BETWEEN:

THE McPHAR ENGINEERING COMPANY OF CANADA LIMITED .... PLAINTIFF;

AND

SHARPE INSTRUMENTS LIMITED and SHARPE GEOPHYSICAL SURVEYS LIMITED ..... DEFENDANTS.

1954
Dec. 3-4, 6-9
1955
Jan. 12-14, 17-21
May 10-13, 16-20, 26-27, 30
1956
Jan. 9-13 16-20, 23-27, 30-31
Feb. 1-3, 8-10, 13-17
1960
Nov. 10

Patents—Infringement—The Patent Act, 1935, S. of C., 1935, c. 32, s. 47—Patent Act, R.S.C. 1952, c. 203, s. 48—Commercial success of invention proof of utility—Statutory presumption of validity of patent—Onus of showing patent invalid not easy to discharge—Charges of ambiguity and avoidable obscurity permissible without pleading or particulars—Infringement by taking substance of invention—Doctrine of equivalency applicable only in respect of non-essential feature—Doctrine of equivalency still in effect in Canada—Whether substance of invention taken a question of fact—Whether particular feature of invention essential a question of fact.

The plaintiff sued for infringement of its rights under patent No. 484,515 for an invention relating to an electromagnetic induction ground prospecting method and apparatus for locating subterranean electrically conducting ore bodies through the use of an exploring primary alternating magnetic field and a detector to indicate spacial angle changes of the field due to the presence of a conducting ore body and the secondary alternating magnetic field set up by it. The plaintiff's transmitting unit consisted of a transmitter coil suspended from below the head block of a tripod so that it hung down freely to be orientable in azimuth and connected with a gasoline driven motor generator. The plaintiff's detector or receiving unit consisted of a receiver coil, with an amplifier and a pair of earphones attached to it, mounted on a pole described as its extended axis, its plane being horizontal, with a clinometer mounted on the pole near the top to enable the operator to measure any angles of deviation in the primary field due to the secondary field set up by a conductor ore body if it was present.

In order to provide the requisite magnetic field strength the equipment in use prior to the date of the invention was of such a heavy nature that it required five men to carry it. The invention covered by the patent resulted in an equipment that could provide the requisite magnetic field strength and be carried by two men. This was accomplished by the inventors by their discovery that they could control the frequency of the generator so that it would be substantially constant by operating it at a frequency below that of the transmitter coil with the result that they could use the maximum power of a small 1.2 horsepower motor and a transmitter that could be carried on the back. They discovered that they could effect the control by using the tuned transmitter coil as a resonant load imposed on the generator that was greater than the maximum power that the motor could supply to it. The resonant load was such that when there was a momentary increase in the power of the motor causing it to speed up the load imposed by the transmitter

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made it slow down to its normal speed and that when there was a momentary decrease in the power the load brought the speed of the motor back to its normal.

The inventors also found that if the transmitter coil was supported with its plane orientated towards the receiver coil and the pole on which the receiver coil was mounted was held in a vertical position so that the axis of the receiver coil was generally in line with the plane of the transmitter coil the risk of phantom or misleading readings by the operator of the receiver coil was reduced to a minimum and they devised a method of prospecting accordingly in which the alignment of the axis of the receiver coil with the plane of the transmitter coil was an essential feature.

In the statement of defence the defendants alleged that the claims in suit were invalid and denied infringement of them.

Held: That the plaintiff's invention has had considerable commercial success in Canada and various parts of the world.

2. That the evidence of the commercial success of the plaintiff's apparatus and prospecting method was convincing proof of their utility.

3. That there is a statutory presumption under section 47 of *The Patent Act,* 1935, of the validity of a patent granted under it and that the onus of showing its invalidity lies on the person attacking it, no matter what the ground of attack may be.

4. That a patentee need not prove the essential attributes of the patentability of the invention covered by his patent before he can succeed in an action for damages for infringement of his patent rights, for he starts with a statutory presumption of their existence in his favor and the onus of showing their non-existence lies on the alleged infringer.

5. That the onus of showing that a patent is invalid is not an easy one to discharge.

6. That the enactment of the statutory presumption of validity effected an important change in Canadian patent law and marked a substantial advance in the protection of a patentee's rights.

7. That the basic concept of control of the frequency of the generator by a load imposed on it by the transmitter coil was a novel one.

8. That a claim for an apparatus may be upheld although it is the operation of the apparatus that is really in issue and that the monopoly in an apparatus may be validly defined by reference to the result which it is to accomplish.

9. That Claim 8 extends only to motors of the size and weight that a person skilled in the art would be likely to use in connection with a transmitter coil that could be carried on a man's back and was tuned as specified in the Claim and that the Claim is not too wide.

10. That the invention defined in Claim 8 involved the exercise of inventive ingenuity.

11. That charges of ambiguity and avoidable obscurity may be made without any reference to them in the pleadings and without particulars.

12. That the term "frequency regulation" in Claim 8 was not ambiguous or avoidably obscure. Any person skilled in the art would know that, since the frequency of the generator could be controlled, it could be regulated and that if he constructed a transmitter coil so that it formed a resonant load for the generator and effected frequency regulation of it in such a way that the frequency was substantially constant, or that it differed from the determined value by an amount that was not appreciable, he would infringe the claim.

13. That the claims were not ambiguous or avoidably obscure by reason of the fact that they contained no reference to the need for the use of a low frequency or a definition of its range. A person skilled in the art would know that the use of a gasoline driven motor and a generator implied that the frequency emanating from it must be a low one and he would know its range.
14. That all the attacks on the validity of Claim 8 fail.
15. That the interpretation of documents is a matter for the Court and not for witnesses.
16. That the alignment feature of Claim 11 that the receiver coil should be "located generally in line with the plane of the transmitter coil" was not anticipated.
17. That it is not a correct approach to the determination of whether a claim is invalid to pick out an individual feature of the invention defined by it and contend that because it is not new or useful or does not involve the exercise of inventive ingenuity the claim is invalid. The alleged invention must be regarded as a whole.
18. That the use of the term "extended axis" in Claim 11 did not make it invalid for ambiguity. Any person skilled in the art would know the ambit of the term and there was no need for specifying it.
19. That all the attacks on the validity of Claim 11 fail and a similar finding applies to Claim 12.
20. That there is nothing to prevent an inventor from claiming less than his invention if that which he claims is itself an invention.

The defendants denied infringement of Claim 8 on the ground that in the transmitting unit claimed in it the transmitter coil was suspended from below the head block of a tripod "to hang freely in a vertical plane" so that its verticality was ensured by the force of gravity, whereas in the defendants' case the transmitter coil was bolted rigidly to a mast above a base plate and could not hang in a vertical plane until after the base plate had been made level by the use of a spirit level on it.

Held:

21. That, since the transmitter coil in the defendants' transmitting unit did not hang "freely", the means of its suspension did not come within the express terms of Claim 8.
22. That Claim 8 is not a claim for a means of suspension of a transmitter coil but for a transmitting unit in which the means of suspension of the transmitter coil is only an accessory that is neither new nor inventive.
23. That the issue in the case was whether the defendants' transmitting unit as a whole was substantially the same as the plaintiff's, notwithstanding the difference in the means of suspension of the transmitter coil.
24. That if a person takes the substance of an invention he is guilty of infringement, even if his act does not in every respect fall within the express terms of the claim defining it. *Clark v. Adie* (1875) 10 Ch. Ap. 667 at 675; (1876-7) 2 A.C. 315 at 320 applied.
25. That if a person takes the substance of an invention he is guilty of infringement and it does not matter whether he omits a feature that is not essential to it or substitutes an equivalent for it. *Marconi v. British Radio Telegraph and Telephone Company Ld.* (1911) 28 R.P.C. 181 at 217 applied.

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26. That a plaintiff can resort to the doctrine of equivalency only in respect of a feature of the invention claimed by him that is not essential to it.

27. That the fact that an element in a combination is particularly described in a claim and differently from its description in another claim or other claims does not make it an essential element in the invention defined in the claims so as to oust the application of the doctrine of equivalency. *Submarine Signal Co. v. Henry Hughes & Son Ltd.* (1932) 49 R.P.C. 149 distinguished.

28. That the doctrine of equivalency is only a particular application of the general doctrine that a patent may be infringed by taking the substance of the invention covered by it.

29. That the doctrine of equivalency is still in effect in Canada and "available for utilization when the proper circumstances arise".

30. That the doctrine of equivalency is not antithetical to the modern concept of patent law, that its retention is still necessary to give inventors the protection against infringers to which they are entitled and that its abandonment would encourage piracy of inventions by taking their substance and omitting or varying some non-essential feature. *Graver Tank & Mfg. Co., Inc., et al. v. The Linde Air Products Company* (1950) 85 U.S.P.Q. 328 at 330 applied.

31. That in every case where it is sought to apply the doctrine of equivalency it must be determined whether the feature in respect of which it is sought to be applied is an essential one.

32. That the determination of the essence of an invention is not to be made exclusively and solely "on an examination of the language used by the patentee in formulating his claims", without resort to any other aid and without regard to the facts. *R. C. Photophone, Ld. v. Gaumont-British Picture Corporation Ld. and British Acoustic Films, Ltd.* (1936) 53 R.P.C. 167 at 197, disapproved.

33. That in order to ascertain the essential features of an invention the specification must be read and interpreted by the light of what was generally known at the date of the patent. *Marconi v. British Radio Telegraph and Telephone Company Ld.* (1911) 28 R.P.C. 181 at 218 applied.

34. That the inclusion of a particular feature of an invention in a claim does not necessarily make it an essential one so as to exclude the application of the doctrine of equivalency.

35. That the question whether the substance of an invention has been taken is one of fact.

36. That the question whether a particular feature of an invention is essential to it is one of fact.

37. That the feature of the invention defined in Claim 8 referred to as "means to suspend said transmitting coil to hang freely in a vertical plane but orientable in azimuth" was not an essential one, that it was merely an accessory which could be replaced by a mechanical equivalent without making any difference to the invention, that the means of suspending the transmitting coil in the defendants' transmitting unit was a mechanical equivalent of it and that the defendants had taken the substance of the invention defined in the claim and infringed it.

38. That the second named defendant infringed the plaintiff's rights under Claims 11 and 12.

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ACTION for infringement of patent.

The action was tried before the President of the Court at Toronto and Ottawa.

Harold G. Fox, Q.C., and *Douglas S. Johnson* for plaintiff.

Christopher Robinson, Q.C., and *Roy H. Saffrey* for defendants.

The facts and questions of law raised are stated in the reasons for judgment.

THE PRESIDENT now (November 10, 1960) delivered the following judgment:

This is an action for infringement of the plaintiff's rights under Letters Patent No. 484,515, dated July 1, 1952, and issued to it as the assignee of George H. McLaughlin and William A. Robinson, the alleged inventors, the date of the application being May 28, 1949.

The opening paragraph of the patent specification states that the invention in suit "relates to a prospecting method and apparatus for locating subterranean conducting materials through the use of an exploring alternating magnetic field and a detector to indicate spacial angle changes of the magnetic field due to the presence of a conductor."

The art to which the invention relates is that of electromagnetic induction prospecting for subterranean electrically conductive ore bodies and more particularly the branch that is concerned with ground prospecting for such bodies. The purpose of the art is to enable prospectors to discover the existence and determine the location and extent of underground ore bodies of such valuable conductors of electricity as copper, nickel, silver and the like. It involves the application of certain principles of geophysics and requires the use of equipment consisting of a transmitting unit and a detector or receiving unit, each with its appropriate elements and attachments.

In the plaintiffs' case the transmitting unit consists of a transmitter coil suspended from below the head block of a tripod so that it hangs down freely to be orientable in azimuth and connected with a gasoline driven motor generator and the detector or receiving unit consists of a receiver coil, with an amplifier and a pair of ear phones attached to it, mounted on a pole. The pole is described as the extended

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axis of the receiver coil, its plane being horizontal. A clinometer is mounted on the pole near its top. In the art the transmitter coil is sometimes called the loop and the receiver coil the detector or search coil, but in these reasons the terms transmitter coil and receiver coil will generally be used.

The theory underlying the electromagnetic induction method of ground prospecting may, for the purpose of this case, be stated briefly in general terms. When the transmitter coil has been located in the area to be prospected and energized by operating the motor it sets up a primary alternating magnetic field in space with magnetic lines of force emanating from it. If an underground electrically conductive ore body is present in the area some of these lines of force pass through it or, to use the term of the art, cut it and thereby generate a voltage in it and induce an electric current to flow through it so that it sets up a secondary alternating magnetic field in space with magnetic lines of force emanating from it. The conductor ore body, hereinafter called simply the conductor, is an anomoly in the earth and its presence creates a disturbance in the primary magnetic field set up by the transmitter coil and causes a deviation in it from that which would be expected in the absence of a conductor. It is possible for the operator of the receiver coil to discover the presence of a conductor in the area, if it exists, and to determine its location and extent by a series of measurements at various points, called stations, and the application and use of certain principles well known to persons skilled in the art.

When the direction lines of force emanating from an alternating magnetic field is such that they cut a receiver coil they generate a voltage in it which induces a current to flow through it so that it creates a sound in the ear phones attached to it. If the lines of force are parallel to the axis of the receiver coil and, therefore, perpendicular to its plane the maximum number of lines of force cut the receiver coil, the maximum amount of voltage is generated in it, the maximum amount of current is created and the maximum sound results in the ear phones. If the axis of the receiver coil is turned slightly so that the lines of force are not parallel to the axis fewer lines cut the coil, less voltage is generated in it, less current flows through it and the sound created in the ear phones is less audible. Finally, if the axis

of the receiver coil is turned so that the lines of force are perpendicular to the axis and, therefore, parallel to its plane, no lines of force cut the coil, no voltage is generated in it, no current flows through it and there is no sound in the ear phones.

