1880s
- German eminence: Siemens & Halske portable telephone with casing & cable (using Bell phone unpatented in Germany).
- UK Boer War phone more effective than Marconi wireless .
- Russo-Japanese War 1904-1905: major use of telephone and wireless by both sides (also trenches and machine guns).
- UK Army signal services set up 1912 within Royal Engineers: pigeons, telephones, signal lamps, bicycles, motorcycles etc

"Japanese soldiers reporting the situation by telephone to Western journalists; Russo-Japanese War (1904-1905)" Bridgeman Art Library.

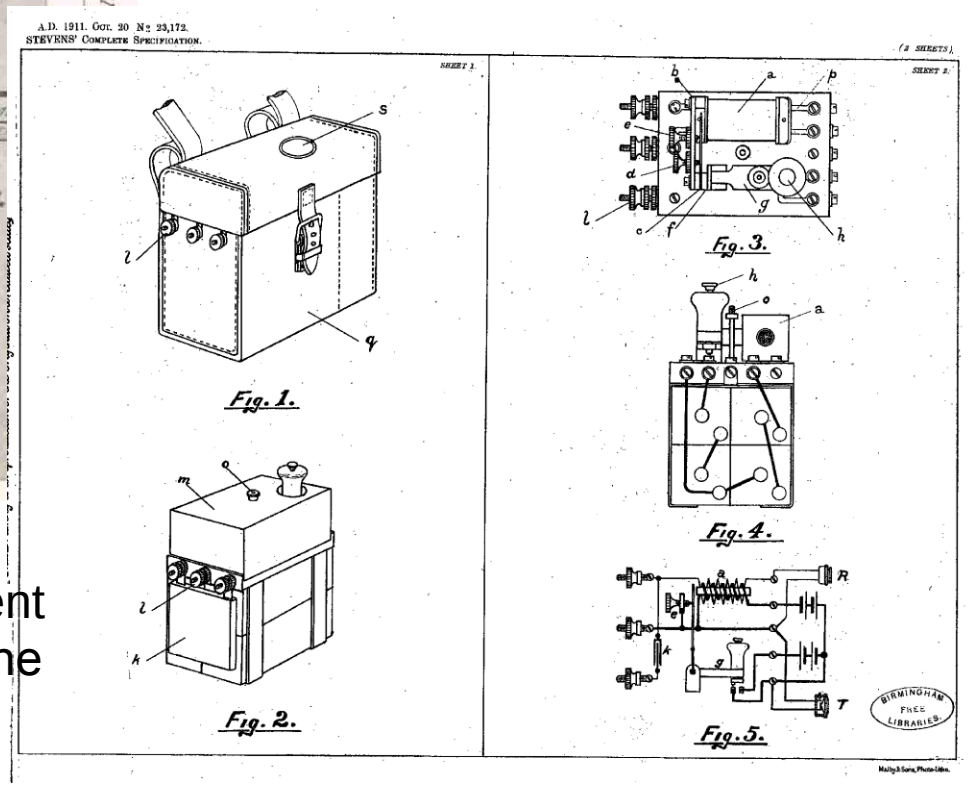
GERMAN TRENCHPHONE, 1905, Museum of Technology.

UK WW1 TELEPHONE No 110 OR TRENCH PHONE
Made by British Post Office Telephones.

Stevens Field telephone (1912)



“Stevens Field Set” in Lieut. **Edward James Stevens** Field Telephones for Army Use (2nd ed. 1912) p.100



Arthur James Stevens UK Patent #23,172 (1912) “A Field Telephone & Telegraph Set” 17th Oct 1912 (Provisional Spec 20 Oct 1911)

N° 23,172 A.D. 1911

Date of Application, 20th Oct., 1911

Complete Specification Left, 13th May, 1912—Accepted, 17th Oct., 1912

PROVISIONAL SPECIFICATION.

A Field Telephone & Telegraph Set.

I, ARTHUR JOHN STEVENS, 1, Park Road, New Cross, S.E., Analytical Chemist, do hereby declare the nature of this invention to be as follows:—

This invention relates to an improved portable combined telephone and telegraph instrument, all the parts of which are as light, compact and accessible as possible, and capable of withstanding rough usage.

