

<p>1942 Oct. 13, 14, 15, 16, 19, 20, 21, 22, 23.</p> <p>1943 May 17.</p>	<p>PHILCO PRODUCTS LIMITED AND CUTTEN-FOSTER & SONS, LIM- ITED (DEFENDANTS)</p> <p>AND</p> <p>THERMIONICS LIMITED, CANA- DIAN MARCONI COMPANY, THE CANADIAN GENERAL ELECTRIC COMPANY LTD., CANADIAN WESTINGHOUSE COMPANY, LTD., AND ROGERS-MAJESTIC CORPORA- TION, LTD. (PLAINTIFFS)</p>	<p>} APPELLANTS;</p> <p>} RESPONDENTS.</p>
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ON APPEAL FROM THE EXCHEQUER COURT OF CANADA

Patent—Infringement of two patents—One held valid and to have been infringed, and one held invalid—Subject-matter—Invention—Anticipation—Alleged illegal agreement in restraint of trade as defence to action for infringement.—Patentee nevertheless entitled to enforce his rights—Combines Investigation Act, R.S.C., 1927, c. 26—Patent Act (D.) 25-26 Geo. V., c. 30—Criminal Code, s. 498.

The action, brought by the respondent Thermionics Limited, is one for the infringement of two patents, the Langmuir and the Freeman patents, acquired by it by way of assignment from the patentees, both patents relating to devices known as vacuum tubes used in radio sets. The other respondents are licensees under the patents so assigned. The appellant, Cutten-Foster & Sons Ltd., was reselling radio tubes, imported into Canada and sold to it by the appellant, Philco Products Ltd., which tubes are alleged to infringe both patents. The Langmuir patent is entitled "Electron Discharge Apparatus"; and the invention relates to electric discharge devices which are provided with three electrodes, namely, an "electron-emitting cathode", a "co-operating anode" and a "conductor constituting a grid" which regulates the flow of electrons. This "combination" was claimed to include a highly evacuated envelope and structural features which are alleged to be novel and to co-operate to increase the range and capacity of such devices. The Freeman patent had for its principal object the provision for radio service of a tube which may be used in the ordinary receiving and amplifying circuits with alternating current on the filament, thereby eliminating, it is contended, the major alternating current hums or noises which were due to three different factors, i.e., the electrostatic, thermal and magnetic effects. A complete detailed description of the patents is contained in the judgments. The appellants also contended that the assignments of the patents to the respondent, Thermionics Ltd., were invalid on the ground that they had been given for an illegal consideration, having been made as a result of an agreement between the respondents whereby they could fix, control and unreasonably enhance the prices at which radio tubes were to be sold to dealers in, and users of, these tubes, thereby restricting competition and detrimentally affecting the public, contrary to the

PRESENT:—Duff C. J. and Rinfret, Kerwin, Hudson and Taschereau JJ.

relevant provisions of the *Combines Investigation Act* and of section 489 of the Criminal Code. The trial judge denied to the appellants the right to adduce evidence to establish facts and things in support of their above-mentioned contentions. The trial judge also held that both patents were valid and that they had been infringed by the appellants.

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Held that, as to the Langmuir patent, the appeal of Philco Products Limited should be allowed, and, as to the Freeman patent, the appeal should be dismissed. The Chief Justice and Hudson J. would dismiss the appeal, and Rinfret J. and Taschereau J. would allow the appeal of Philco Products Limited, in connection with both patents (1).

Held that the combination of the features referred to in the Langmuir patent does not afford subject-matter, and, as between the respondents and the appellant Philco Products Limited, the patent granted on Langmuir's application is invalid. The Chief Justice and Hudson J. dissenting.

Held that the Freeman patent was a true combination patent and a novel and useful device, that there was subject matter in it and that the appellants have infringed. Rinfret J. and Taschereau J. dissenting.

Held, also, that, as to the Freeman patent, the defence of anticipation has not been established. Rinfret and Taschereau JJ. dissenting.

Held, also, that the appellant Cutten-Foster & Sons Ltd. was bound by a clause in an agreement entered into by it that it "admits the validity of the letters patent under which radio tubes are or may be licensed", and that, by reason of such admission, the Langmuir patent is valid as between it and the respondents.

Held, further, that the defence, based on an alleged offence against the relevant provisions of the *Combines Investigation Act* and of section 498 of the Criminal Code, should fail. Assuming the transactions between the respondents or some of them and Thermionics Ltd. were illegal and void, the patents were still vested in them and they were entitled to enforce those rights (Sections 54 to 57 of the *Patent Act*).

Judgment of the Exchequer Court of Canada ([1941] Exc. C.R. 209) varied.

APPEAL by the defendants from the judgment of Maclean J., late President of the Exchequer Court of Canada (1), maintaining the respondents' action and holding the appellants liable for the infringement of two patents, both relating to radio tubes, and granting relief accordingly to the respondents, of whom the first named sued as owner by assignment of the two patents and the others as licensee thereunder.

Maclean J. held that both patents were valid and that they had been infringed by the appellants.

(1) [1941] Exc. C.R. 209.

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The material facts of the case and the questions at issue are stated in the above head-note and in the judgments now reported.

D. L. McCarthy K.C. and *E. G. Gowling* for the appellants.

O. M. Biggar K.C. and *R. S. Smart K.C.* for the respondents, except the Canadian Marconi Company.

W. F. Chipman K.C. for the respondent, the Canadian Marconi Company.

The judgment of the Chief Justice and Hudson J. was delivered by

THE CHIEF JUSTICE.—To deal first with the Langmuir patent, it is important to notice with care what the invention is, as described in the patent. “The present invention”, the patent states, “relates to electron discharge devices, for example, discharge tubes having an incandescent cathode”. The general character of the devices is described in the specification in these words:—

Devices of this nature are provided with an electron-emitting cathode, an anode, and a conducting body, commonly termed a “grid”, consisting ordinarily of an electrical conductor located between cathode and anode for statically controlling the electrical discharge conditions of the tube.

It proceeds:—

Electron discharge devices as described may be operated at exceedingly high voltages and have a high load capacity. This new apparatus is suited for use in a much wider field than former devices of this nature which were limited to low voltages and very feeble currents.