Consequently, if the operator of the receiver coil holds the pole on which it is mounted in a vertical position and generally in line with the plane of the transmitter coil, so that the axis of the receiver coil is perpendicular to the direction of the lines of force emanating from the transmitter coil and he does not hear any sound in the ear phones he may conclude, subject to what I shall point out later, that there is no conductor in the vicinity. If he finds the same situation at other stations he knows that there is no conductor in the area.

But if he does hear a sound in the ear phones when he holds the pole in the same position as that already described he knows that some lines of force are cutting the coil and that, consequently, their direction is not perpendicular to the axis of the coil, from which he concludes that there has been a disturbance in the magnetic field emanating from the transmitter coil causing a deviation in the direction of its lines of force from that which would have been normally expected and that this has been caused by a conductor in the vicinity. While he knows that such a body is present he does not know its direction. He then rocks the receiver coil on its extended axis from side to side until he finds the position at which there is a nil or minimum sound in the ear phones. He knows that now the axis of the coil is perpendicular to the lines of force emanating from the disturbed magnetic field and is able to tell their direction and, consequently, that of the conductor. He looks at the clinometer on the pole and notes the angle of declination of the extended axis from the vertical which tells him that the line of declination points in the direction of the conductor. If the angle of declination is to his left the conductor is to his right and *vice versa*.

When the magnetic lines of force emanating from the transmitter coil cut the conductor, they generate a voltage in it and induce a current to flow through it so that in setting up its secondary magnetic field it operates as if it were a transmitter coil. The two magnetic fields combine to produce, in effect, a single magnetic field and the angle noted by the operator of the receiver coil when he has found the

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position of nil or minimum sound is the resultant angle of the angles of declination from the vertical of the vectors of the lines of force of the primary and secondary magnetic fields respectively.

The method of prospecting used by the plaintiff was described in detail by Mr. Cartier, the plaintiff's vice-president, but a brief outline of it will suffice. In the area to be prospected the operator of the transmitter coil set it up at a given spot and connected it with the motor generator. Then a base line up to 1,000 feet was cut from south to north. At its end a traverse line of 800 feet on each side of it was cut. This was chained and pickets placed at 100 foot intervals. These marked the stations at which readings were made by the operator of the receiver coil. Before a reading was taken at a station, the operator of the transmitter coil orientated it to the receiver coil and the operator of the receiver coil held the pole on which it was mounted in a vertical position on the ground so that the extended axis of the coil, namely, the pole, was generally in line with the plane of the transmitter coil. Then the operator of the transmitter coil turned on the motor and the operator of the receiver coil turned on the amplifier, put on the ear phones and listened for a signal. If at the first station, which was on the base line, he did not hear any sound he concluded that there was no conductor in the vicinity and moved to the second station. If he did not hear any sound when he was at this station he knew that there was no conductor near him. But if he did hear a sound he concluded, for reasons that I have already indicated, that a conductor was present in the area. He then rocked the pole from side to side thereby swinging the receiver coil on its extended axis until he found the position of nil or minimum sound. He then looked at the clinometer to ascertain the angle of deviation of the extended axis from the vertical and recorded this angle as his reading at that station. If the angle was to his left this told him that the conductor was to his right. If, at the third station, having found a conductor when he was at the second station, he did not hear any sound in the ear phones he knew that he was directly over the conductor. Here I interrupt the outline of the plaintiff's method to set out the explanation of this phenomenon, as given by junior counsel for the plaintiff, namely, that in this situation the axis of the receiver coil was in the plane of the transmitter

coil and also in the plane of the conductor and the direction of the lines of force emanating from the combined magnetic field was parallel to the plane of the receiver coil and did not cut it and that, consequently, there was no sound in the ear phones. But if, at the third station, the operator of the receiving coil did hear a sound he again rocked the receiver coil on its extended axis until he found the position of nil or minimum sound. If the angle of deviation of the extended axis from the vertical, as ascertained from the clinometer, was now to his right he knew that the conductor was to his left, which meant that it was somewhere between the second and third stations. On the other hand, if the angle was still to his left he knew that he was still on the same side of the conductor ore body as he had been at the second station, namely, that it was to his right, but, of course, nearer to him. This procedure was continued until there were sufficient readings to indicate the east and west limits of the conductor. A similar procedure was followed to ascertain the north and south limits. It was important that before any reading was taken the transmitter coil should be orientated so that its plane contained the receiver coil and that the axis of the receiver coil should be generally in line with the plane of the transmitter coil.

The patent specification contains 71 paragraphs of disclosures and 11 figures and ends with 12 claims of which only Claims 8, 11 and 12 are in suit. These read as follows:

> 8. A transmitting unit for an electromagnetic clinometer apparatus comprising a motor-driven alternating current generator, a tuned air core transmitting coil of a size to be carried on the back connectable with said generator to form a resonant load for said generator acting to effect frequency regulation thereof, and means to suspend said transmitting coil to hang freely in a vertical plane but orientable in azimuth.
>
> 11. A method of prospecting for conductor materials consisting in creating a low frequency alternating magnetic field by means of a transmitting coil suspended to hand vertically and orientable in azimuth and detecting any spacial angle of change of the magnetic field due to the disturbing influence of a conductor material by swinging a search coil located generally in line with the plane of the transmitting coil on an extended axis, and noting the angular position of the axis of said search coil relative the perpendicular for minimum search coil signal.
>
> 12. A method as claimed in claim 11 in which said transmitting coil is energized to provide an audio-frequency magnetic field.

It will be seen that two inventions are claimed, one for the apparatus defined in Claim 8 and the other for the method defined in Claims 11 and 12.

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In the statement of defence several objections were taken to the claims in suit, it being alleged that they are invalid, and infringement of the plaintiff's rights under them, if any, was denied.

Evidence on behalf of the plaintiff was given by Mr. W. O. Cartier, to whom I have already referred, Mr. W. A. Robinson, one of the alleged inventors, who at the date of the invention was the plaintiff's general manager, and Mr. C. E. Doeringer, a lecturer in the Department of Electrical Engineering at the University of Toronto. The witnesses for the defendants were Mr. Hans Lundberg, a practising exploration geophysicist, Dr. H. Watson, the Associate Professor of Physics at the University of McGill, Dr. H. O. Seigel, a consultant in mining geophysics, and Mr. G. Mounce, a professional engineer.

The trial of this action took a total of 54 days, making it the longest patent action trial in the history of this Court. It raised several issues of importance and difficulty and it was essential to a proper understanding of them that consideration should be given to such matters as the state of the prior art and its defects, the objectives sought to be accomplished by the inventors, the problems that confronted them and the circumstances of their solution. And the issue of infringement raised questions of the utmost importance in patent law. But, while I realize the importance and difficulty of the issues and appreciate that it is much easier to see how the trial of a patent action could have been shortened after it has been concluded than it would have been to decide how it could be shortened, either before it began or during its course, I must say, after a review of the transcript of the evidence which took 26 days and consideration of the argument of counsel which took 28 days, that, in my opinion, the trial took an inordinately long time.

There was considerable evidence relating to the state of the prior art. Early prospecting for minerals was of the pick and shovel and drilling type. But it had long been realized that bodies of magnetic ore lying below the surface of the earth caused deviation in the lines of magnetic force emanating from it. In the early days of the war efforts were made to perfect a magnetometer for the purpose of locating submerged submarines which could be mounted in an aeroplane and used to measure the magnetic intensity of the

field over which it was passing and any deviation in it. The advance of radar brought these efforts to an end but the idea of locating magnetic bodies was applied to prospecting for minerals. It seemed obvious that if a magnetometer could detect the presence of a mass of metal such as a submerged submarine by detecting changes in the magnetic intensity of a particular area of the sea it could be equally useful in detecting the presence of magnetic ore bodies below the surface of the earth. Thus it followed that magnetometers were adapted for use in or attached to an aeroplane for aerial prospecting for minerals.

There was also a type of equipment, other than that of a magnetometer, which was used for the purpose of detecting electrically conductive ore bodies below the earth surface such as, for example, the equipment described in the patent in suit.

Several methods of ground prospecting for electrically conductive ore bodies were described in the evidence. One of these was called the electrode or resistivity method. Two iron stakes, which operated as electrodes, were driven into the ground a considerable distance apart and connected with a motor generator which passed a low frequency alternating current between them thus setting up an electric field in the intervening ground. The effect of this was measured by a second pair of electrodes and if the resulting measurement showed a low voltage the presence of a conductor was indicated. There were several disadvantages in the use of this method. One was that it was difficult to use in the winter when the ground was frozen and covered with ice since this formed a non-conducting layer over the ground, a second, that it was difficult to employ where there was not a soil overburden over the rock and the third, that it did not lend itself to use from the air. This method has a limited use. Another method was called the self-potential method. It did not require any current from a motor generator but made use of the natural current in the ground created by the presence of a conductor. It was carried out by using porous ceramic pots containing a saturated copper sulphide solution, pressing the pots into the ground about 100 feet apart and measuring the voltage generated between them. This method is used only to a limited extent.

There was some question whether the resistivity and self potential methods could properly be called electromagnetic

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methods but this need not be determined for they were quite different from the electromagnetic induction method that I have described. There were two embodiments of it, in one of which a horizontal transmitter coil, which might be up to a mile in diameter, was laid on the ground with the receiver coil within the area surrounded by it and in the other the transmitter coil was set up vertically with the receiver coil some distance from it.

The use of the horizontal transmitter coil was subject to serious disadvantages. Its length, even with the use of fine wire, raised a problem of portability for it required two men to carry it and it was difficult to lay it out in swampy or rough, rocky country. Moreover, if the terrain was hilly the coil would be partly horizontal, partly sloping and partly vertical which led to error in the readings made by the operator of the receiver coil. Finally, the horizontal coil was not made up but had to be re-arranged from time to time. There were also difficulties in measuring the effect of the secondary magnetic field set up by a conductor in the case of certain formations such as the argilatious quartzite referred to by Mr. Lundberg. The disadvantages involved in the use of the horizontal transmitter coil, notwithstanding the large area covered by it, were so great that it passed out of use. By 1949 it was not used at all.

The vertical transmitter coil had an advantage over the horizontal one in that it was made up, that is to say, the frame on which it was to be wound could be collapsed and easily set up and the coil wound around it but it had disadvantages. It was not possible to work inside it and the strength of the magnetic field set up by it was not as great as in the case of the horizontal transmitter coil.

There were two kinds of vertical transmitter coils, one operating at high frequencies and the other at low ones. In the early days of the art it was not known that the difference between high and low frequencies was one of kind rather than of degree. It was not realized until after the date of the invention that the magnetic field set up by a high frequency vertical transmitter coil was a wave or travelling field, whereas that set up by a low frequency one was stationary. Several of the witnesses spoke of the two kinds of frequencies as being "different animals".

The terms "low" and "high", when applied to frequencies, must be related to the arts in which they are used. For

example, 25 cycles per second is a low frequency in the case of power transmission and any frequency over 100 cycles is high. On the other hand, in the case of radio transmission anything under 200,000 cycles is low. In the art with which this case is concerned the audio frequency range, that is to say, the range of frequencies that would result in sound that a person could hear through the earphones attached to the receiver coil, is from 20 cycles per second up to 12,000 cycles and even as high as 20,000 cycles. Low frequency is any frequency up to 2,000 cycles or, as Dr. Watson put it, any frequency from 300 cycles per second up to 3,000 cycles. Certainly, a frequency of 1,000 cycles per second, which was that at which the plaintiff's generator operated, was clearly a low frequency.

But whether a high or a low frequency was used the electromagnetic induction method of prospecting was subject to the serious defect that it gave misleading information. The readings taken by the operator of the receiver coil were frequently "phantom readings". This term was used in two senses, one meaning readings indicating the presence of a conductor when no conductor was actually present and the other readings indicating that valuable conductor ore bodies were present when all that was actually present was useless material such as wet clay, muskeg, swampy ground, graphite or powdered rock, which gave indications similar to those that a valuable conductor would have given. This was particularly true when a high frequency vertical transmitter coil was used. It had the advantage of portability since a small coil could be used with a battery but the phantom readings made its use of little value. Efforts were made to overcome the defect of such readings by turning from high to low frequencies. It was found that with low frequencies there were no responses from wet clay unless the frequencies were higher than 5,000 cycles per second. To that extent, there was a gain in accuracy to offset the loss in field strength. Claims verging on the miraculous were made for the method but the efforts to overcome the defect of phantom readings failed. Mr. Lundberg stated that in the boom days of 1926-1928 thousands of indications of ore bodies were obtained by the use of the vertical coil operating at a low frequency but drilling did not disclose any ore. This was a sad experience for prospectors, mine owners and mining claim owners with the result that the use of the vertical

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coil was abandoned about 1928 and not revived until about 1945. Mr. Cartier confirmed this evidence. He stated that large sums had been spent on the basis of reports of prospectors only to find that they were untrue. In the result the whole electromagnetic induction method, whether the transmitter coil that was used was horizontal or vertical and whether it was operated at high or low frequencies, fell into complete disrepute and was not used at all in the period from 1930 to about 1945 when it was revived, as will appear later.