3a. Military telephones& training

- Lieut. Edward J.Stevens: Instructor in Electricity at Ordnance College, Woolwich; 1912: Army School of Signalling, Aldershot
- Field Telephones for Army Use including an elementary course in electricity and magnetism 1908, 2nd edition 1912
- Patent by analytical chemist brother evading military control?
- Patented “Stevens” telephone published in 2nd edition
- Textbook used widely during Great War (7th ed. 1918) even if Stevens phone was not: Post Office & Ericsson model instead.
- More importantly Lieut E.J. Stevens trained Cuthbert Fuller

3b The Fullerphone

- Algernon Cuthbert Fuller (1885-1970) trained at Woolwich, graduating 1904 with Armstrong Medal & Commission.
- Army Wireless Co, Aldershot in 1910: amplification technique of “Dynaphone” unpatented rival to thermionic valve.
- 1914-15: problem of German interception of telephone lines
- Fuller works in country cottage 1915 to develop technique of “chopping” telegraph signal to defeated eavesdroppers
- Later claim: not invention ‘on duty’
- 1916 rapidly effective at battlefront as telegraph device (added phone)
- Submits patent application in 1916
- Patent only accepted April 3 1919

PATENT SPECIFICATION

Application Date, Feb. 16, 1916. No. 2339/16.

Complete Left, June 13, 1916.

Complete Accepted, Apr. 3, 1919.

PROVISIONAL SPECIFICATION.

Improvements in Telegraphy and Apparatus therefor.

I, ALGERNON CLEMENT FULLER, of Signal Service Training Centre, Woburn, Bedfordshire, Captain, R.E., do hereby declare the nature of this invention to be as follows:—

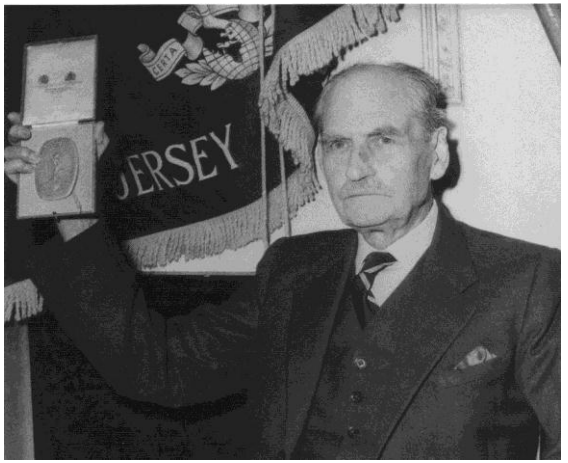
This invention relates to improvements in telegraphy and apparatus therefor and has for its principal object to devise means whereby the telegraphic signals transmitted cannot be read or overheard in the line except by inserting in the line a form of instrument constructed in accordance with the invention.

A further object of the invention is to enable telegraphic signals and telephonic speech to be simultaneously carried over the line, the telegraphic signals and the speech being entirely separate and distinct the one from the other.

A still further object of the invention is to provide means whereby the disturbing effects in the apparatus of any earth or extraneous currents may be entirely eliminated.

3c. Rewards for the Fullerphone

• Freed from wartime secrecy, Fuller gives Fullerphone paper to IEE April 13 1919.
• Gets IEE Webber premium
• Admiration for both technical innovation and saving lives of signals engineers
• Challenges to priority e.g. from A.C. Brown with 1896 patent (a Bell associate)
•With Army support, Fuller takes claim to Royal Commission on Awards to inventors
• 1st March 1920, claims £21,899
•Commission & awards him just £3500 – active patent rights and contested priority
• But O.B.E. in 1922 & C.B.E in 1941 for refined Fullerphone used in World War 2.



Major General Fuller 1966 awarded the Royal Signals Institution's Princess Mary medal

4.Wireless: Marconi and Lodge seeking rewards

- Pre-war Marconi company collapse in credibility in “Marconi Scandal” (1913) & lost opportunity for imperial wireless chain
- During war Government appropriates all wireless facilities: Marconi effectively a national combat & training resource.
- Post-war claims for compensation for lost patent royalties and services to state to both Post Office and Government..
- Adviser Lodge also claims *infringement* of his syntony patent
- 1922: Admiralty pays £257,000. 1924: Post Office pays £75,140
- Marconi and Lodge also dissatisfied with lost profits due to Government sub-contracting of wireless manufacture.
- 1925 assigned to Lord Buckmaster to arbitrate: outcome secret
- But Marconi now has funds for ETC merger: Cable & Wireless

Conclusions

- First World War 1 reveals important features of IP management of telecomms not hitherto addressed by (civilian) historians of technology:
- Over-riding imperative was to adapt telecomms for secret usage against a counter-strategizing combatant – very different to civilian development

  State makes more routes available for inventors to gain reward
- Telephony/telegraphy open & patentable with/without military approval.

  Stevens - rewarded through (shared?) patent royalties and book sales

  Fuller - rewarded by patent royalties, army and Commission rewards
- Wireless closed during war and innovations handled secretly e.g. B.I.R.

  Lodge and Marconi squabble over compensation for nearly a decade.

  But Marconi ends up in a stronger position to merge with cable rivals
- Yet telegraphy lives on in the form of the Fullerphone – used during WW2
- Question: does wartime reveal authentic nature of IP or just a refraction?