The combination includes a highly evacuated envelope and structural features which are said to be novel and to co-operate to increase the range and capacity of such devices. Evacuation, it is said, should be carried preferably to a pressure “as low as a few hundredths of a micron, or even lower”. In any event, it should be so low that no appreciable gas ionization takes place during normal operation. The various parts of the apparatus are shown as mounted in a tube, or globe, upon a pedestal “similar to the mount employed for incandescent lamps”. The cathode consists of a substantially straight filament of highly refractory material, preferably tungsten, mounted between two oppositely disposed supports constituting a

frame-work, and upon this frame-work is wound (transversely to the cathode) the wire which constitutes the grid. The turns of the wire are closely adjacent to each other and "very closely adjacent to", but out of contact with, the incandescent cathode. The supporting frame-work for the cathode and grid is attached to a rod, mounted upon the stem of the tube, and adjacent to this frame-work is the anode, which consists of a wire strung zig-zag over hooks attached to fork-shaped supports and attached to the same rod springing from the stem of the tube. It should be observed parenthetically that the form of neither the anode nor the cathode, as given in this description, is exclusive. Alternative forms are suggested by which the anode takes the form of a plate attached to supports similarly provided and the cathode is "V" shaped. Under these alternative forms, the operation of the apparatus, as regards the matters with which we are concerned, remain the same in principle.

Langmuir admittedly was the first to propose vacuum tubes in which the removal of gases from the envelope was carried to the degree described in this specification. The terms "highly exhausted tube" and "highly rarefied tube", which had been used by scientists and engineers for some years before 1913, the date of Langmuir's invention, conveyed no idea of such a degree of exhaustion, which, by the methods of evacuation then available, could not have been achieved. The advantages of the hard valve, or the hard tube, meaning a highly exhausted valve, are well recognized, one of the most important, perhaps the most important, being that the removal of the residual gases by the methods initiated by Langmuir got rid of a pronounced lack of uniformity in operation, which was encountered in tubes of the soft variety, and made possible the use of tubes carrying current of great magnitude, as well as of exceedingly high potential. About this there is no dispute and, simultaneously with the patent now in question, Langmuir applied for and obtained a patent for his highly exhausted tube which has expired.

The invention of the hard valve brought about a revolution in the radio art. On behalf of the appellants it is contended that the value of the apparatus now in question is almost entirely due to the fact that such a valve is employed and that beyond this Langmuir's combination

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involves no invention. On the other hand, it is contended that by this apparatus, and especially by its novel features, the advantages of the hard valve can be realized to a degree not possible through any apparatus previously known.

The features of the apparatus, which are emphasized in the argument of the respondents, are:

(1) The construction of the grid consisting of a wire, which may be very fine, wound upon a frame-work, which may be made of a non-conducting material, or of metal, in turns closely adjacent to one another.

(2) The position of the filament which is supported by the two ends of the same frame that supports the grid and is surrounded by the turns of the wire constituting the grid, but not in contact with, though closely adjacent to it.

(3) That all the electrodes, the cathode and the grid (that is to say, the frame which supports the cathode and the grid), and the anode (or the supports to which the anode is attached) are mounted upon a single pedestal in such a manner that sufficient rigidity may be secured to protect each and all of the parts of the apparatus against material shocks, or electrical stresses, having a tendency to bring the separated parts of the apparatus into contact with one another, or to alter the relative position of one part in respect to any other.

As we have seen, it is explicitly stated in the specification that the electron discharge device described may be operated at "exceedingly high voltages" and have a "high load capacity"; the evidence supports this averment.

It is also said that this new apparatus is adaptable for use in a much wider field than former devices of the same nature which were limited to low voltages and very feeble currents.

There is, moreover, a statement at the end of the specification that the apparatus may be used to transmit currents limited in potential only by the dielectric strength of the tube and the mechanical strength of the parts subjected to static forces; the evidence establishes this.

I think the evidence sufficiently supports the proposition that such a closely wound grid in close proximity to

the cathode can be employed to obtain a high magnification of the plate current; in other words, that a slight proportionate increase in the potential applied to the grid may cause a vastly greater proportional increase in the value of the plate current; and there is evidence that it may be used to obtain a high load capacity and high magnification of the plate potential.

It is indisputable that the form of grid adapted by Langmuir was entirely new and I cannot accept the proposition that the utility of a closely wound grid of this type placed in close proximity to a cathode, as Langmuir places it, must have been obvious to any radio engineer at the time; nor can I think that the idea itself of using a grid of that type can be said to have been obvious. It seems to me to be too clear for discussion that the grid was a useful improvement and that employed in the manner prescribed by the specification it would co-operate with the highly evacuated envelope to produce most important results. I cannot reach the conclusion that Langmuir's patent has no subject matter.

As to Freeman and Wade, Freeman's invention was made in August, 1921. As a rule, up to that time the heat supplied to the cathode had been derived from a direct current storage battery known as A-battery. There was a wide and insistent demand for some plan by which this battery might be dispensed with and the alternating current of the ordinary electric light circuit be utilized. Such alternating current was then, as now, supplied between 25 and 60 cycles. The application of this current to the tubes of that time produced a loud humming noise in telephone receivers and loud speakers, and Freeman devoted himself to designing a cathode and connections by the use of which this fault might be corrected.

There were then two common types of cathode. In one, the electrons were emitted from the incandescent surface of a refractory conductor, or filament, directly heated by current from an A-battery. In the other, an A-battery also supplied direct current which heated a conductor and from this conductor heat for the cathode was indirectly derived. It seems to be generally admitted that the second type possessed advantages over the first in securing greater uniformity of emission throughout the whole sur-

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face of the cathode and thus, in considerable degree, avoiding undesirable irregularities in the electrical field between the anode and the cathode.

When it was attempted to utilize the alternating current of the electric light circuit for heating the filament, the humming noises mentioned were so pronounced that the necessity of discovering some means of getting rid of these noises was at once evident. Freeman ascertained that these noises had three distinct sources, which are conveniently designated as magnetic, electrostatic and thermal. The specification states:

The principal object of our invention is to provide a device of the character described which may be employed for detecting, amplifying or rectifying alternating currents and which embodies a cathode structure adapted for excitation from a source of low-voltage, commercial-frequency alternating-currents without the introduction of the alternating-current noises heretofore observed in the operation of such devices.

* * *

Heretofore, it has not been practical to employ alternating currents for the excitation of the cathode or filament of a receiving or amplifying tube for the reason that such currents introduce variations in the plate current of the tube. Such variations are thought to be due to the following causes:

1. The variations in the intensity of the magnetic field established by the alternating currents traversing the filament, thereby resulting in a variable deflection of the electron stream emanating from the filament;
2. The variations in the electric field around the filament which are caused by the reversals in the potential distribution along the filament;
3. The variations in the emissivity which are caused by the alternate heating and cooling of the filament.

We have found that the desirable results outlined hereinabove may be obtained by applying a cathode construction having an operating cathode surface which has no fall of potential along its surface, that is, a so-called "equipotential surface". Such cathode surface may be rendered thermionically active in a number of different ways, as by subjecting the same to heat or to an electron bombardment. In one form of embodiment of our invention, we provide a cathode construction comprising a central heater element and a co-operating equipotential cathode surface which is positioned immediately adjacent to the heater element. The thermal energy of the heater element may be transferred to the cathode surface either by conduction or by radiation.