In addition to the problem of phantom readings which baffled the art, there was also the problem of frequency instability in the case of vertical transmitter coils operating at a low frequency. Variation in the frequency of the generator was due to several causes including changes in the condition of the atmosphere due to changes in temperature. This was a particularly important factor in the wintertime. It was recognized in the art that stability of the frequency of the generator was essential to the proper working of the electromagnetic induction method of prospecting and that variations in the frequency caused serious difficulties. One of these was the dissipation of power due to the fact that the transmitter coil set up a magnetic field not only at the frequency to which the receiver coil was tuned but also at other frequencies to which it was not tuned. Moreover, the deleterious effects of wandering frequencies was aggravated by the production of side bands and harmonics, with the result that the transmitter coil was not able to induce a usable current in the receiver coil and cause the desired sound in the ear-phones attached to it. The signal in them would fade or blare or wander, all of which made it difficult for the operator of the receiver coil to determine the position of nil or minimum sound and make reliable readings. Various efforts were made, prior to the date of the invention in suit, to eliminate the harmful effects of variations in frequency, such as by the use of filters, but they had not succeeded.

The events leading to the discovery of the invention in suit and the circumstances under which it was made were described by Mr. Cartier. Late in 1946 he was approached by Dr. A. Brant, Professor of Geophysics at the University of Toronto, and Dr. C. S. Davidson, a consulting engineer for Ventures Limited and its associates, with a view to hav-

ing their prospecting equipment adapted for use in an aircraft. The equipment, referred to in the evidence as the Davidson-Brant equipment, had been devised by Mr. Robinson and Mr. McLaughlin, who were at the time engineers in the plaintiff's employ. It was being used in the Sudbury area and it was later used in the vicinity of Noranda and in a mobile form for use on ice in the vicinity of Flin Flon. Its use marked the first revival of the electromagnetic induction method of prospecting since its abandonment in about 1930. The equipment was turned over to Mr. Cartier at Sudbury and he and his associates, Mr. Robinson and Mr. McLaughlin, spent about two years experimenting with it. They found it reasonably satisfactory in the Sudbury area where it could be put on a truck and carried to the place where it was to be used, but its large size made it unsatisfactory for use in an aircraft and the effort to adapt it for such use was abandoned about the end of 1948.

Mr. Cartier and his associates then turned their attention towards perfecting the equipment for use on the ground. As a matter of fact its use marked the culmination of the art as it stood immediately prior to the date of the invention in suit.

While the equipment was reasonably satisfactory in locating valuable conductors it gave some phantom readings but its greatest drawback was its large size and consequent lack of portability. Its transmitter coil was in the form of an equilateral triangle, each side being about twenty-five feet in length, with its apex mounted on a vertical pole held in position by guide ropes and its total weight was approximately 100 pounds. The electrical current required to energize it was supplied by a generator driven by a gasoline motor of from 4 to 5 horsepower. The motor generator set weighed about 160 pounds. The receiver coil was approximately two feet in diameter and mounted on a tripod. There was also a small clinometer. The weight of the receiving unit came to about 40 pounds. The equipment required five men to operate it, two to carry the motor generator set, two to carry the transmitter coil and its attachments and one to carry the receiver coil and the rest of the equipment.

The difficulty involved in the use of this heavy equipment led Mr. Cartier and his associates to an attempt to devise an equipment that could be carried by two men and at the same time ensure frequency stability and provide adequate

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field strength. With this purpose in mind Mr. Cartier experimented with a small 1.2 horsepower motor weighing about 20 pounds but he found it impossible to regulate the frequency with the necessary stability. In his experiments with the small motor he designed the transmitter coil so that at resonance, that is to say, when it was tuned to the exact frequency of the generator, it would absorb the power supplied by the motor. In other words, he sought to match the load imposed by the transmitter coil to the power supplied by the motor. This was in accordance with the teaching of the art at the time. Mr. Cartier's efforts failed. When he operated the motor generator at the desired frequency of 1,000 cycles per second and tuned the transmitter coil to resonance at 1,000 cycles he found that the motor ran away with resulting frequency instability. He found that he could not get the same stability of frequency from the small motor as he could obtain from the large one with which he had previously been working. With it he could effect reasonable frequency stability by using a governor and throttling the engine down below the maximum power that it could deliver. But the use of a governor for the small motor was valueless. It reduced the power of the motor so that it could not provide adequate field strength and it did not enable the motor to accommodate itself to temperature changes.

Mr. Cartier finally concluded that the problems with which he was confronted were insoluble. It seemed impossible to devise an equipment that was portable and at the same time capable of ensuring frequency stability, adjusting itself to changes in temperature and providing adequate field strength. Having reached this conclusion Mr. Cartier decided to continue his efforts to improve the equipment that used the large motor.

But Mr. Robinson and Mr. McLaughlin continued to struggle with the problems that had baffled Mr. Cartier. They repeated his experiments and found, as he had done, that when they tuned the transmitter coil so that it was resonant at 1,000 cycles per second and then energized it with the motor generator set at 1,000 cycles the motor ran away and, despite what they did with the governor, it would not hold. They then discovered that they could control the frequency of the generator so that it would be substantially constant and use the maximum power of the small 1.2 horsepower motor by operating the generator at a frequency

below that of the transmitter coil. This led them to the idea that they could use the transmitter coil as a load to control the frequency of the generator by imposing a load on it that was greater than the power that the motor could supply. To put it briefly, they discovered that they could ensure the stability of the frequency of the generator by load control of it imposed by the transmitter coil.

Mr. Robinson was unable to state precisely when the idea of load control of the frequency of the generator by the transmitter coil was conceived by Mr. McLaughlin and himself or state the circumstances under which it was conceived or who had the idea first. They were working together and the thinking of one reacted on that of the other. In my opinion, it does not matter precisely when or how the concept came. The important thing is that it did come.

After the inventors had conceived the idea that they could control the frequency of the generator and regulate it so that it was substantially constant by using the transmitter coil as a load imposed on the generator that was greater than the maximum power that the motor could supply to the generator they began to think of it in terms of power and load curves. A great deal of evidence was directed to this topic. The final representation of the working of the idea was shown in Figure 7 of the drawings accompanying the patent specification and, in greater detail, in a graph, filed as Exhibit 8. These showed two curves, one being the brake horsepower curve, representing the power supplied by the motor to the generator, and the other the load curve, representing the load imposed on the generator by the transmitter coil. The load curve was of a sharply rising character with the brake horsepower curve intersecting it at a steeply rising part below its apex. Figure 7 and Exhibit 8 illustrate the operation of the motor generator and the kind of load imposed on the generator by the transmitter coil. They show that the load curve intersects the brake horsepower curve at a point sufficiently below the apex of the load curve, representing the resonant frequency of the series tuned resonant circuit of the transmitter coil and, therefore, the point at which it was capable of absorbing its maximum power, that any momentary increase in the power of the motor above its normal maximum could not drive it above the apex. Put otherwise, Figure 7 and Exhibit 8 show that the load imposed on the generator by

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the transmitter coil was of such a sharply rising character that the maximum power of the motor, including any momentary increase in it, could not overcome it.

It was only after the inventors had conceived the idea of load control of the frequency of the generator by the transmitter coil that they were able to illustrate the operation by which it was to be carried into effect in terms of curves and determine the kind of load to be imposed on the generator by the transmitter coil. It had to be a peaked load of a sharply rising character such as that represented by the load curve shown in Figure 7 and Exhibit 8.

When the inventors had conceived their idea and understood the relationship of the brake horsepower curve and the load curve, as exemplified by Figure 7 and Exhibit 8, they designed the transmitter coil so that it would impose a load on the generator of the kind represented by the load curve shown in Figure 7 and Exhibit 8. They had found that a transmitter coil with a series tuned resonant circuit would serve the desired purpose and they designed a transmitter coil with such a circuit. It was essential that it should be able to absorb more power than the motor could supply to the generator in order that it could impose a load on the generator that was greater than the maximum power of the motor, including momentary increases in it above the normal. Consequently, the load must be such that when it was represented by a load curve the apex of the load curve would be above the brake horsepower curve. In order to accomplish the desired purpose the inventors decreased the resistance of the transmitter coil and increased the size of the wire in it. They also added condensers to it to make it resonate at from 20 to 25 cycles per second above the intended operation of the generator at about 1,000 cycles, at which point the motor could deliver its maximum normal power to the generator. The current in the transmitter coil when thus designed was about the same as in the first transmitter coil that the inventors had used, and the field strength provided by it was also about the same. When the newly designed transmitter coil was connected with the generator and energized by it the result was satisfactory. The motor did not run away and frequency stability within the limits of plus or minus one and a half per cent was achieved. It was now possible to utilize the power of the small motor without a governor. It was not necessary, or

even useful, and could be thrown away. The problem of regulating the frequency of the generator of the small motor so that it was substantially constant was solved.

It is not necessary to explain in detail the manner in which the load imposed by the transmitter coil on the generator effected regulation of its frequency. The undisputed fact is that it did so. It will be sufficient to say that when there was a momentary increase in the power of the motor causing it to speed up the load imposed by the transmitter coil made it slow down to its normal speed and that when there was a momentary decrease in the power the load brought it back. I should also add that it was recognized in the art that in order to make the best use of a tuned transmitter coil, that is to say, to get the maximum current in it, the motor generator should operate or energize it at its resonance, represented by the apex of the load curve shown in Figure 7 and Exhibit 8, but to do this was to operate the motor generator at its maximum frequency instability. Consequently, the operation of the motor generator at 1,000 cycles per second and arranging the transmitter coil so that at resonance its frequency was 20 to 25 cycles higher involved some sacrifice of field strength but, as already stated, frequency stability was achieved.

The achievement of frequency stability of the generator made the solution of the problem of portability simple. The heaviest part of the previous equipment, namely, the Davidson-Brant equipment, was the motor generator set. As already stated, it weighed about 160 pounds. It had to be carried on two shafts like a stretcher, and required two men to carry it, one in front and the other behind. Its weight made it difficult to carry in the bush and over rocky ground. The inventors used a small 1.2 horsepower motor generator set that could be mounted on a pack board and carried on a man's back with an acceptable weight, including that of the packboard, of not more than 60 pounds.

When the inventors designed the transmitter coil in the manner described the increase in the size of the wire in it increased its weight but there was some compensation for this in the reduced weight of the form. Later it was possible with some adjustments and better condensers to increase the resistance of the coil and reduce the size of the wire in it thus lessening its weight. It was also possible to decrease the size and weight of the transmitter coil by improving the

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receiver coil. Anything that increased its sensitivity, such as the use of a magnetic core, tuning and mounting of the clinometer, made for the decrease in the size and weight of the transmitter coil. The size of the new coil was about the same as that of the first one and its weight was from 25 to 30 pounds as compared with the weight of the transmitter coil of the Davidson-Brant equipment of about 100 pounds.

Two larger transmitter coils are made by the plaintiff, the smaller one being almost triangular in shape with about 15 feet to the side and weighing about 60 pounds, and the other being larger and weighing well over 100 pounds. These larger coils are used for special purposes, the largest one being seldom used.

All that remained to be considered was the receiving equipment. The receiver coil was reduced in size and weight and a magnetic core was used. This helped to reduce the size of the coil and give better operation but its use was not essential. The receiver coil was mounted on a pole instead of on a tripod thus permitting greater accuracy in the determination of the nil or minimum sound in the earphones by reason of the wide arc in which the coil could be swung on the pole which served as its extended axis. A clinometer for indicating the angle of declination of the pole from the vertical when the position of nil or minimum sound was found was mounted on the pole at eye level, which made for greater accuracy in determining and recording the angle than had previously been possible. The problem of portability of the equipment was now solved.

The inventors had been faced with four considerations in their attempt to solve their problems. It was essential, in the first place, that there should be frequency stability so that the range of variation of frequency should be reduced to a minimum. Secondly, it was desirable that the motor should deliver its maximum power so that the smallest motor and, therefore, the one of least weight that would be effective could be used. It was also desirable that the equipment should automatically accommodate itself to changes resulting from weather conditions. And, finally, it was desirable that the equipment should be able to provide adequate field strength. All of these objectives were achieved.

It was now possible for the first time to use a prospecting equipment that could be carried by two men working in the type of terrain in which prospecting was usually done

and was at the same time capable of performing effectively the functions for which it had been devised, namely, ensuring frequency stability, accommodating itself to changes in temperature and providing adequate field strength. In my opinion, the inventors made an important invention.

While the difficulties resulting from frequency variation were substantially overcome by the inventors after they had discovered that they could effect frequency regulation of the generator so that it was substantially constant by load control imposed by the transmitter coil in the manner described, the inventors realized that if the electro-magnetic induction method was to recover from the disrepute into which it had fallen prior to 1930 it was necessary to solve the problem of the misleading readings that had caused the sad experience to which Mr. Lundberg referred and they set themselves to the task of devising a prospecting method that would substantially eliminate them. Some of these misleading readings were due to elevational errors and others were phantom readings. Prior to the date of the invention defined in Claim 11 the cause of phantom readings was not known. It had been realized that the use of high frequencies was productive of them for with their use almost anything was a conductor and a switch to the use of low frequencies was made but, while there was some improvement, as I have already indicated, in the case of wet clay, the use of low frequency, even when so regulated that it was substantially constant, did not solve the problem. Something more was necessary.

Eventually, the inventors found that if the transmitter coil was orientated towards the receiver coil so that its plane contained it and the pole on which the receiver coil was mounted, serving as its extended axis, was held in a vertical position so that the axis of the receiver coil was generally in line with the plane of the transmitter coil the risk of phantom readings by the operator of the receiver coil was reduced to a minimum and they devised a method of prospecting accordingly, in which the alignment of the axis of the receiver coil with the plane of the transmitter coil was an essential feature.

The evidence of Mr. Robinson and Mr. Cartier establishes that when this alignment was maintained the phantom readings were substantially eliminated. This fact is con-

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firmed by the defendant's own Booklet C, filed as Exhibit 4, describing its prospecting method in which a similar alignment is featured.

