



Paper to be presented at the
DRUID Society Conference 2014, CBS, Copenhagen, June 16-18

The Coordination of Independently-Owned Vacuum Tube Patents in the Early Radio Alleged Patent ?Thicket?

John Howells
Aarhus University
School of Business and Social Science
joh@asb.dk

Katznelson D Ron
Bi-Level Technologies
Encinitas, CA
ron@bileveltech.com

Abstract

It has been proposed that difficulties in negotiating cross-licenses under multiple, independently-owned and ?overlapping? patents may lead entrepreneurs to hold-up or deter development of technology covered by such patents. The literature alleges these features were present in radio development during 1905-1920, with numerous allegations of an impasse in bargaining the necessary patent rights until these were ultimately incorporated in the RCA patent pool. This paper seeks to determine with new precision how entrepreneurs and managers actually managed patent rights in this scenario. Accordingly, we re-examine the legal trajectories and entrepreneurial exploitation of patents on early vacuum tube technology where Fleming?s diode patent was alleged to have ?overlapped? with De Forest?s triode patents. We show, by means of the relevant historical record, patent claims, litigation records and other relevant law, how patent rights were resolved by the courts and by the immunity of suppliers to the government from patent infringement liability. We trace the cross-licensing agreements between the different radio interests and find that licensing was always chosen over hold-up and so enabled robust, state-of-the-art radio development.

The Coordination of Independently-Owned Vacuum Tube Patents in the Early Radio Alleged Patent “Thicket”

By John Howells* and Ron D Katznelson**

Abstract

It has been proposed that difficulties in negotiating cross-licenses under multiple, independently-owned and “overlapping” patents may lead entrepreneurs to hold-up or deter development of technology covered by such patents. The literature alleges these features were present in radio development during 1905-1920, with numerous allegations of an impasse in bargaining the necessary patent rights until these were ultimately incorporated in the RCA patent pool. This paper seeks to determine with new precision how entrepreneurs and managers actually managed patent rights in this scenario. Accordingly, we re-examine the legal trajectories and entrepreneurial exploitation of patents on early vacuum tube technology where Fleming’s diode patent was alleged to have “overlapped” with De Forest’s triode patents. We show, by means of the relevant historical record, patent claims, litigation records and other relevant law, how patent rights were resolved by the courts and by the immunity of suppliers to the government from patent infringement liability. We trace the cross-licensing agreements between the different radio interests and find that licensing was always chosen over hold-up and so enabled robust, state-of-the-art radio development. **Full text available at <http://j.mp/Radio-Thicket>.**

Keywords: Patent thicket, Overlapping patents, Anticommons, Holdup, Radio, Vacuum tube, Diode, Triode, Marconi, De Forest, Fleming, RCA.

Table of Contents

1	Introduction	2
2	Development of the Triode and Licensing of the Diode Patent	5
2.1	Development of vacuum tube technologies as radio detectors	5
2.2	Development of the revolutionary properties of the triode	9
2.3	The legal background to radio development and the 1916 decision	11
2.4	Post-War Resumption of Civil Radio Markets	13
2.4.1	Marconi Company Licensing of the Diode Patent	13
2.4.2	Pioneer patents pooled to create RCA	14
3	Conclusion	15
	References	17
	Appendix - Key vacuum tube-based electronics and radio patents	20

* Department of Business Administration, Bartholins Allé 10, School of Business and Social Science, Aarhus University, 8000, Aarhus, Denmark Email: joh@badm.au.dk

** Bi-Level Technologies, Encinitas, CA, USA. Email: ron@bileveltech.com