There can be no doubt that by Freeman's combination these noises from all the sources are for practical purposes sufficiently suppressed. By giving to the cathode a substantial mass, a temperature which is virtually constant is maintained in it. As to magnetic hum, the legs of the U-shaped wire are so close together that the opposed magnetic fields go far to cancel each other; and Freeman has

by his device succeeded in reducing the effect of these fields to a point where it ceases to be of practical importance. Electrostatic hum disappears, the evidence shows, because Freeman's arrangement affords an effective shield against the electrostatic effects of the alternating potential.

I agree with the learned President of the Exchequer Court of Canada that the defence of anticipation has not been established and I think it unnecessary to add anything to his discussion of that branch of the defence.

The question of substance is: is there subject matter? Freeman, it must be remembered, was not engaged in a scientific investigation. He was trying to find a practical method for getting rid of the noises attending the use of alternating current for heating the cathode. He, of course, possessed the knowledge of scientific principles that we should naturally ascribe to any competent radio engineer; but the practical difficulties were stubborn. The primary object of the current was to produce the emission of electrons from the cathode by the agency of heat; and the heat generated by the current must have the required effect upon the cathode surface. At the same time the flow of electrons must be protected from disturbance due to the magnetic and electrostatic fields set up by the alternating current. This practical problem Freeman succeeded in solving.

The learned President says:—

There can be no doubt that it was obviously desirable that generally radio receiving tubes be operated, if possible, by commercial alternating current, and apparently that was an object that engaged the attention of prominent workers in the art, prior to the date of Freeman. Freeman was the first to disclose a device which could use alternating current and at the same time eliminate the major alternating current hums or noises, and his device has been almost universally used for the purposes described and directed by him. It seems to me that a very strong case has been made for sustaining the validity of this patent. My conclusion is that Freeman is a true combination patent, a novel and useful device, almost universally used in all receiving and amplifying radio circuits using alternating current, and apparently it solved problems which were recognized, the solution of which was deemed desirable and sought for by others, and that there is subject-matter in Freeman.

With this I agree.

I am also satisfied with the conclusions of the learned President in respect of the issue of infringement and with his reason in support of those conclusions. I ought perhaps

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to say explicitly that I think the learned President has quite satisfactorily dealt with the argument based upon the Torrisi patent.

I now come to the defence based upon the Criminal Code. Paragraph 7 of the statement of defence is in the following words:

The assignments by which the plaintiff, Thermionics Limited, purports to have acquired and holds the patents in suit are invalid because they were given for an illegal consideration, having been made in pursuance, or as a result of an agreement between or among the plaintiffs or some of them, whereby the said plaintiffs fix, control and unreasonably enhance the prices at which radio tubes are sold to dealers in and users of the said tubes, thereby restricting competition and detrimentally affecting the public, all of which is contrary to the provisions of the *Combines Investigation Act*, R.S.C., 1927, chap. 26, section 2, and amending Acts, and The Criminal Code, R.S.C. 1927, chap. 36, section 498.

The respondents put in evidence the following exhibits in support of the title of the patents in suit:

Exhibit no. 3

Assignment, dated January 2, 1936, of Langmuir patent 212,366 and other patents from Canadian General Electric Company, Limited, to Thermionics Limited, for consideration of one dollar.

Exhibit no. 4

Assignment, dated January 2, 1936, of Freeman and Wade patent 265,517, and other patents from Canadian Westinghouse Company, Limited, to Thermionics Limited for consideration of one dollar.

Exhibit no. 5

License agreement, dated January 2, 1936, from Canadian General Electric Company, Limited, to Thermionics Limited, granting licenses under "all present and future patents" of Licensor and Radio Corporation of America, relating to radio tubes, providing for and limiting the assignments of all patents, including the Langmuir patent in suit, and cancelling many other recited agreements.

Exhibit no. 6

License agreement, dated January 2, 1936, from Canadian Westinghouse Company, Limited, to Thermionics Limited, granting licenses under "all present and future patents" of Licensor and Radio Corporation of America, relating to radio tubes, and providing for and limiting the assignment of all patents, including the Freeman and Wade patent in suit, and cancelling many other recited agreements.

Exhibit no. 7

Admission by appellants, among other things that defendant Cutten-Foster & Sons, Limited, a jobber and one of the appellants, entered into a licensed radio tube sales agreement with the plaintiff Canadian Marconi Company, as of January 3, 1938, executed February 28, 1938.

Exhibit no. 9

The Cutten-Foster agreement, identified in exhibit 7

The Cutten-Foster agreement in question was entitled "Licensed Radio Tube Sales Agreement (Jobbers)" and defined, among others, the following terms as a basis upon which radio tubes would be furnished by Canadian Marconi Company, Limited, to Cutten-Foster & Sons, Limited.

It was recited that

"The Manufacturer is engaged in the business of manufacturing and/or selling Thermionic devices * * * hereinafter known and described as 'Radio Tubes';

"All said Radio Tubes are covered by various Letters Patent of the Dominion of Canada owned or controlled by Thermionics Limited";

"The Licensed Jobber desires to become an authorized jobber of the Manufacturer for the sale only of licensed Radio Tubes in accordance with the license terms and conditions applicable to the same";

(1) "The Manufacturer agrees to sell and the Licensed Jobber agrees to purchase such Radio Tubes";

(4) "The Manufacturer reserves the right at any time to change or modify the list prices, net prices or terms to the Licensed Jobber and/or dealers in respect of Radio Tubes merchandized by the Manufacturer";

(5) "The Licensed Jobber agrees to accept its appointment as a jobber licensed for the sale of only such Radio Tubes as are manufactured in accordance with * * * the manufacturing patent license enjoyed by the Manufacturer and will purchase only such tubes as are so licensed. The Licensed Jobber * * * will not sell * * * any licensed Radio Tubes at less than such net prices to dealers, service men and licensed amateurs as may be approved from time to time by the Manufacturer, nor will the Licensed Jobber sell to any customers * * * at less than such list prices as from time to time may be approved by the Manufacturer; * * * Any price lists * * * issued * * * by the Licensed Jobber shall contain the list prices only of licensed Radio Tubes as from time to time approved by the Manufacturer."

(6) "* * * The Licensed Jobber admits the validity of the Letters Patent under which said Radio Tubes are or may be licensed * * * and admits that all Radio Tubes manufactured in accordance with said Letters Patent are subject to the limited licenses set forth on the labels attached thereto, and to the conditions set out in this agreement or in the Manufacturer's patent license agreement."