In view of this evidence it is, strictly speaking, unnecessary to explain why the maintenance of this alignment had such an effect, but the explanation put forward on the plaintiff's behalf will not be amiss. It has been stated earlier in these reasons that when the receiver coil is orientated towards the transmitter coil so that its axis is generally in line with the plane of the transmitter coil and there is no conductor in the area, the magnetic lines of force emanating from the transmitter coil are perpendicular to the axis of the receiver coil and, consequently, do not cut it with the result that no voltage is generated in it, no current flows through it and there is no audible sound in the ear phones attached to it and that, consequently, the operator of the receiver coil concludes that a conductor is not present and makes what is called a zero reading. If he maintains the alignment referred to he will make a similar zero reading even if a useless conductor such as wet clay or swampy ground is present in the area and under the transmitter coil. The reason for this may be stated briefly. The magnetic lines of force emanating from the transmitter coil cut the conductor both when going down and when coming up generating a positive voltage in it when going down and a negative one when coming up. The plane of the transmitter coil is exactly in between the direction of the lines of force going down and that of those coming up and the voltages generated in the conductor on each side of the plane cause currents to flow in it and set up secondary magnetic fields on each side of the plane with magnetic lines of force emanating from each as if there were a transmitter coil on each side of the plane. Since the wet clay or swampy ground conductor is symmetrical, that is to say, of the same nature on one side of the plane as on the other, the currents on each side are equal and since the voltages creating them are opposite the effect of the secondary field from one side of the conductor on the primary field set up by the transmitter coil is nullified by that of the secondary field from the other side of the conductor. The result is that they cancel out in the sense that no sound is created in the ear phones and the effect is the same as if no conductor were present. Consequently, the operator of the receiver coil makes a zero reading instead of a phantom one.

It is true that there would be the same result if a valuable conductor that is precisely symmetrical were present but that is unlikely. Consequently, if a reading indicates the presence of a conductor the likelihood is that it is a valuable one. Moreover, when readings are taken at several stations the chances of any one body being symmetrical so that the secondary fields set up on each side of the plane of the transmitter coil cancel out at the receiver coil are remote. There is also the fact that a valuable conductor sets up a stronger secondary magnetic field than a poor conductor does.

Thus the inventors found that one of the reasons for the phantom readings in the prior art was the failure to orientate the receiver coil so that its axis was generally in line with the plane of the transmitter coil. In that case the situation was that while the voltages generated in the conductor on each side of the plane of the transmitter coil were opposite the currents caused by them and the resulting secondary magnetic fields were not equal with the result that they did not cancel out at the receiver coil and its operator would be led to make a reading showing the presence of a valuable conductor when only a valueless conductor was present.

The inventors also found that orientation of the receiver coil in the line of the plane of the transmitter coil did not eliminate phantom readings if high frequencies were used. Consequently, they concluded that it was necessary, not only to use a low frequency, but also to align the transmitter coil and the receiver coil so that the axis of the latter was generally in line with the plane of the former.

The inventors also found that if they maintained this alignment they eliminated not only phantom readings but also elevational errors, which had commonly occurred in the previous art when the transmitter coil and the receiver coil were not on the same levels. Indeed, prior to the date of the invention it was not clear whether the misleading readings that occurred were phantom readings or were due to elevational errors. Mr. Cartier's evidence was that they were tied together.

The inventors were also concerned with increasing the efficiency of the receiving unit of their prospecting method and several improvements in it were made but we are concerned only with the one referred to in Claim 11, namely,

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that the receiver coil should be mounted on a pole so that the pole was an extension of its axis, which made it possible to place the bottom end on the ground and swing the receiver coil on what was called its extended axis from side to side over a wide arc. Then a clinometer was placed on the pole at eye level. The improvement in the receiver coil thus referred to led to efficiency of its operation for the wide swinging of the receiver coil on its extended axis enabled its operator to determine the position at which there was a minimum or nil sound in the ear phones attached to the receiver coil with greater ease and accuracy than previously and the placing of the clinometer at eye level helped him to note with greater precision than previously the angle of declination from the vertical of the extended axis of the receiver coil when the position of minimum or nil sound had been determined. Consequently, it was no longer necessary as it had been previously under other methods, to measure the intensity of the magnetic field or to make composite measurements, one angle being sufficient for each reading, or to use a ratiograph.

Thus the plaintiff's method of prospecting, as defined in Claim 11, had the advantages of correcting elevational errors and substantially eliminating phantom readings and ensuring more rapid and reliable readings than had previously been possible. In my opinion, it was an important invention.

Here I might add that Claim 12 defines the method set out in Claim 11 with the limitation that the frequency to be used is in the audio-frequency range, which, as I have already stated, runs from 20 cycles per second up to 12,000 cycles, and even as high as 20,000 cycles.

The plaintiff's invention, whether of its apparatus or of its prospecting method, has had considerable commercial success. It is, of course, established law that evidence of the commercial success of the subject of a patent is admissible, but it should be pointed out that by reason of the presumption of validity of a patent enacted by section 47 of *The Patent Act,* 1935, Statutes of Canada, 1935, Chapter 32, now section 48 of the *Patent Act,* R.S.C. 1952, Chapter 203, evidence of commercial success is not as important in Canada as in countries, such as the United Kingdom, where there is no similar statutory presumption. Under the circumstances, I shall make only a brief reference to the evi-

dence of commercial success in the present case. The use of the plaintiff's equipment has been widespread. It has been sold to the leading mining companies in Canada such as the International Nickel Company and the Consolidated Mining and Smelting Company. The equipment and the prospecting method have been widely used in various parts of the world, including Canada, the United States, South Africa and Greece, and their use has resulted in important discoveries of valuable ore bodies, of which perhaps the most notable were the discoveries of copper and tin near Bathurst in New Brunswick in 1952 and near Newcastle in the same province in 1954. But while the plaintiff's prospecting method involving the use of its equipment has been useful it has not wholly displaced other prospecting methods. The resistivity and self-potential methods are still in use to a limited extent and, as Dr. Seisel stated, there were two electro-magnetic induction methods other than the plaintiff's that were in use in Canada, namely, the Slingram method and a modification of the Turam methods, both originating in Sweden. Thus the factors that might make commercial success evidence *per se* of invention of the subject covered by a patent, if such evidence were needed, are not present in this case, as they were in the cases of *The King v. Uhlemann Optical Company*[1] and *The King v. American Optical Co.*[2] But while this is so, the evidence of the commercial success of the plaintiff's apparatus and prospecting method is convincing proof, if any were needed, of their utility.

Counsel for the defendants made the usual attacks on the validity of the plaintiff's patent, namely, that it was void for lack of novelty, utility and inventive ingenuity, and also some special attacks that will be mentioned later. In this connection I refer again, as I have done in previous cases, to the statutory presumption of the validity of a patent granted under the governing *Patent Act*. The first reference to this presumption was in *The King v. Uhlemann Optical Company*[3] where I said, at page 161:

> There is a presumption of validity in favor of the patent by reason of its issue and the onus of proving that it is invalid for lack of invention is on the person attacking it . . . The onus is not an easy one to discharge.

[1] [1950] Ex. C.R. 142. [2] [1950] Ex. C.R. 344.
[3] [1950] Ex. C.R. 142.

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The finding that the onus of showing the invalidity of a Canadian patent lay on the person attacking it followed of necessity from section 47 of *The Patent Act*, 1935, which provided:

> 47. Every patent granted under this Act shall be issued under the signature of the Commissioner and the seal of the Patent Office. The patent shall bear on its face the date on which it is granted and issued and it shall thereafter be *prima facie* valid and avail the grantee and his legal representatives for the term mentioned therein . . .

This statutory presumption of validity has been dealt with in several cases since the *Uhlemann Company* case (*supra*): *vide O'Cedar of Canada Ltd. v. Mallory Hardware Products Limited*[1]; *Riddell v. Patrick Harrison & Co. Ltd.*[2]; *Reliable Plastics v. Louis Marx*[3], and, most recently, in *Unipak Cartons Ltd. v. Crown Zellerbach Canada Limited ante* p. 396. In the last mentioned case I made the following comment:

> the statutory presumption is not confined to the attribute of inventiveness but extends to the other attributes that an invention must have if it is to be patentable under the Act, such as novelty and utility. The three attributes of patentability, namely, novelty, utility and inventiveness are all presumed to be present in an invention for which a patent has been granted until the contrary is clearly shown.

On further consideration I am of the opinion that this statement is not as wide as the terms of the Act warrant. It must follow from the provision of the Act that a patent granted under it "shall thereafter be *prima facie* valid" and avail its grantee and his legal representatives for the term of the patent that the onus of showing that it is invalid lies on the person attacking it, no matter what the ground of attack may be, and that until it has been shown to be invalid the statutory presumption of its validity remains.

This does not mean that the patent is immune from attack or that the patentee is free from the obligations that are incumbent on him by way of consideration for the grant of the patent monopoly to him, but it seems clear that, since Parliament has deliberately endowed a patent granted under the Act with a presumption of validity, the onus of showing that such a patent is invalid is not an easy one to discharge. That being so, the English decisions indicating that a patentee must prove the existence of the essential attributes of the patentability of the invention covered by

[1] [1956] Ex. C.R. 299 at 316. [2] (1957-58) 17 Fox P.C. 83 at 99.
[3] (1958) 29 C.P.R. 113 at 127.

his patent before he can succeed in an action for damages for infringement of his rights under his patent are no longer applicable in Canada. He need not prove the existence of these attributes, for he starts with a statutory presumption of their existence in his favor and the onus of showing their non-existence lies on the alleged infringer of the patent. The enactment of the statutory presumption of validity effected an important change in Canadian patent law and marked a substantial advance in the protection of a patentee's rights.

There were several attacks on the validity of the plaintiff's patent. Some of them related to both the apparatus invention defined in Claim 8 and the prospecting method invention defined in Claims 11 and 12, but I shall, as far as I am able, deal first with the attacks on the validity of Claim 8.

While it was alleged in the statement of defence that the invention claimed by the plaintiff was known and used by others before its date as appeared from the common knowledge of the art and prior public knowledge as shown by prior uses by Hans Lundberg and others, counsel for the defendants stated that he would not rely on any prior user of the invention or any prior publications as being anticipatory of the invention except two documents, filed as Exhibits J and K. This means that the evidence of Mr. Lundberg purporting to show prior use of the invention may be disregarded and it is also clear that Exhibits J and K have no bearing on the validity of Claim 8. They will be dealt with when the attacks on Claims 11 and 12 are considered.

There is, in my opinion, no possible doubt that the basic concept of control of the frequency of the generator by a load imposed on it by the transmitter coil was a novel one. No one had thought of it prior to the date of the invention in suit. Mr. Cartier had never previously heard of the idea. Indeed, what the inventors did involved a radical departure from the teaching of the prior art which was to the effect that a resonant circuit should be operated at the resonant frequency. Mr. Robinson stated that in the prior art a person would have tuned his load to the operating frequency and that the idea of tuning the transmitter coil to a frequency above the desired frequency of the generator was a new one. Mr. Doeringer said that prior to the date of the invention the only means of controlling the frequency of

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the generator that he knew of was by a governor and a flywheel. He did not know anything about sharply rising loads. Mr. Mounce admitted that there was novelty in the idea. He had never found any reason for doing what the inventors had done and never knew of a series tuned circuit with a sharply rising peak being imposed on the generator as a load.

There was a good deal of discussion about the two curves shown on the graph, Exhibit 8, namely, the brake horsepower curve and the load curve, and it was suggested that the evidence of Mr. Mounce and Dr. Watson indicated that they were not novel. But Mr. Mounce admitted that he was not aware of any text book showing a load curve for a series tuned circuit, and he had no knowledge of the brake horsepower curve that would be portrayable on a graph from the operation of an engine with a governor. It was not shown in any text book. Dr. Watson also admitted that he would not find the brake horsepower curve in any text book but stated that he would be able to get it from the engine manufacturer or calculate it. Similarly, he said that while the load curve did not appear in any text book it also could be calculated. But the fact is that, even if the shape of each curve was known or could be calculated, the idea of putting the two curves together was not known prior to the date of the invention. There was no evidence that at any time prior to such date anybody had ever thought of a tuned transmitter coil in terms of a load that could be imposed on the generator in such a way as to effect frequency regulation of it. Indeed, the evidence is conclusive that the idea was a novel one.

It was contended for the defendants that the invention defined in Claim 8 was different from that which was disclosed in the specification and described in the evidence. After reviewing the elements in the Claim other than the means of suspension of the transmitter coil, which will be dealt with in detail when the issue of infringement is considered, counsel for the defendants submitted that while it was stated that the transmitter coil was of a size to be carried on the back there was no limitation of the size or weight of the motor generator set, that while it was specified that the transmitter coil should be tuned to form a resonant load for the generator there was no indication of how it should be tuned or what the steepness of its load should be and that the frequency referred to in the Claim was not

limited to low frequency. Coupled with these criticisms, it was contended that if there was any invention it lay in specifying the operating conditions under which a tuned transmitter coil, when connected with a motor generator, would effect regulation of its frequency and that, consequently, the alleged invention was that of an operation and not that of pieces of apparatus as claimed. It was also urged that when a resonant tuned transmitter coil was connected to a motor generator the frequency of the generator could be controlled by setting the throttle of the motor so that its available power, regardless of the size of the motor, would be smaller than that of the transmitter coil or, to put it in the language of the inventors, less than the load that the transmitter coil could impose on the generator. It was, consequently, submitted that the Claim would extend even to such a large motor as that which Mr. Cartier had used at Sudbury, if he throttled it down appropriately, from which it followed that the Claim was wider than the alleged invention and was invalid in that it asserted a monopoly that was more extensive than was necessary to protect the alleged invention and different from it.