The appellants' counsel, being called upon to state the facts which he proposed to establish under the plea based upon the *Combines Act* and the *Criminal Code* (para. 7), stated it was his purpose to prove that:

before the execution of the agreement in 1936, these four people were exercising their rights under their patents and in open competition. But the result of the agreement was to put the fixing of prices of all the radio tubes made in Canada in the hands of one person, who as a matter of fact, receives no benefit from it, because he gets no royalties except a small royalty from one,—who fixes the price of all radio tubes in Canada and entirely eliminates all competition.

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that they are the only manufacturers in Canada; that in 1936 they combined and put the right and the power to fix prices in Thermionics Limited, to whom they assigned their patent rights; and that that company, controlling as it does every manufacturer in Canada, has fixed prices, has fixed prices not only to the manufacturer but also to the retailer and the jobber. Therefore I say that of itself is an infringement not only of the Code but also of the *Combines Investigation Act*.

The appellants contend that, as a result of the ruling of the President of the Exchequer Court of Canada, they were denied the right to adduce evidence to establish *inter alia* the following facts and things:

That the respondents, then in open competition, entered into a combine to create a holding company for all of their patents on radio receiving tubes,

That they granted licenses to manufacture radio tubes only to three members of their own group, so that all radio tubes manufactured in the Dominion are limited to these sources,

That there was no consideration for the assignments of the patents on radio receiving tubes other than the illegal combine licenses,

That the respondents jointly fixed the prices of all radio tubes manufactured in the Dominion,

That the respondents kept no records of their price fixing,

That the respondent, Canadian General Electric Company Limited, used the respondent, Thermionics Limited, as a medium to bring patent suits against its competitors without prejudicing its own sales,

That practically all the research and patents which were pooled by the respondents were derived from their corresponding United States companies,

That they eliminated all competition and stifled trade to the detriment of the public, all contrary to the *Combines Investigation Act* and the Criminal Code,

And that the assignments upon which the respondents base this action were founded solely upon illegal agreements and combines.

The facts relied upon by the appellants beyond doubt point to the conclusion that the respondents had entered into an agreement to restrict competition among themselves in respect of radio tubes; and I shall assume that where A and B enter into an agreement to suppress competition in respect of articles of commerce they do not escape the provisions of section 498 of the Criminal Code merely by reason of the fact that these articles of commerce are protected by patents. I shall assume further that the learned trial judge ought to have permitted the appellants to proceed with evidence establishing the existence of such a combine, that is to say, a combine constituting a criminal offence under section 498.

I find myself faced with this difficulty. Prior to the arrangements of 1936, which are impeached by the plea

of the appellants, the Langmuir patent was vested in the General Electric Company—in point of fact the Canadian patent was issued to the Canadian General Electric Company—and the Freeman patent was vested in the Westinghouse Company, having been issued to that company. The illegal combination, assuming it to have been such, to which these companies were parties, did not effect a forfeiture of the statutory rights under the patents. Assuming the transactions between these companies and Thermionics Ltd. were illegal and void, the patents were still vested in them and they are, I think, entitled to enforce those rights. By sections 54 to 57 of the *Patent Act*, the patentee, as well as those claiming under him, is entitled to recover damages sustained by reason of the infringement, as well as, in a proper case, to an injunction. On this ground I am constrained to the conclusion that the defence embodied in paragraph 7 fails.

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The appeal should be dismissed with costs.

The judgment of Rinfret and Taschereau JJ. was delivered by

TASCHEREAU J.—This is an action for infringement brought by Thermionics Limited, a patent holding company. By order of the Court, Canadian Marconi Company, Canadian General Electric Company, Canadian Westinghouse Company, and Rogers Majestic were added as plaintiffs.

The first of these patents, dated August 30th, 1921, bears no. 213,178 and is called the Langmuir patent; the second one, which is no. 265,517, dated November 2nd, 1926, has been referred to throughout the proceedings as the Freeman patent. Both relate to devices known as vacuum tubes used in radio sets.

In their statement of claim the plaintiffs allege that the defendants, the Philco Products Limited, and Cutten-Foster & Sons Limited, both having their head office in the city of Toronto, have infringed the rights of the plaintiffs under the two above-mentioned patents: the defendant Philco Products importing into Canada, and selling through Cutten-Foster & Sons, and this latter defendant re-selling in the ordinary course of business radio tubes of the types nos. 41E, 75, 78E, 6A, 7E, known

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as Philco tubes, which infringe both letters patent, and also Philco Radio tubes type 84 which infringe letters patent no. 265,517. The late president of the Exchequer Court of Canada came to the conclusion that both patents were valid, and that they had been infringed by the appellants.

As to the Langmuir patent, the appellants submit that it does not disclose any novel patentable subject-matter, that the claims in suit are anticipated by the prior art, and that there has been no infringement. Their submission as to the Freeman patent, is that Freeman did not do more than apply the knowledge common in the art, that it contains no subject-matter, and, as in the first patent, they also submit that there is no infringement.

Dealing first with the Langmuir patent no. 213,178, which is entitled "Electron Discharge Apparatus", and which relates to vacuum tubes, used in radio sets, it is necessary, I think, to indicate the history of the development of these vacuum tubes, for a better understanding of the case.

The early discoveries which lead to their creation go as far back as the beginning of this century. The first audion detector was operated with a Bunsen Burner, the flame of which heated salt in a small cup, with the result that small particles of the sodium were thrown carrying electric charges to an upper platinum wire. It was soon found to have great practical disadvantages. Deforest invented a new type of detector. In an ordinary incandescent lamp he placed a filament (cathode), which when heated gave off small particles of ions of metal or carbon, which were bombarded on a sheet of platinum (anode) placed very near the filament. This detector, based on the same principle as the previous one, constituted an improvement, but it did not obviate all the difficulties. The electrons were received only on the vertical plate placed on the side of the cathode, and it followed that all those projected in other directions were lost inside the lamp.

In order to improve this device, Fleming thought of putting a cylinder of platinum around the filament, thus allowing the anode to fulfil its role in a much more efficient way. This new tube was called the "Fleming Oscillation Valve".

At this state of the development of the art, these tubes were, therefore, merely composed of a lamp in which were found a filament or "cathode" (negative pole) from which there was a flow of electrons to the cylindrical "anode" (positive pole). Deforest, after substituting nickel to platinum for the "anode", found that if a "grid" of platinum wire were placed between the anode and the cathode, and properly loaded with electricity, the flow of electrons would become much more regular, and the efficiency of the tube greatly increased.

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The next step was made by Langmuir. The improved Deforest Tube could furnish only a low voltage on account of the gas accumulated in the tube. On the 11th of May, 1920, Langmuir obtained patent no. 200,061 which is not the patent in suit. In his specification he says:

My present invention comprises improvements in electron discharge apparatus having a high load capacity and operable with the highest voltages. The novel features of my invention will be pointed out with greater particularity in the appended claims.

The drawings accompanying the specifications show that in the tube are found an "anode", a "cathode" and a "grid" between both to regulate the flow of electrons. However, the claims make no mention of the grid. Claim no. 9 reads as follows:

9. A discharge tube having a cathode adapted to emit electrons, and anode adapted to receive electrons and tube walls fashioned or shaped so as to permit the free passage of a useful proportion of said electrons from cathode to anode, the gas content or residue of said tube and the relation of the parts of the tube being such that the tube is capable of operation with stable and reproducible results substantially unaffected by positive ionization and fluorescence with currents of at least 5 milliamperes and with voltage of at least 200 volts.

This patent, which expired in 1938, was properly called "the high vacuum patent". The tube did not contain any new devices, but, its capability of operating at a very high voltage and high load capacity, depended upon its evacuation to the degree specified in the patent. It is Langmuir himself, who said, speaking of this patent:

Further investigation showed that with the elimination of the gas effects, all of the irregularities which had previously been thought inherent in vacuum discharges from hot cathodes were found to disappear. In order to reach this condition, however, it was not sufficient to evacuate the vessel containing the electrodes to a high degree, but it was essential to free the electrodes so thoroughly from gas that gas was not liberated from them during the operation of the device. It was also necessary to free the glass surfaces very much more thoroughly from gas than had been thought necessary previously.

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It is under these circumstances and with the above-described development of the art, that Langmuir applied for the first patent in suit, which was granted on the 30th of August, 1921. This patent is called the "Electron Discharge Apparatus".

In his specifications, Langmuir says:

Devices of this nature are provided with an electron-emitting cathode, an anode, and a conducting body, commonly termed a "grid", consisting ordinarily of an electrical conductor located between cathode and anode for statically controlling the electrical discharge conditions of the tube. Electron discharge devices as described may be operated at exceedingly high voltages and have a high load capacity. This new apparatus is suited for use in a much wider field than former devices of this nature which were limited to low voltages and very feeble currents.

The present invention comprises various structural features of novelty which co-operate to increase the range and capacity of a device of this type. For example, in accordance with my invention the grid is supported on a frame-work in such manner that mechanical displacement of the grid by static strains or by mechanical shocks cannot easily occur. Other features of novelty are pointed out with particularity in the claims.

Claims 2 to 5 which are the claims on which the plaintiffs rely in their particulars of breaches are as follows:

2. The combination of a highly evacuated envelope, and electron-emitting cathode, a co-operating anode, rods spaced apart and adjacent said cathode, a conductor constituting a grid supported by said rods, and having a plurality of sections transverse to said rods, and external connections for said electrodes and said grid.

3. An electron discharge apparatus comprising an evacuated envelope, an electron-emitting cathode, a co-operating anode, a frame-work spaced about said cathode, and a conductor mounted thereon closely adjacent said cathode.

4. An electron discharge apparatus comprising an evacuated envelope, a refractory conductor, connections for transmitting energy to incandesce said conductor, bars located on opposite sides of said conductor, a wire wound with closely adjacent turns on said bars to constitute a grid, but out of contact with said incandescing conductor, a second set of bars closely adjacent to the first set but insulated therefrom and a conductor constituting an anode mounted thereon in a plane substantially parallel to said grid, and leading-in conductors to said grid and anode.

5. A vacuum discharge tube comprising a highly evacuated envelope, a cathode adapted to be heated, a co-operating anode, a frame-work located adjacent thereto, a conductor mounted thereon, and located between the cathode and anode, and external connections for said electrodes and said conductor.

It is clear, I think, that what is claimed by this patent is a "combination" composed of a "highly evacuated envelope, and electron-emitting cathode, a co-operating anode", and a "conductor constituting a grid". I have no

trouble in coming to the conclusion that the various elements used in the construction of this "Electron Discharge Apparatus" are contrivances that were known long before this Langmuir patent was issued.

Deforest's filament in the incandescent lamp, bombarding electrons on a circular sheet of platinum as developed by Fleming, by many years anticipated the description of the devices given in Langmuir's patent; and theoretically, the "grid" later discovered by Deforest and placed between the anode and cathode to regulate the flow of electrons, clearly is a bar to Langmuir's claims of novelty. As to the highly evacuated envelope, it was the subject-matter of the patent issued to Langmuir himself under no. 200,061 on the 11th of May, 1920, and it was as a result of this former discovery that it has been made possible to obtain an electron discharge apparatus having a high load capacity and "operable with the highest voltages", as it has been said by Langmuir speaking of his 1920 patent.

The grid has been the subject of much discussion at the hearing, and with the highest respect, I am unable to agree with the conclusions of the learned president. The only descriptions of the grid, which may be found in the claims on which the respondents rely, are the following:

- (a) (claim no. 2) A conductor supported by rods and having a plurality of sections transverse to the rods.
- (b) (claim no. 4) A wire wound on bars, with closely adjacent turns.
- (c) (claims 3 and 5) A conductor wound on a frame-work.

If there is any novelty in this grid, it is surely not in relation to its function, for as Langmuir says in the specifications in order to show the usefulness of this grid:

For example, in accordance with my invention, the grid is supported on a frame-work in such manner that mechanical displacement of the grid by statics, strains or by mechanical shocks cannot easily occur. Other features of novelty are pointed out with particularity in the claims.

It is to the particular structure of the grid that Langmuir has applied his attention, and as to the other features of novelty, I have been unable to find them in the claims. And even the structure does not strike me as being a novelty.

In 1912, Mertz in "Electrician & Mechanic" illustrated a radio tube having a cathode, an anode and a "cylindrical grid" consisting of a helix of wire (as Langmuir's) interposed between the cathode and anode for controlling

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the electron stream. This tube which has been placed on the market was described as follows by Dr. Chaffee in his evidence:

That illustration shows the looped filament, in fact two loops comprising the filament, sealed into the tube from the lower end, a cylindrical or helical grid coil surrounding the filament, and a cylindrical plate. Both the plate and the grid were supported from the upper press of the tube. I think those are the pertinent parts of this article.

And this is how he compares Mertz tube with the appellants' structure:

There are of course some minor differences but essentially, referring in particular to the grid structure, the cylindrical Mertz grid and the defendants' are similar in that they are helical- or spiral-shaped grids, except that in the Mertz grid the helix is supported from the end whereas in the defendants' grid there are side bars put on to maintain the spacing of the various turns uniform, or at least as designed.