There is a ready and simple answer to the contention that if there was an invention it lay in an operation and not in pieces of apparatus and that, consequently, Claim 8 was bad in that it claimed an invention different from that which was made. There are numerous cases in which a claim for an apparatus has been upheld although it was the operation of the apparatus that was really in issue: *vide,* for example, *Lightning Fastener Co. Ltd. v. Colonial Fastener Co. Ltd. and G. E. Prentice Mfg. Co. Ltd.*[1] And it is clear that a monopoly in an apparatus may be validly defined by reference to the result which it is to accomplish: *vide No-fume Ltd. v. Frank Pitchford & Co. Ltd.*[2] Thus a claim is not invalid by reason of the fact that it is drawn in terms of the result of the invention defined by it.

As I construe Claim 8 it defines a combination of elements, the so-called pieces of apparatus, so constructed and arranged that when the combination is operated it produces a certain result, namely, regulation of the frequency of the generator. The combination is a transmitting unit and comprises, as two of its elements, a motor driven alternating current generator and a tuned air core transmitting coil, the

[1] (1934) 51 R.P.C. 349 at 367. [2] (1935) 52 R.P.C. 231.

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coil being of a size to be carried on the back and being connectible with the generator, that is to say, having a wire by which it can be connected to and disconnected from the generator, and being designed and constructed so that when it is connected to the generator it will, without any manipulation of the throttle of the motor, form a resonant load for the generator, that is to say, that it will impose a peaked load on the generator and thereby effect frequency regulation of it. The idea of load control by the transmitter coil of the frequency of the generator whereby it was regulated certainly involved an operation, but the idea was embodied in an apparatus that was so constructed and arranged that it made the desired result possible. Thus it was an apparatus embodying the idea referred to that was invented and Claim 8 properly defines it. This particular attack on Claim 8 fails.

The contention that Claim 8 was wider than the invention was more complex. While the size and weight of the motor generator is not specified in the Claim and its portability is not mentioned the fact that the transmitter coil is of a size to be carried on the back defines by necessary implication the power capability of the motor generator and, therefore, its size and weight. The portability of the transmitter coil limits the amount of copper in the coil and, consequently, the amount of power from the motor that it can control, for since it is to control and regulate the frequency of the generator by imposing a load on it that is greater than the power that the motor can supply it follows, of necessity, that if there is a transmitter coil of a certain size, the motor generator to which it is to be connected must be of such a size that the maximum power which the motor can supply will not be able to meet the load which the transmitter coil can impose on the generator. Thus, in effect, the portability of the transmitter coil defines the size and weight of the motor generator set to which, as contemplated in the claim, it is to be connected. It follows, of course, that the Claim would extend to any motor generator set which could not supply sufficient power to meet the load imposed on the generator by a transmitter coil that could be carried on a man's back. But the motor generator set that is contemplated by the Claim is limited in size and, therefore, in weight to that with which the portable transmitter coil, when tuned as specified in the Claim and connected to it, could regulate its frequency.

Counsel for the defendants contended that the Claim, because of the use of the word connectable (*sic*), did not impose any limitation on the size or weight of the motor generator. It was his submission that a transmitter coil of a size to be carried on the back could be connected to a large motor generator in which case the determination of whether it was so tuned as to form a resonant load for the generator and so act to effect its frequency regulation would depend on the proper setting of the throttle of the motor. If it were set so that its available power would not be sufficient to meet the load that the transmitter coil could impose on it then its frequency could be regulated. This was the basis of the submission that the Claim would extend to the large motor on which Mr. Cartier had worked at Sudbury and was, therefore, wider than necessary to protect the invention.

Counsel's submission that the Claim was too wide was related to his submission that if there was any invention it lay in an operation and that such operation consisted in so setting the throttle of the motor to which the transmitter coil was to be connected that its available power would be less than the transmitter coil could absorb or, to put it otherwise, not sufficient to meet the load which the transmitter coil could impose on the generator. On that view of the invention it would be conceivable that the claim extended to a motor generator set of large size and power but throttled down so that it could not supply any more power than that which could be supplied by an unthrottled small motor, such as the 1.2 horsepower motor referred to in the evidence, and that the supplier of such a large motor generator set with the motor throttled as indicated and a portable transmitter coil would infringe the claim, if any person would be senseless enough to buy a motor of such large size throttled down as indicated and so carry useless weight.

In my opinion, Claim 8 does not extend to a large but throttled motor. The idea that struck the inventors was the converse of that suggested by counsel for the defendants. Their invention did not lie in the idea of a proper setting of the throttle of the motor. On the contrary, it lay in the idea that the transmitter coil could be used as a load to be imposed on the generator in order to control and, therefore, regulate its frequency. The problem of the inventors was the maintenance of frequency stability with the use of the smallest size motor that would give the necessary signal

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strength. It was, therefore, necessary to use its maximum power and their invention consisted in the discovery that they could control the frequency of the generator and thereby effect its frequency regulation by designing and constructing the transmitter coil so that when it was connected with the generator it would impose a steeply rising load upon the generator that was greater than the power that the unthrottled small motor could supply. Claim 8 does not contemplate any throttling of the motor of the motor generator set but rather that the tuned transmitter coil should form a resonant load for the generator and so effect its frequency regulation immediately on its connection with the generator and the setting of it into operation. That is how a person skilled in the art would read the Claim. He would not read it as extending to a large size motor that had to be throttled so that its full available power could not be used, but would know from the fact that the transmitter coil was to be of a size to be carried on the back the limits of the size and weight of the motor to which it should be connected. Thus Claim 8 extends only to motors of the size and weight that a person skilled in the art would be likely to use in connection with a transmitter coil that could be carried on a man's back and was tuned as specified in the Claim. In my opinion, Claim 8 is not too wide.

One of the charges against Claim 8 was that it was invalid for lack of inventive ingenuity in the purported invention defined by it. This was related to the submissions that what was claimed as an invention was merely a method of operating the motor so that it could not produce more power than the transmitter coil could absorb when it was tuned as defined and connected with the motor generator, that if the motor was operated in such a manner the desired frequency regulation would be effected and that it would be obvious to any workman skilled in the art who wished to obtain frequency stability that he could do so merely by operating the motor so that its available power would never equal the load imposed on the generator by the resonant tuned transmitter coil and that he could effect the desired frequency regulation by simply setting the throttle of the motor so that it would limit its available power to the desired amount.

There is no merit in this complaint. It is contrary to the clear instruction in paragraph 36 of the specification,

namely, that the conditions of operation of the generator should be such that the resonant circuit of the transmitter coil and its condensers should be utilized to maintain the speed of the generator and hence its frequency substantially constant. The inventors were not seeking frequency stability by throttling a large motor so that it could not deliver all its power. What they were seeking to accomplish was the maintenance of frequency stability in the case of the smallest motor that could provide adequate field strength and they accomplished the desired result, not by throttling the motor, but by tuning the transmitter coil so that it imposed a sharply rising load in the generator that was greater than the power that the motor could supply, and thereby utilizing the maximum power of the smallest motor that would give an adequate signal to the operator of the receiver coil. It was the discovery of the principle of load control by the transmitter coil of the frequency of the generator to effect its frequency regulation so that it would be substantially constant that was the essence of the invention. This required a resonant tuning of the transmitter coil of such a nature that when the operations of the transmitter coil and of the motor were portrayed on a graph in terms of curves, the brake horsepower curve, representing the power of the motor, would intersect the sharply rising load curve, representing the load imposed by the transmitter coil, below its apex, as shown by Figure 7 of the drawings and Exhibit 8, and never rise above it. The discovery made by the inventors involved, as already stated, a radical departure from the prior teaching of the art and was certainly not obvious. There is no doubt that the invention defined in Claim 8 involved the exercise of inventive ingenuity. The answer to the charge of lack of invention carries with it a reply to the complaint made by counsel for the defendants that there was no indication of how the transmitter coil should be tuned or what the steepness of the load imposed by it should be. The Claim specifies that the transmitter coil should be tuned to form a resonant load for the generator which should act in such a way as to effect frequency regulation of it and Figure 7 of the drawings shows how this is to be done, namely, that the load to be imposed on the generator by the transmitter coil must be of a steeply rising character like the load curve shown in Figure 7 and that it must be greater than the power that the motor could supply as

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indicated by the fact that the brake horsepower curve, representing the power of the motor, as shown on Figure 7, intersects the load curve below its apex which teaches that the load must always be greater than the power of the motor.

The remaining charges against Claim 8 were that it was ambiguous and avoidably obscure by reason of the fact that the term frequency regulation was not defined and there was no indication that low frequency was to be used.

Counsel for the plaintiff took objection to these charges on the ground that the allegations on which they were based amounted to allegations of insufficiency and, as such, must be pleaded and that since the charges had not been pleaded counsel for the defendants was precluded from raising them. A lengthy argument resulted in the course of which counsel for the plaintiff relied upon, *inter alia,* Terrell and Shelley on Patents, Ninth Edition, at page 338; *Heathfield v. Greenway*[1]; and *The Franco-Strohmenger and Cowan Inc. v. Peter Robinson Ltd.*[2]

Counsel for the defendants contended that the charges were not allegations of insufficiency but charges of ambiguity and avoidable obscurity and that they might properly be made without any allegations of them in the pleadings.

The law on the question is well settled. It is set out in the classic statement of Earl Loreburn in *Natural Kinematograph Co. Ltd. (in liquidation) v. Bioschemes Ltd. (In the Matter of G. A. Smith's Patent)*[3], where he said:

> Some of those who draft Specifications and Claims are apt to treat this industry as a trial of skill, in which the object is to make the Claim very wide upon one interpretation of it, in order to prevent as many people as possible from competing with the patentee's business, and then to rely upon carefully prepared sentences in the Specification which, it is hoped, will be just enough to limit the Claim within safe dimensions if it is attacked in Court. This leads to litigation as to the construction of Specifications, which could generally be avoided if at the outset a sincere attempt were made to state exactly what was meant in plain language. The fear of a costly lawsuit is apt to deter any but wealthy competitors from contesting a Patent. This is all wrong. It is an abuse which a Court can prevent, whether a charge of ambiguity is or is not raised in the Pleadings, because it affects the public by practically enlarging the monopoly, and does so by a kind of pressure which is very objectionable. It is the duty of a patentee to state clearly and distinctly, either in direct words or by clear and distinct reference, the nature and limits of what he claims. If he uses language

[1] (1894) 11 R.P.C. 17 at 20. [2] (1930) 47 R.P.C. 493 at 502.
[3] (1915) 32 R.P.C. 256 at 266.

which, when fairly read, is avoidably obscure or ambiguous, the Patent is invalid, whether the defect be due to design, or to carelessness or to want of skill. Where the invention is difficult to explain, due allowance will, of course, be made for any resulting difficulty in the language. But nothing can excuse the use of ambiguous language when simple language can easily be employed, and the only safe way is for the patentee to do his best to be clear and intelligible.

and in that of Lord Parker in the same case, where he said, at page 268:

Patents are granted by the Crown in consideration of the disclosure of some invention likely to benefit the public and on the representation that such disclosure is made by the Complete Specification. In preparing the Complete Specification, therefore, the applicant for a Patent must observe the utmost good faith. The intentional introduction of an ambiguity for the purpose of misleading the public, or of embarrassing them in the exercise of their Common Law right to trade in such manner as they think best, would be alone sufficient to avoid the Patent, and in a case reasonably capable of unambiguous statement the want of good faith may be gathered from the terms of the Specification itself. In such a case, I apprehend that the Court might, on its own initiative, declare the Patent to be invalid. Further, though it may be true that in construing an instrument *inter partes* the Court is bound to make up its mind as to the true meaning, this is far from being the case with a Specification. It is open to the Court to conclude that the terms of a Specification are so ambiguous that its proper construction must always remain a matter of doubt, and in such a case, even if the Specification had been prepared in perfect good faith, the duty of the Court would be to declare the Patent void. Once again, though the Court may consider that the meaning of the Specification is reasonably clear, yet if the Specification contain statements calculated to mislead the persons to wohm it is addressed, and render it difficult for them without trial and experiment to comprehend in what manner the patentee intends his invention to be performed, these statements may avoid the Patent.

and in *The Franc-Strohmenger and Cowan Inc. v. Peter Robinson Ltd.*[1], where Maugham, J., said, at page 500:

I think it is quite clear from the authorities that the plea of ambiguity is open to be taken by the Defendant without any special reference to it in the pleadings, and, of course, without particulars. The question of ambiguity goes to the true ambit of the monopoly. The question is one of construction for a judge.

Vide also *Marconi's Wireless Telegraph Co. Ltd. v. J. B. Cramer & Co. Ltd.*[2]

Counsel for the defendants took the position that the use of the term frequency regulation in the Claim was so ambiguous that it rendered the whole Claim ambiguous. His complaint, put briefly, was that the term was not defined either in the Claim or in the disclosures of the Specification, that it was indefinite and not precise, that there was no help in the statement in the disclosures that the frequency

[1] (1930) 47 R.P.C. 493. [2] (1932) 49 R.P.C. 400.

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should be substantially constant, that the load curve shown in Figure 7 of the drawings did not show how steep the curve should be, that the extent of the claimed monopoly should have been precisely defined so that a person would be able to know whether he infringed it or not, that the applicants for the patent could and should have specified the range of tolerable frequency variation implied in the term and that since they had not done so the Claim was ambiguous and avoidably obscure.