And this was confirmed by Mr. Hogan, the respondent's expert:

Q. Is there any difference between the grid shown in the Mertz tube and the grids of defendants' tubes, except that side rods have been inserted in the defendants' tubes?—A. Broadly speaking, I think that is the only difference. The method of support, of course, is different but I am speaking about the grid itself, that is the fact with a helical grid as shown in Mertz and a helical grid as used by defendants. Both are helices.

Moreover, I find in the drawings of the "grid" of Langmuir's first patent such similarity with the "grid" of this patent in suit, that I am unable to see the differences, if there are any.

I believe that it may be said, that the application of side rods to Mertz cylindrical grid is not the work of inventive and creative faculties, but merely the ordinary mechanical modification which may from time to time be expected from skilled mechanics, in the normal development of an art.

Of course, I am not forgetful, and I have kept in mind that what is claimed here is a combination. The combination of known contrivances may be the proper subject matter of a patent, but, it has to achieve a combined result, which is the novelty. In the Langmuir patent, with respect, I see nothing of the kind. The co-acting parts described in the patent were before used together for all the purposes mentioned in the claims. The high voltage which is claimed as the result of this combination, is not

to my mind a statement based on the evidence. Dr. Chaffee, expert witness for the appellants, comes to the conclusion, and Dr. Hogan, called by the respondents, practically corroborates this assertion, that if properly evacuated the Deforest tube could be used at high voltages. The converse is also true, and if improperly evacuated the Langmuir tube would lose its virtue. It is the first Langmuir patent of 1920 that achieved the result of allowing such high voltages to be obtained, and I cannot sustain this patent in suit, unless I import from the expired patent what was its subject-matter. I believe that this Langmuir patent is invalid.

Patent no. 265,57 referred to as the Freeman patent, relates to "Thermionic vacuum tubes" and has also been assigned to the respondents.

In dealing with the Langmuir patent, we were dealing with a tube where direct current only was used to heat an unequipotential cathode, although, as it will be seen later, the equipotential cathode was not unknown. In November, 1920, when the returns of the Presidential election were broadcast, public attention was directed to radio, and the use of alternating current with radio receivers arose widespread interest.

However, in applying alternating current to the then existing radio sets, three noises or "hums" developed in the receiver, which were different in character and independent one from the other. They were found to be due to three different factors.

The voltage drop along the filament caused by the heating current, developed the electrostatic effect, which is an electrical condition existing whenever there is a difference of voltage. It has been described in the case of a tube having a filamentary cathode, as being the difference in voltage along the filament with the result that there is an unequal distribution of the electrostatic field, and consequently of the electron stream between the cathode and anode. If the voltage drop is produced by an alternating voltage the electron stream is disturbed by each cycle of the alternating voltage and a "hum" results.

The second disturbance is caused by the variation of temperature produced in the filament, and is called the thermal effect. When the temperature of the cathode varies appreciably with each cycle of the alternating heat-

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ing current, the flow of electrons varies likewise, and a second "hum" occurs. The third "hum" is due to the magnetic field. In going through a straight filament the heating current produces this magnetic field which will deflect the flow of electrons on the anode; and if the current be alternating, then the deflection will obviously create a disturbance (due to the numerous cycles) which is negligible when the source of heat is direct current.

It is the contention of the respondents that the "Thermionic Vacuum Tube" patented by Freeman on the 2nd day of November, 1926, eliminated all these three disturbances.

I read in the specifications:

The principal object of our invention is to provide a device of the character described which may be employed for detecting, amplifying or rectifying alternating currents and which embodies a cathode structure adapted for excitation from a source of low-voltage, commercial-frequency alternating-currents without the introduction of the alternating-current noises heretofore observed in the operation of such devices.

We have found that the desirable results outlined hereinabove may be obtained by applying a cathode construction having an operating cathode surface which has no fall of potential along its surface, that is, a so-called "equipotential surface". Such cathode surface may be rendered thermionically active in a number of different ways, as by subjecting the same to heat or to an electron bombardment. In one form of embodiment of our invention, we provide a cathode construction comprising a central heater element and a co-operating equipotential cathode surface which is positioned immediately adjacent to the heater element. The thermal energy of the heater element may be transferred to the cathode surface either by conduction or by radiation.

The claims relied upon by the respondents are: 1, 4, 8, 24, 57 and 58. These claims read as follows:

1. In combination, an equipotential cathode structure comprising an equipotential surface, a non-inductive electrical heater for rendering said surface thermionically active and an alternating current supply circuit operatively associated with said electrical heater for energizing the same.

4. In a cathode structure, a mass of refractory material and a filament comprising branch portions disposed in said mass, said branch portions being so arranged that the magnetic fields established by currents traversing the branch portions balance one another.

8. In a space-current device, the combination with a heater element comprising adjacently disposed portions so arranged that the magnetic fields established by currents traversing said portions balance, of a member providing an equipotential cathode surface and refractory means for insulatingly supporting said heater element and for providing a thermally conductive path between said heater element and said member.

24. In a vacuum-tube device, a heater element in the form of a U-shaped conductor, the parallel members of said conductor being so closely adjacent that the resultant field is without substantial effect on the space current.

57. In an electron-discharge tube, a cathode member comprising a tubular casing having an outer surface adapted to emit electrons and a heating element comprising a plurality of parallel disposed wires within said casing, said heating wires being insulated from each other and from said casing by tubular insulating members individually surrounding said heater wires.

58. In an electron-discharge device, a cathode member having an outer surface adapted to emit electrons when heated, a U-shaped heater wire longitudinally disposed in said tubular casing and refractory tubular members for insulating the same with respect to each other and to the walls of said outer casing.

It will therefore be seen, that, what is claimed is a combination of an equipotential cathode, a non-inductive heater and an anode, the principal object of which is to provide a device heated by alternating currents without the introduction of "hums" or noises, heretofore observed in the operation of such devices.

I do not think this Freeman combination achieved any previously unknown results as claimed by the respondents. The equipotential cathode which is used and relied upon as the main factor eliminating the electrostatic and thermal effects, is not the invention of Freeman. In 1915, Nicholson obtained a patent for a cathode, the purpose of which was to eliminate the non-uniform distribution of the electron stream caused by the voltage drop; and as Nicholson said:

This invention provides a thermionically active cathode which, while affording a large active area, will be devoid of the property of presenting a drop of potential between its terminals. It is in fact an equipotential cathode, that is, a cathode all parts of whose active surface can be maintained at the same potential. Thus, an even distribution of space current over the cathode surface is permitted, and the cathode as a whole may be worked at its maximum efficiency. This result is obtained by divorcing the heating agent from that which produces the thermionic activity.