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I agree that it was open to counsel to make his charge, notwithstanding the absence of pleadings in the matter but I am also of the opinion that there is no sound basis for the charge. While it is true that the term frequency regulation is used only in Claim 8 and is not defined in it and that Mr. Cartier agreed that there was no sharp boundary line of tolerable frequency variation the fact is that it is desirable to have the frequency control as close as possible and that in terms of curves the load curve should be steeply rising and have its apex above the brake horsepower curve. A person skilled in the art would, in my opinion, come unerringly to this conclusion. On seeing the term frequency regulation in the Claim and finding no specific definition for it, he would resort to authoritative definitions to ascertain its meaning. The American Standard Definitions of Electrical Terms, filed as Exhibit 24, defines "frequency control" and "regulated frequency". "Frequency control" means "the regulation of the frequency of a generating station or system within a narrow range", and "regulated frequency" means "frequency so adjusted that the average value does not differ from a predetermined value by an appreciable amount". Mr. Cartier, Mr. Robinson and Mr. Doeringer all agreed with these definitions. Moreover, there is the instruction in the Specification that the resonant circuit of the transmitter coil and its condensers is utilized to maintain the generator speed and hence frequency "substantially constant". It is, of course, implied in the term and the Claim that the frequency regulation should be useful. A person skilled in the art would not read the Claim otherwise. Mr. Cartier stated that, in his opinion, a satisfactory frequency control in the art under review meant a control within a variation of three per cent, that is to say, plus or minus one and a half per cent each way, which was the degree of control achieved by the inventors, but a variation of five per

cent would be tolerable. The essence of the Claim was the fact that the frequency of the generator could be controlled and, therefore, regulated. Any person skilled in the art would know that and there could be no doubt in his mind that if he constructed a transmitter coil so that it formed a resonant load for the generator and effected frequency regulation of it in such a way that the frequency was substantially constant or that it differed from the determined value, say a value of 1,000 cycles, by an amount that was not appreciable, he would infringe the claim. Under the circumstances, it was not necessary to set out precisely how steep the load curve shown by Figure 7 of the drawings should be. Its steepness was sufficiently indicated by the Figure. In my opinion, the charge that the use of the term frequency regulation in the Claim made it ambiguous and avoidably obscure is unfounded.

Finally, there was the charge that Claim 8 was ambiguous and avoidably obscure by reason of the fact that there was no reference in it to the need for the use of a low frequency. Coupled with this there was the complaint, perhaps more referable to Claims 11 and 12 than Claim 8, that the range of the frequency that was to be used was not defined. It was urged that the patentee could have specified that the frequency regulation that was to be effected was regulation of a low frequency within a specified range and that he should have done so. The contention was, in effect, that, since a term of such comparative and uncertain ambit was used, there was an obligation to define its permissible range so that a person would know the limit of the monopoly that was claimed. I am unable to accept this contention. I agree that there is no reference to the requirement of low frequency in the Claim and no reference to it in the disclosures of the specification, except inferentially in paragraph 31 where there is a reference to the audio-frequency range, and that there is no definition of low frequency in the patent but, in my opinion, there is a complete answer to the specific complaint now under consideration, namely, that a person skilled in the art who had read the specification would know that the frequency regulation referred to in Claim 8 meant regulation of a low frequency and would know the range of such low frequency. The specification and the Claim refer to the fact that the transmitter coil creates an alternating magnetic field and the evidence indicates that it is only by

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the use of a low frequency apparatus that an alternating magnetic field can be created. The evidence also shows that the use of a gasoline driven motor and a generator implies, of necessity, that the frequency emanating from it must be a low one. A person skilled in the art would know these facts so that as soon as he saw the words "motor-driven alternating current generator" in Claim 8 he would know that it was limited to the use of a low frequency and could not extend to the use of a high one. Consequently, it was not necessary to specify that the frequency must be a low one. Such a specification would be redundant or, as counsel for the plaintiff put it, pleonastic. And it was not necessary to specify the range of the low frequency that was to be used for, as I have already stated, the terms "low" and "high", when applied to frequencies, must be related to the arts in which they are used and in the art with which this case is concerned the term low frequency means any frequency up to 2,000 cycles per second or, as Dr. Watson put it, any frequency from 300 cycles up to 3,000 cycles. Thus the charge fails.

Consequently, I find that all the attacks on the validity of Claim 8 fail and that it is valid.

The attacks on the validity of Claim 11 were fewer in number. While it was suggested by Dr. Seigel in the course of his evidence that the prospecting method defined in the Claim was not more effective than previous methods had been and that its commercial success was fortuitous, counsel for the defendants did not go so far as to contend that the Claim was invalid for lack of utility. If he had done so his attack could not have succeded for, quite apart from the presumption of utility in favor of the Claim, an effective answer to the charge would have been, as will appear later, that the method was used by the defendant Sharpe Geophysical Surveys Limited: *vide Turner v. Bowman*[1] and *Samuel Parkes & Co. Ltd. v. Cocker Brothers Ltd.*[2] And, as I have already stated, the evidence of the commercial success of the plaintiff's apparatus and method, notwithstanding Dr. Seigel's suggestion, is proof of utility, if any proof were needed.

There were several attacks on the validity of the Claim. I shall deal first with the contention that the alignment

[1] (1925) 42 R.P.C. 29 at 39.

[2] (1929) 46 R.P.C. 241, per Tomlin, J., at 244.

feature of the Claim, namely, that the receiver coil should be "located generally in line with the plane of the transmitter coil" was not novel but had been anticipated by a prior publication, filed as Exhibit J. This was an extract from Memoir 170 of Studies of Geophysical Methods, 1930, published by the Canadian Department of Mines, Geological Survey, in 1932. It described, in Chapter 3, certain electro-magnetic induction methods of locating conducting ore bodies and in particular "The Induction Method with Vertical Exciting Loop". It was contended by counsel for the defendants that the document was anticipatory of the alignment feature of the method defined in Claim 11, that this was its essential feature, and that no inventive ingenuity was involved in any of its other features. He submitted, with characteristic propriety, that the soundness of his contention depended on whether there was an instruction in Exhibit J that the receiver coil (called in Exhibit J the exploring coil, the detecting coil, or simply the coil) was or was not located generally in the line of the plane of the transmitting coil (called in Exhibit J the vertical loop, or simply the loop). In this portion of the reasons for judgment I shall use the term coil as meaning the receiver coil and the term loop as meaning the transmitter coil.

I should state that the method described in Exhibit J was used to illustrate its value in determining the location of a known conductor ore body. The instructions on which counsel relied were set out on pages 43 and 44 of the document. After it had been specified that the coil should be set up at stations on a line at right angles with the known strike of the ore body, it was stated, on page 43:

> The loop is now turned so that its plane points towards the exploring coil. The exploring coil is orientated towards the loop with the plane of the coil vertical.

and, on page 44:

> To make the survey, the stations are chosen above the line and the loop adjusted with its plane pointing to the coil. The plane of the coil is pointed towards the loop . . .

Counsel interpreted these statements as an instruction that the plane of the loop (transmitter coil) should be pointed towards the coil (receiver coil) in such a way that the plane of the loop passed through the coil and that the coil should be pointed toward the loop with its plane vertical.

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If this is the correct interpretation of the document it follows that the coil was to be "located generally in line with the plane of the transmitting coil", within the meaning of Claim 11 and, therefore, anticipatory of its alignment feature.

But it was contended for the plaintiff that the instruction of Exhibit J was that the planes of the loop and the coil were to be pointed towards one another so that they were face to face with their axes co-axial. If that is the correct interpretation of the document it was plainly contrary to the alignment feature of Claim 11 and, of course, not anticipatory of it.

There was conflicting evidence on the meaning of Exhibit J. Strictly speaking, such evidence was inadmissible, the interpretation of the document being a matter for the Court and not for witnesses: *vide Celanese v. Cortaulds*[1].

Exhibit J was introduced by counsel for the defendants in the course of his cross-examination of Mr. Cartier and he relied on the fact that Mr. Cartier had never criticized the document on the ground that it failed to teach the need for aligning the coil in the plane of the loop. He contended that a review of Mr. Cartier's evidence left no doubt that he took Exhibit J as telling him to point the loop to the coil so that the plane of the loop would pass through the coil and, hence, indicating that the coil should be located generally in line with the plane of the loop. There was a good deal of force in this contention but it should be noted that Mr. Cartier did say that he did not know what was meant by the statement in Exhibit J that the plane of the loop should be pointed to the coil and that he did not understand the described arrangement.

Counsel did not fare as well with Dr. Watson. On his first reading of Exhibit J Dr. Watson found that the axes of the loop and the coil, if their planes were pointed at one another as directed in the document, would coincide and that, consequently, the loop and the coil would be coaxial. If this was so the instruction in Exhibit J would run counter to the alignment feature of Claim 11. The day after Dr. Watson gave his opinion he changed it. Counsel sought to explain Dr. Watson's first opinion by saying that he had read the document in the light of his present knowledge and that what led him to it was the fact that elevational errors

[1] (1935) 52 R.P.C. 171 at 195, l. 44.

were mentioned in the document and that these would occur only if the planes of the loop and the coil were face to face from which he concluded that they must have been so. Counsel submitted that if Dr. Watson had not had his present knowledge he could not have read Exhibit J as he first did but would have found that the loop and the coil were co-planar.

Finally, the submission of counsel was that any reader of Exhibit J with the knowledge that a person skilled in the art would have at the time of its publication would conclude from it that it contained a direction that the transmitter coil should be pointed to the receiving coil so that its plane passed through the receiver coil and that if Claim 11 were only for its alignment feature Exhibit J would be anticipatory of it.

There are several reasons for rejecting this submission. One reason is based on the fact, as I have computed it, that the evidence relating to Exhibit J and the argument of counsel on the effect of the evidence and the meaning of the document took up at least five days of the trial. Under the circumstances, it would be utterly unreasonable to hold that a person skilled in the art would, on reading Exhibit J, find in it a clear instruction that the receiver coil should be located generally in line with the plane of the transmitting coil and that, consequently, Exhibit J was anticipatory of the alignment feature of the invention defined in the Claim. If the dispute as to the meaning of Exhibit J, in which such experts as Mr. Cartier and Dr. Watson took part, and in which such eminent counsel as counsel for the parties were engaged, took up five days of trial surely it could not be said, in the words of Viscount Dunedin in *Pope Appliance Corporation v. Spanish River Pulp and Paper Mills Ltd.*[1], that a man who was grappling with the problem solved by the Patent attacked, and having no knowledge of that patent, if he had had the alleged anticipation (Exhibit J) in his hand, would have said, "That gives me what I wish." It is much more likely that he would have been as confused about the teaching of the document as Mr. Cartier and Dr. Watson were.

Moreover, the contention of counsel for the defendants was completely demolished by Mr. Johnson, junior counsel for the plaintiff, in his able cross-examination of Dr. Watson

[1](1929) 46 R.P.C. 23 at 52.

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and his convincing examination of Exhibit J itself. He proved conclusively that the method described in Exhibit J gave misleading information. I have already referred to the fact that the method was used over a known conductor ore body but it also appears from a continuation of Exhibit J, which was filed as Exhibit 27, that it was also used over a diabase dyke, which Dr. Watson admitted was a non-conductor, and that the results of its use over the said diabase dyke indicated the presence of a conductor ore body there although no such body was present.

If the proper interpretation of Exhibit J was that the coil and the loop should be pointed towards one another so that they were co-axial, as Dr. Watson first understood the instruction in it, that would be the worst possible arrangement for effective prospecting for it would almost certainly lead to misleading readings. I, therefore, agree with Mr. Johnson's submission that a person skilled in the art would, on reading Exhibit J and Exhibit 27, consider that the method described in the documents was not only useless but also led to misleading readings.

To say the least, the meaning of the instruction that the planes of the loop and coil should be pointed to one another was not free from doubt. Mr. Cartier did not understand what it meant, counsel for the defendants took from it the meaning that I have described, Dr. Watson took one meaning out of it the first time and a different one the next day and junior counsel for the plaintiff submitted that the words meant precisely what they said, namely, that the plane of the loop was to be pointed to the coil and the plane of the coil pointed to the loop which would make the loop and the coil co-axial as Dr. Watson had found on his first reading of the document. If the meaning of the instruction is ambiguous it should certainly not be allowed to rebut the statutory presumption of validity to which the plaintiff is entitled.

Finally, Mr. Johnson demonstrated beyond doubt, from Exhibit J itself, that its authors intended that the planes of the loop and the coil should be pointed towards one another so that they would be face to face and, therefore, co-axial. The demonstration was of a highly technical nature involving the application of geophysical principles, the circumstances under which maximum and minimum sounds would be produced in the coil, the ascertainment of the directions

of the vectors of the lines of force of the primary and secondary magnetic fields respectively set up by the loop and the known conductor ore body with its known strike and the measurement of the angle of deviation of the resultant vector from the vertical and the resulting direction of the conductor ore body. No useful purpose would be served in setting out the argument in the detail that would be necessary to make it intelligible. It took Mr. Johnson a full day to develop it. I have carefully reviewed the transcript of his argument and am fully satisfied with the conclusion reached by him. Under the circumstances, it will be sufficient if I state it briefly. Substantially, his conclusion was that the results of the use of the method described in Exhibit J, as shown by Figure 19 of the Exhibit, could not have been produced otherwise than by having the plane of the coil and the plane of the loop point towards each other so that they were face to face and the loop and the coil were co-axial, that the results would have been different if the loop and the coil had been co-planar instead of co-axial and that it was erroneous to read the instruction in Exhibit J that the planes of the loop and the coil should point towards one another as meaning that the loop should be pointed towards the coil in such a way that its plane passed through the coil.

Consequently, I find that Exhibit J did not teach the alignment feature of the prospecting method defined in Claim 11 and was not anticipatory of it. It is significant to note in this connection that there is no evidence that any method based on Exhibit J was ever put into commercial use.

Counsel for the defendants also relied on Exhibit K as anticipatory of the alignment feature of the plaintiff's prospecting method. This was an extract from a book on Exploration Geophysics by Dr. J. J. Jakosky, published in 1928. On page 422 of the book Figure 244 shows a medium frequency vertical energizing coil (transmitter coil) in position with a flag at the electrical centre of the coil which was used for proper alignment of the direction-finding coils (plural). On the same page there is a description of the field operations for the vertical energizing coil method. On page 423 there is Figure 245, a sketch illustrating the possible relative orientations of the direction-finding coil and the energizing coil for minimum signal. It is stated, at

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page 422, that when a direction-finding coil is placed in such a position that its axis of rotation lies in the plane of the energizing coil the minimum signal will be obtained when the coils are at right angles to each other, that is, when the direction-finding coil is horizontal and the energizing coil is vertical, and that, on the other hand, a maximum signal will be obtained when the direction-finding coil is in the same place as the energizing coil. At page 423, it is stated that the axis of rotation for the direction-finding coil is horizontal *only* when the direction-finding coil is at the same elevation as the energizing coil and then it is pointed out that the initial setting up of the equipment involves two operations, as follows:

> (1) proper alignment of the energizing coil so that its plane is always vertical and passes through the axis of rotation of the receiving coil, and
>
> (2) alignment of the direction-finding coil so that its axis of rotation passes through the centre of the energizing coil.

On the strength of these statements counsel for the defendants contended that Exhibit K really taught the use of the alignment feature of the plaintiff's prospecting method and was, consequently, anticipatory of it. This was strongly resisted by Mr. Cartier who pointed out at least five inaccuracies in the description of the Jakosky method and concluded that Exhibit K was utter nonsense. In my judgment, this conclusion was justified. It was stated by Mr. Cartier that in the original text of Dr. Jakosky's book, published in 1928, there were 14 pages in between the description of the vertical coil on page 422, as shown by Figure 244, and the description of the field operations for the vertical energizing coil method and that these 14 pages described a method that used high frequencies. Mr. Cartier concluded from this fact that the field operations for a vertical energizing coil method that were described in Exhibit K were those of a method that used high frequencies and that a description of it was valueless to a person who was seeking to solve the problems of the art with a method that used low frequencies. There can be no doubt that the method described by Exhibit K did use high frequencies. This was not disputed by counsel for the defendants but he contended that the criticisms of the method made by Mr. Cartier would not lead a normal reader of Exhibit K to any doubt as to the meaning of the directions on page 423 and that

there was nothing to indicate that the method was to be used only with high frequencies. The answer to this was that there was a difference in kind between high frequencies and low frequencies. Junior counsel for the plaintiff effectively answered the contention of counsel for the defendants pointing out in the course of his argument, *inter alia*, that the equipment portrayed in Figure 244 was not orientable in azimuth as in the case of the plaintiff's transmitter coil and that its use did not contemplate the use of traverse lines, that there was no instruction in Exhibit K as to what was to be done with the equipment after it had been initially set up, that the references in the article to dip and strike meant that two measurements were to be made and that the alignment of the direction-finding coil so that its axis of rotation passed through the centre of the energizing coil meant that it should pass through its electrical centre. He agreed with Mr. Cartier's strictures concerning Exhibit K and concluded that the method described in it had nothing to do with the prospecting method defined in Claim 11. In his opinion, a person reading the article would be led away from the method of the Claim to a method of high frequency energizing coils. In my opinion, Exhibit K does not support the contention of counsel for the defendants.

Counsel for the defendants did not go so far as to contend that Exhibit J was anticipatory of the whole of the prospecting method defined by Claim 11. Obviously, it did not meet the requirements of an anticipatory publication that are set out in *The King v. Uhlemann Optical Co.*[1]; *vide* also *O'Cedar of Canada Ltd. v. Mallory Hardware Products Ltd.*[2] But counsel's argument led, in effect, to the same result as if he had made such a contention. He submitted that the only difference between Claim 11 and Exhibit J was the feature specified in the former that the search coil (receiver coil) should be swung on an extended axis, that, otherwise, Exhibit J contained everything that was in Claim 11, that there was nothing inventive about swinging the search coil on an extended axis and that, consequently, Claim 11 was invalid in that it claimed exactly the same method as that described in Exhibit J except the swinging of the search coil on an extended axis in respect of which there was no invention. It was also contended that Claim 11 did not

[1] [1950] Ex. C.R. 142 at 157. [2] [1956] Ex. C.R. 299 at 313.

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specify how extended the axis of the search coil should be, that it would, therefore, include any extension, no matter how short or how long, that the receiver coil referred to in Exhibit J was mounted on a tripod and swung from it and that no inventive ingenuity was involved in maintaining the receiver coil on an extended axis instead of on a tripod. Counsel also submitted, in effect, that there was no utility in the swinging of the search coil on an extended axis, that there was nothing to show whether the plaintiff's commercial success was attributable to the use of its apparatus or to the use of its prospecting method, that such success could not be attributed to swinging the search coil on an extended axis, that it would have been achieved just as well without it, that the result of using the method defined in Claim 11 was exactly the same as that of using the method described in Exhibit J, that the former was not an improvement over the latter and that there was no advantage in using it. Finally, counsel submitted that, if there was novelty in swinging the search coil on an extended axis thus making Claim 11 novel as compared with Exhibit J, the creation of such novelty did not involve the exercise of any inventive ingenuity. Thus, counsel for the defendants, instead of contending that Exhibit J was anticipatory of Claim 11, argued that it was anticipatory of its alignment feature and that the feature of swinging the search coil on an extended axis, which was the only thing that differentiated it from Exhibit J, lacked utility and inventiveness and that, consequently, the Claim was invalid.

There is a two-fold answer to this attack on the Claim. If counsel for the defendants was right in his contention that the feature of swinging the search coil on an extended axis was the only thing that differentiated the prospecting method defined in the Claim from that described in Exhibit J and that it did not add anything useful or inventive to the alignment feature of the method this was tantamount to saying that, apart from creating a low frequency alternating current by means of a transmitting coil suspended to hang vertically and orientable in azimuth, the invention defined in Claim 11 lay exclusively in its alignment feature. Indeed, this was implicit in counsel's argument that the result of using the method defined in the Claim was exactly the same as that of using the Exhibit J method, from which it would follow that the feature referred to was not only a

non-essential feature of the invention but also had no effect on it. It could not, therefore, fairly be said to be a limitation of the features that constituted the invention. Consequently, the remarks of Romer, J., in *Nettlefolds Ltd. v. Reynolds*[1] do not apply in this case.

Moreover, it is not a correct approach to the determination of whether a claim is invalid to pick out an individual feature of the invention defined by it and contend that because such feature is not new or useful and does not involve the exercise of inventive ingenuity the Claim is, therefore, invalid. It is well settled, as Lord Romer said in *Non-Drip Measure Com'y Ltd. v. Stranger's Ltd., et al.*[2] that this is not a legitimate method of approach and that the alleged invention must be regarded as a whole. If this were done in the present case there would be no doubt that the plaintiff's prospecting method was novel. Mr. Cartier had never heard of its having been used prior to the date of the invention and did not know any prospecting method, other than the plaintiff's, that combined the features of creating a low frequency alternating magnetic field, aligning the receiver coil generally in the plane of the transmitter coil, swinging the receiver coil on an extended axis and noting only one angle of declination from the vertical of the extended axis when the position of minimum or nil sound had been found. Moreover, the utility of the method was proved beyond dispute. Certainly it did not lie in the mouth of either of the defendants to deny its usefulness. And the evidence proves, if any proof were required, that the use of the low frequency and alignment features of the method substantially eliminated the misleading readings that had been such a bad feature of the prior art. In my view, Claim 11 when read as a whole defined an invention that was new, useful and inventive. Certainly, the statutory presumption that these factors of patentability were present was not disturbed.

Moreover, even if it were permissible to consider the attacks on the feature of swinging the search coil on an extended axis I would have no hesitation in finding that they were unfounded. I am unable to agree with the contention that the feature added nothing to the other features specified in the Claim and was useless and non-inventive.

[1] (1892) 9 R.P.C. 270 at 285, ll. 34-44.
[2] (1943) 60 R.P.C. 135 at 145.

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While it is true that there was some evidence on behalf of the defendants that the operator of the receiver coil would find it just as useful to hold it in his hand and swing it from side to side as to swing it on an extended axis, the weight of the evidence strongly indicates the usefulness of the feature in that it was possible to find the position of minimum or nil sound with greater ease and accuracy than previously and so make a quicker and more reliable reading of the spacial angle referred to in the Claim. And there was no evidence to warrant counsel's contention that the feature did not involve the exercise of inventive ingenuity.

It is not easy to separate some of the attacks on Claim 11 from the attempted defence against the charge of infringement of it. I have already referred to the comments of counsel for the defendants on the feature of swinging the search coil on an extended axis and his submissions that it was neither useful nor inventive. There were other attacks on the feature. Here I refer to the evidence of Mr. Doeringer regarding the receiver coil used by the defendant Sharpe Geophysical Surveys Limited. It was mounted on a pole that was four and a half feet high and was a foot and a half from the bottom of the pole and had a diameter of one foot and a thickness of two inches.

On these facts it was contended for the defendants that if it could be said that this coil was mounted on an extended axis then the Claim would extend to any extended axis no matter how short it was, even if only three inches, in which case the Claim would be wider than the invention, if there was any, in that it would include an extended axis that was so near to the ground that it could not produce the advantages claimed in the disclosures of the specification. In the alternative, it was submitted there was nothing in the patent to indicate how extended the extended axis should be and that, consequently, the Claim was invalid for ambiguity.

In my opinion, these charges cannot be supported. It was not necessary to specify in the Claim the ambit of the term "extended axis". I find support for this opinion in the decisions of the House of Lords in *British Thomson-Houston Company Ltd.*[1] where the term "large diameter" when applied to the filament of an incandescent electric lamp was held to be not ambiguous, and *Raleigh Cycle Co'y Ltd. et al.*

[1] (1922) 39 R.P.C. 49.

v. H. Miller and Co'y Ltd.[1] where the meaning of the term "steady light even at slow speeds" in the specification was considered.

Moreover, there is a practical limitation in the ambit of the term in the fact that since the receiver coil is to be swung on its extended axis it must be placed on the pole sufficiently above the ground to enable it to be swung as specified. Mr. Robinson stated that it did not matter where the receiver coil was placed on the pole so long as it was sufficiently above the ground to be out of the mud. In my opinion, any person skilled in the art would appreciate that fact and also the need for having the coil sufficiently above the ground so that it was swingable on the extension of its axis that was between it and the ground. Such a person would have no difficulty in knowing the ambit of the term.

In the course of the argument counsel for the defendants commented that the term "noting" in Claim 11 was wide enough to cover any kind of noting, even that used by Mr. Lundberg, and that, consequently, the Claim extended to a method of noting that was neither easy nor quick, but I did not understand him to go so far as to attack its validity on that ground. If he had done so the attack would have failed for the rest of the claim shows clearly that the purpose of swinging the search coil on an extended axis was to enable the operator of the receiver coil to note the spacial angle referred to in the Claim after the position of minimum or nil sound had been found, meaning thereby to make a reading at his station based on the angle of declination from the vertical of the extended axis of the receiver coil when it had been swung to the position of minimum or nil sound.

In my opinion, all the attacks on Claim 11 failed and I find the Claim valid.

The same finding applies to Claim 12. It is the same as Claim 11 except that it contemplates the use of an audio-frequency instead of a low frequency. Thus it extended to a higher frequency than Claim 11 does and, in that sense, it is a broader Claim. I find the Claim valid.

I now come to the question of infringement. The defendants deny that they have infringed any of the plaintiff's rights either to the apparatus defined in Claim 8 or to the prospecting method defined in Claims 11 and 12. I shall deal first with the question in respect of Claim 8. It should

[1] (1948) 65 R.P.C. 141.

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be noted that the invention defined in it is limited to the transmitting unit of the plaintiff's prospecting apparatus. It is thus of narrower extent than the invention which the evidence discloses, but there is nothing to prevent an inventor from claiming less than his invention if that which he claims is itself an invention as, in my opinion, the plaintiff's transmitting unit plainly is. And, of course, the Court is here concerned only with whether there has been infringement of the plaintiff's rights in respect of the invention as claimed.

In a statement of admissions, filed as Exhibit 2, the defendants admit that the defendant Sharpe Instruments Limited has constructed and sold to others and the defendant Sharpe Geophysical Surveys Limited has used prospecting apparatus which includes an air core transmitting coil which can be carried on the back and which in use is mounted in a vertical position for orientation azimuthally, that the transmitting coil is electrically connected to a gasoline engine driven alternating current generator and that a condenser is connected in parallel with the transmitting coil for the purpose of achieving a resonant load for the alternating current generator.