The evidence reveals, that Nicholson has built these equipotential cathodes prior to 1920, and Mr. Hogan says in his evidence that the Nicholson tube was "theoretically and technically a very good equipotential tube".

Goucher in "Physical Review", in 1916 also describes experiments in which equipotential cathodes were used.

In 1921, Garnett Barber wrote in "Physical Review" that, in order to determine the exact potential at which secondaries begin to be emitted, an equipotential filament is used, and that a hot platinum tube coated with oxide serves as the source of primary electrons.

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In 1921 also, Morecroft, a professor at Columbia University, shows, in a text book entitled "Principles of Radio Communication", how voltage drop along the filament causes an equipotential distribution of the electron stream. He states that the equipotential cathode provides a uniform electrostatic field between the cathode and anode, obviously eliminating the electrostatic effect and also the thermal effect.

Sworykin, a co-worker of Freeman, filed in 1921 a patent application directed to a special alternating current cathode in which it is stated:

Still another object of my invention is to provide such a filament-supply system that the effects of the potential drop along the filament upon the electron emission therefrom may be reduced to a low value, thereby providing a filament having the characteristics of an equipotential cathode.

And, in 1922, Lee Sutherlin also applied for a patent in the United States, entitled "Vacuum Tube Filament Structure". In his specifications he said:

Heretofore, considerable difficulty has been experienced in the excitation of the cathode element of detecting and amplifying vacuum tubes of the three-electrode type by alternating currents of commercial frequency because of the periodic variation in the voltage-current characteristic of the tube, resulting in the so-called "alternating-current hum" in telephone devices associated therewith.

A further disadvantage of many types of vacuum tubes heretofore employed consists in the microphonic action observed in the operation of the tube when the same is jarred. Such microphonic action may take the form of a sustained note of several minutes' duration and may be detected in the telephone receivers associated with the plate-filament elements of the tube.

It will be seen, that in all these patents, the equipotential cathode is well known. If applied to these cathodes, the alternating current does not develop any electrostatic or magnetic effects; on account of the construction of these cathodes and their mass, the emission of electrons is from the sleeve surrounding the filament, and they are, therefore, constantly provided with sufficient heat to emit a regular flow. The electrostatic effect disappears due to the elimination of the voltage drop or fall of potential along the cathode, and the thermal effect is also overcome, because the sleeve is massive enough to prevent any appreciable variation of cathode temperature.

These equipotential cathodes were therefore used long before Freeman, but, as a rule were heated with direct current. In embodying these cathodes into their tubes,

the appellants who sell them to be used without regard to the current to be employed, did not copy Freeman's device, but adapted to their tubes a cathode known since 1915.

When in 1920 and 1921, alternating current became a source of heat for radio tubes, it was common knowledge, that the electrostatic and thermal effects could be eliminated by the use of the equipotential cathode.

There remained, however, a third "hum" which was due to the magnetic field, caused by the use of a single filament. But, it was easily overcome by bending the wire back on itself into the form of a "hairpin". It was then as before common knowledge that the simplest way of eliminating an undesirable magnetic field was to neutralize it by opposing to it an equal field, and this is obtained by the use of the "hairpin" filament. The field due to the current passing up one side of the "hairpin" is balanced by the field of the current passing down the other. The art was well aware of the cause of the deflection of the electrons, and it knew also how to cope with this inconvenience.

Dr. Chaffee explained in his evidence that the magnetic field is circular around the wire, and that Ampere was the first to suggest that if the wire is doubled back on itself, the magnetic field according to the proximity of the wires is neutralized to a greater or lesser extent.

In 1914, Richardson found out that the effect of the magnetic field arising from the heating current is very important and, explained that under certain conditions the effect of this field is great enough to prevent any electrons from reaching the anode.

Marconi in British patent no. 6476 of 1915, entitled: "Improvements in or Relating to the Cathode of Vacuum Tubes Suitable for Use in Wireless Telegraphy" disclosed an equipotential cathode in which a cylinder constitutes the equipotential metallic sleeve from which the electrons are emitted. This sleeve is heated by two wires in the form of an inverted U. These wires are disposed within the cathode sleeve, and are connected by a link at the top so that a complete circuit is formed passing from the battery up through one wire and returning by the other wire to the battery.

Mr. Hogan said in his evidence:

If you wish to cancel the effect of a magnetic field of a straight wire, as that field is exhibited some distance from the wire, then the simplest way to do that would be to set up an opposing field equal in amount from some other similar wire placed as close as possible to the first one.

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Mr. Hogan also says, speaking of the "hairpin" shape of the wire:

It certainly was well known in 1920 and long before, that a so-called non-inductive winding or resistor could be made by doubling a resistance wire back upon itself, and that such a wire did not have a substantial magnetic field.

In the spring of 1921, Sutherlin had pointed out that if alternating current is applied on a straight filamentary cathode there will result a "hum", and that this can be avoided by the bending of the filament upon itself.

In 1921, Sutherlin had made a patent discovery witnessed by Freeman himself in which he stated:

In the construction of vacuum tubes, the filaments of which are to be lighted with alternating current, it is desirable to have the filament made of two branches running parallel to each other and as close together as practicable so as to reduce the magnetic field. The current flows in opposite directions in the two branches.

There is some additional evidence in the record, but what I have pointed out is sufficient, I believe, to show that the existence of the magnetic field, its effect upon the flows of electrons, and the method of overcoming it was well known prior to the alleged invention of Freeman, and that, in order to eliminate it, he merely applied common knowledge.

The result, in my opinion, is that Freeman simply juxtaposed known contrivances (the equipotential cathode, and the hairpin filament), to serve a known purpose, which is the elimination of the electrostatic, thermal and magnetic effects. It is on account of the use of alternating current that the necessity of juxtaposition arose; but it was common knowledge before, that this method was the proper and only one that could be used, when time came to heat cathodes with this additional source of current. Freeman's device may have the merit of having been the first to be assembled, but I do not think it is an invention within the meaning of the *Patent Act*.

Another point raised by the respondents is that Cutten-Foster & Sons Limited, one of the appellants, is estopped from contesting the validity of the patents in suit, because on January 3rd, 1938, it entered into a one-year agreement with one of the respondents, Canadian Marconi Company, under which the validity of the letters patent was admitted.

The clause in the agreement read as follows:

The licensed jobber admits the validity of the letters patent under which said radio tubes are or may be licensed and all trade marks owned by the manufacturer, and admits that all radio tubes manufactured in accordance with said letters patent are subject to the limited licenses set forth on the labels attached thereto, and to the conditions set out in this agreement, or in the manufacturer's patent license agreement.

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I cannot see how Cutten-Foster & Sons Limited can escape the legal consequences that flow from the unequivocal terms of this agreement. It is true that it expired on the 31st of December, 1938, but it is for alleged infringements while it was in force that the proceedings were instituted. Cutten-Foster is, I think, estopped from contesting the validity of these letters patent, and as the evidence reveals that it has infringed, its appeal must fail.

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As to the other defence based upon the Criminal Code and the *Combines Investigation Act*, I agree with the reasons given by my Lord the Chief Justice.

I, therefore, come to the conclusion that the appeal of Philco Products Limited should be allowed with costs throughout. I would vary the judgment of the Exchequer Court of Canada as to Cutten-Foster & Sons Limited so that the order against it be without costs, and I would dismiss its appeal without costs.

KERWIN J.—The first patent in suit, known as Langmuir, issued August 30th, 1921, on a petition dated April 4th, 1919, and filed May 3rd, 1919. The respondents proposed to assert that the invention described in this patent was made by Langmuir on or about March 12th, 1913, but there does not appear to be any evidence in the record as to any date earlier than October 16th, 1913, when a petition was filed in the United States patent office for a patent that is stated to be similar to the one in suit. In the first instance, many claims in the Langmuir patent were relied on but by amendment the respondents confined themselves to claims 2 to 5 inclusive, which read as follows:

2. The combination of a highly evacuated envelope, an electron-emitting cathode, a co-operating anode, rods spaced apart and adjacent said cathode, a conductor constituting a grid supported by said rods, and having a plurality of sections transverse to said rods, and external connections for said electrodes and said grid.

3. An electron discharge apparatus comprising an evacuated envelope, an electron-emitting cathode, a co-operating anode, a frame-work spaced about said cathode, and a conductor mounted thereon closely adjacent said cathode.

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4. An electron discharge apparatus comprising an evacuated envelope, a refractory conductor, connections for transmitting energy to incandesce said conductor, bars located on opposite sides of said conductor, a wire wound with closely adjacent turns on said bars to constitute a grid, but out of contact with said incandescent conductor, a second set of bars closely adjacent to the first set but insulated therefrom and a conductor constituting an anode mounted thereon in a plane substantially parallel to said grid, and leading-in conductors to said grid and anode.

5. A vacuum discharge tube comprising a highly evacuated envelope, a cathode adapted to be heated, a co-operating anode, a frame-work located adjacent thereto, a conductor mounted thereon, and located between the cathode and anode, and external connections for said electrodes and said conductor.

By petition dated June 5th, 1919, and filed August 11th, 1919, Langmuir applied for another patent. This was granted May 11th, 1920 (i.e., prior to the date of the one in suit), and expired before any of the appellants' activities complained of in this litigation. This other patent relates to a hard tube, by which is meant a highly evacuated tube, and is known as the high vacuum tube patent. Claim 2 may be taken as typical:

2. A discharge tube having a cathode adapted to emit electrons and an anode adapted to receive said emitted electrons, the tube walls being fashioned or shaped to permit the direct passage of a useful proportion of said electrons from cathode to anode, the gas content or residue of said tube and the relation of the parts of the tube being such that the tube is capable of being so operated in a range below saturation and materially above ionization voltages that the space current is governed or limited by the electric field of said electrons substantially unaffected by position (positive ?) ionization.

In my opinion all the advantages are present in this that were claimed for the Langmuir patent in suit. What is here claimed is a combination of,—

(a) a hard tube;

(b) a grid, consisting of a wire which may be very fine, wound upon a framework in turns closely adjacent to one another;

(c) a filament supported by two ends of the same frame that supports the grid and surrounded by the turns of the wire constituting the grid but not in contact with, although closely adjacent to it;

(d) the mounting of the grid, filament and plate upon a single pedestal.

The hard tube is covered by the high vacuum tube patent. The hard tube also permitted the use of a higher voltage which in turn would make it clear to one skilled in

the art that protection against electrical stresses would be afforded by the rigidity of the electrodes. That this rigidity could be secured by mounting the electrodes in the manner suggested by Langmuir did not require the use of any inventive faculty and it would also seem to be obvious that this same rigidity would protect the electrodes against mechanical shocks. There was nothing new in using a coarse wire in the grid and quite evidently a fine wire would require support to keep it from sagging or spreading. The combination of the features referred to does not afford subject-matter in Langmuir and as between the respondents and the appellant, Philco Products Limited, the patent granted on his application is invalid.

However, the appellant, Cutten-Foster & Sons Limited, is bound by the following clause in an agreement entered into by it:

The licensed jobber admits the validity of the letters patent under which said radio tubes are or may be licensed and all trade marks owned by the manufacturer, and admits that all radio tubes manufactured in accordance with said letters patent are subject to the limited licenses set forth on the labels attached thereto, and to the conditions set out in this agreement, or in the manufacturer's patent license agreement.

Cutten-Foster & Sons Limited is the jobber referred to and by reason of its admission the Langmuir patent is valid as between it and the respondents. Unquestionably there was infringement.

The second patent in suit is the Freeman-Wade patent or, as it is called, Freeman. For the reasons stated by him, I agree with the learned President of the Exchequer Court of Canada that this

is a true combination patent, a novel and useful device, almost universally used in all receiving and amplifying radio circuits using alternating current and apparently it solved problems which were recognized, the solution of which was deemed desirable and sought for by others, and that there is subject-matter in Freeman

and that the appellants have infringed. I also concur that Freeman was not anticipated and in that connection merely desire to point out that before us the appellants abandoned any reliance upon the Torrisi patent.

For the reasons stated by My Lord the Chief Justice, the defence based upon the Criminal Code and the *Combines Investigation Act* fails.

As regards the Langmuir patent, I would allow the appeal of Philco Products Limited and dismiss the action

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against it, with costs of the action and appeal of all the issues relating to that patent except the defence under the Criminal Code and the *Combines Investigation Act*. The respondents are entitled to hold their judgment in connection with that patent against Cutten-Foster & Sons Limited, but without costs, and the latter's appeal so far as it relates to that patent is dismissed without costs. The costs of the reference, if it is proceeded with, will be dealt with after the Registrar of the Exchequer Court of Canada shall have made his report.

As regards the Freeman patent, I would dismiss the appeal and allow the respondent their costs of the action and of the appeal so far as they relate to the issues involved therein, including the defence based upon the Code and the *Combines Investigation Act*.

Appeal dismissed in part, and appeal allowed in part.

Solicitors for the appellants: *Herridge, Gowling McTavish & Watt*.

Solicitors for the respondents: *Smart & Biggar*.