This is as far as the statement goes. There is no mention of the frequency regulation referred to in the Claim. But important evidence of this was given by Mr. Cartier who had inspected the prospecting apparatus manufactured and sold by the defendant Sharpe Instruments Limited and used by the defendant Sharpe Geophysical Surveys Limited. Two inspections were made by him, one on March 31, 1954, and the other on November 17, 1954. They were made at the premises of the defendant Sharpe Instruments Limited and in the presence of its president and counsel for the parties. Here I should state that when I use the term defendant I mean the defendant Sharpe Instruments Limited and when I use the term defendant's apparatus or defendant's transmitting unit I mean the apparatus or transmitting unit manufactured and sold by the defendant Sharpe Instruments Limited and used by the defendant Sharpe Geophysical Surveys Limited. At the inspections referred to Mr. Cartier was shown a prospecting apparatus similar to that described in the defendant's booklet, filed as Exhibit 4. It consisted of a transmitter coil suspended from a short mast that rotated on a tripod so that the coil was freely

orientable in azimuth, a gasoline motor engine driven generator to energize it and a receiver coil with the necessary attachments including a clinometer. The motor generator set, which weighed 50 pounds and was mounted on a packboard, was similar to the plaintiff's. The transmitter coil was connected with the generator and the apparatus put into operation. There was a governor on the motor but it was inoperative. Mr. Cartier made certain tests while the apparatus was being operated and observed the effects of variations in the speed of the motor and the frequency of the generator. He measured this from time to time with a frequency meter and made notes of his measurements. Mr. Doeringer was also present at the inspection on November 17, 1954. In my opinion, no useful purpose would be served in setting out the details of the several tests and measurements made by Mr. Cartier. It will be sufficient to set out the conclusions drawn from them. I have already pointed out that the defendant's generator set was similar in weight and size to the plaintiff's. And, without going into the details of the evidence on the subject given by Mr. Cartier, Mr. Robinson, Mr. Doeringer and Mr. Mounce, I am satisfied that the electrical circuit in the defendant's apparatus, as shown in the right portion of the circuit diagram, filed as Exhibit 3, was electrically, if not physically, the equivalent of the electrical circuit in the plaintiff's apparatus, as shown in Figure 3 of the drawings of the specification. This equivalence was specifically stated by Mr. Doeringer and the fact is not disputed. Moreover, Mr. Cartier found that the speed of the motor and, consequently, the frequency of the generator was controlled by a sharply increasing resonant load imposed by the transmitter coil on the generator and by it on the motor. Mr. Doeringer also found that the speed of the motor and, therefore, the frequency of the generator was controlled by the combination of the transmitter coil and its associated condensers. And Mr. Mounce admitted that the load acted to restrict the speed variation of the motor. Thus, the load imposed by the transmitter coil operated as a control of the frequency of the generator and effected frequency regulation of it.

Mr. Cartier considered that the frequency control achieved by the defendant's apparatus, that is to say, by its transmitting unit was very good and Mr. Doeringer found its frequency regulation excellent.

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After Mr. Cartier had made his inspections he plotted the results in the form of curves representing the horse power of the engine on the one hand and the load imposed on the generator and the motor by the transmitter coil and its condensers on the other and put the curves together in a graph, filed as Exhibit 20. The steeply rising top portion of the load curve in this graph, which represents the operating portion of the load, is essentially similar to the corresponding portion of the load curve in Exhibit 7, which represents the operating portion of the load in the plaintiff's transmitting unit and is likewise similar to the load curve shown in Figure 7 of the drawings of the specification. And Mr. Doeringer stated that the load imposed by the defendant's transmitter coil and its condensers was a load of a resonant type and of such a character that on a graph it would be represented by a sharply rising curve and that on such a graph the brake horse power curve, representing the speed of the motor and the frequency of the generator, would intersect the sharply rising load curve on its rising side below its apex. This is exactly what Mr. Cartier's graph, Exhibit 20, shows.

Thus, there is justification for Mr. Cartier's conclusion, in reply to counsel for the plaintiff's question, that the defendant's transmitter coil was connectible with the generator to form a resonant load for the generator and acted to effect frequency relation thereof. This conclusion is in the very terms of Claim 8. In my opinion, the evidence fully supports this conclusion and I find accordingly.

In view of this finding I need not consider the evidence regarding the inspection made by Mr. Cartier of the operation of the defendant's transmitter coil when it was connected with a generator driven by a larger gasoline motor than the one referred to.

If this were all that need be considered there would be no difficulty in finding that the defendants infringed the plaintiff's rights under Claim 8, for it is clear that the defendant has taken the substance of the invention defined in it, namely, a transmitting unit for an electro-magnetic prospecting apparatus comprising a motor generator that can be carried on a man's back and a transmitter coil that can be connected with it so as to impose a resonant load on it to control and thereby regulate its frequency.

But it was contended for the defendants that they were not guilty of the alleged infringement by reason of the fact that in the defendant's transmitting unit the means of suspension of the transmitter coil described in Claim 8 was not used.

To appreciate this contention it is necessary to set out the difference on which counsel for the defendants relied. The means of suspension of the plaintiff's transmitter coil is described in paragraphs 10, 42 and 57 of the specification and illustrated in Figure 1 of the drawings. A tripod with a head block is set up on the ground and the transmitter coil is suspended from below the head block so that it hangs down freely. Consequently, it is maintained in a vertical plane by the force of gravity. It is also orientable in azimuth, that is to say, it can be pointed to the horizon in any direction with its vertical plane in alignment with the axis of the receiver coil at the station at which readings are to be taken.

The defendant's transmitting unit is set up differently, as described and illustrated in its own booklet, filed as Exhibit 4. The transmitter coil is held in the form of a rectangle by two collapsible spreader bars and at the point where these cross one another it is rigidly bolted to and suspended from a short mast rising from and rotating on a tripod set on the ground. There is a small spirit level on the tripod base plate which is used for the purpose of making the base plate level so that the transmitting coil may be held in a vertical plane. The base plate may be orientated so that the coil can be pointed at the station at which a reading is to be taken and when it is pointed in the desired direction it may be locked in that position by means of a small lock screw under the tripod base plate.

Thus, apart from the fact that the defendant's transmitter coil is suspended from a short mast above the base plate of the tripod, whereas the plaintiff's is suspended from below the head block of the tripod, the difference on which counsel for the defendants relied is that in the plaintiff's transmitting unit the transmitter coil is suspended "to hang freely in a vertical plane" so that its verticality is ensured by the force of gravity, whereas in the defendant's case the transmitter coil is bolted rigidly to the mast above the base plate and cannot hang in a vertical plane until after the

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base plate has been made level by the use of the spirit level on it. It should be noted that in both cases provision is made to ensure the verticality of the transmitter coil when it is pointed in the desired direction. The only difference is in the means whereby the desired verticality is accomplished. In the plaintiff's case it is done by the force of gravity, whereas in the defendant's case a spirit level has to be used.

It was on this difference in the means of ensuring the verticality of the transmitter coil that counsel for the defendants entirely relied for his defence against the allegation of infringement of Claim 8. He emphasized the use of the word "freely" in the Claim and contended, firstly, that the defendants' transmitter coil is not suspended and, secondly, that if it can be said to be suspended it is not suspended to hang "freely".

Counsel for the plaintiff put his argument in support of charge of infringement on several grounds. His first submission may be put briefly. It was, in effect, that the difference in the means of suspension of the transmitter coil in the two transmitting units is so small that it may fairly be said that the means used by the defendant falls within the express words "means to suspend said transmitter coil to hang freely in a vertical plane but orientable in azimuth".

I am unable to accept this submission. There is no dispute that when the defendant's transmitting unit is set up the transmitter coil is freely orientable in azimuth. There is support for this conclusion, if any is needed, in the evidence of Mr. Cartier that when he inspected the defendant's apparatus the transmitter coil was suspended in such a manner as to be freely orientable in azimuth. And, in my opinion, there is no doubt that the defendant's transmitter coil is suspended, notwithstanding the fact that it is rigidly bolted to the mast that rises from the base plate of the tripod. The defendant's own booklet, Exhibit 4, describes the coil as being suspended from a mast. Nor does it involve any distortion of language to say that it hangs. That follows from its suspension. And it is also a fact that it is suspended to hang in a vertical plane after the base plate has been made level by the use of the spirit level. That is the means used by the defendant for ensuring the verticality of the

coil. Thus it may fairly be said that the defendant's transmitting unit does include "means to suspend said transmitting coil to hang in a vertical plane but orientable in azimuth". But it is clear that the defendant's transmitter coil does not hang "freely" in a vertical plane as the plaintiff's coil does. The base plate of the tripod must be made level before it can hang in the desired plane. It cannot do so by itself. I must find, therefore, that the means of suspension of the transmitter coil used by the defendant does not come within the express terms of Claim 8 to which I have referred.

But it does not follow that I must accept the contention of counsel for the defendants that the plaintiff has limited the Claim to a specific means of ensuring the verticality of the transmitter coil, namely, that it must be suspended to hang "freely", and that, consequently, it must be held to its own limitation. There would be force in the contention if the Claim were for a means of suspension of the transmitter coil but Claim 8 is not a claim for such an invention at all. The invention defined in it is that of a transmitting unit in which the means of suspension of the transmitter coil is only an accessory that is neither new nor inventive. The need for verticality of the transmitter coil was well known in the art and there was nothing inventive in the idea of ensuring it by the force of gravity. The issue is not whether the means for ensuring the verticality of the transmitter coil used by the defendant infringed the means described in Claim 8 but whether the defendants' transmitting unit as a whole infringed the plaintiff's transmitting unit. Consequently, the decisions on which counsel for the defendants relied in support of this particular contention do not apply and I need not refer to them.

The real issue is whether the defendant's transmitting unit is substantially the same as the plaintiff's. If it is, then it is within Claim 8, in the sense that it is within its scope, even although the means of ensuring the verticality of the transmitter coil used by the defendants is not within the express terms describing that feature in the plaintiff's unit. It is the substance of the defendant's transmitting unit as a combination that must be considered.

The determination of this issue involves consideration of several questions. The main contention of counsel for the plaintiff in support of the charge of infringement of Claim

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8 was, in effect, that when the defendant embodied the idea of portability of the transmitting unit together with frequency control and regulation of the generator by the transmitter coil into its transmitting unit it took the substance, or the "pith and marrow", of the invention defined in the Claim and, consequently, infringed it, notwithstanding the fact that it did not use the means of ensuring the verticality of the transmitter coil described in it but used a different means, which was a mechanical equivalent of a feature of the plaintiff's invention that was not essential to it but merely accessory.

To this contention counsel for the defendants took strong exception. His submissions were, in effect, that by particularizing the means of ensuring the verticality of the transmitter coil, namely, that it should be suspended to hang "freely", the plaintiff had brought itself within the decision in *Submarine Signal Co. v. Henry Hughes & Son Ltd.*[1], that the requirement in the Claim that the transmitter coil should be suspended to hang "freely" was essential to the invention defined in it and, consequently, the doctrine of mechanical equivalency was not applicable, that the doctrine was antithetical to the modern requirement of precision of claims and no longer necessary in patent law and that, in any event, it should not be applied in the circumstances of the present case.

It has long been established that if a person takes the substance of an invention he is guilty of infringement even if his act does not in every respect fall within the express terms of the claim defining it. This basic principle was stated as early as 1875 byJames L. J. in *Clark v. Adie*[2] in the following terms:

> A patent for a new combination or arrangement is to be entitled to the same protection, and on the same principles, as every other patent. In fact, every, or almost every, patent is a patent for a new combination. The patent is for the entire combination, but there is, or may be, an essence or substance of the invention underlying the mere accident of form; and that invention, like every other invention, may be pirated by a theft in a disguised or mutilated form, and it will be in every case a question of fact whether the alleged piracy is the same in substance and effect, or is a substantially new or different combination.

[1] (1932) 49 R.P.C. 149.

[2] (1875) 10 Ch. Ap. 667 at 675.

When *Clark v. Adie* went to the House of Lords[1], the Lord Chancellor (Lord Cairns) discussed the various ways in which a patent for an apparatus could be infringed. In the course of his discussion he said, at page 320:

> The infringer might not take the whole of the instrument here described, but he might take a certain number of parts of the instrument described; he might make an instrument which in many respects would resemble the patent instrument, but would not resemble it in all its parts. And there the question would be, . . ., whether that which was done by the alleged infringer amounted to a colourable departure from the instrument patented, and whether in what he had done he had not really taken and adopted the substance of the instrument patented. And it might well be, that if the instrument patented consisted of twelve different steps, . . ., an infringer who took eight or nine or ten of those steps might be held by the tribunal judging of the patent to have taken in substance the pith and marrow of the invention, although there were one, two, three, four or five steps which he might not actually have taken and represented upon his machine.

Lord Cairns appears to have been the originator of the mixed metaphor "the pith and marrow of the invention". While the metaphor has been criticized the principle enunciated in *Clark v. Adie* (*supra*) has been followed and applied in many cases, both in Great Britain and in Canada, and has never been repudiated: *vide*, for example *Proctor v. Bennis et al.*[2]; *Benno Jaffe und Darmstaedter Lanolin Fabrik v. John Richardson and Co. (Leicester) Ltd.*[3] *The Incandescent Gas Light Company, Ld. v. The De Mare Incandescent Gas Light System Ld., et al.*[4] *Marconi v. British Radio Telegraph and Telephone Company Ld.*[5]; *British Thomson-Houston Co. Ld. v. Metropolitan-Vickers Electrical Co. Ld.*[6]; *The Rheostatic Company Limited v. Robert McLaren and Company Limited*[7]; *Lightning Fastener Co., v. Colonial Co., Ltd. et al.*[8]; *Dominion Manufacturers Ltd. v. Electrolier Manufacturing Co. Ltd.*[9]; *Samson-United of Canada et al. v. Canadian Tire Corpn. Ltd.*[10]

1 (1876-7) 2 A.C. 315.
2 (1887) 4 R.P.C. 333 at 345, 352, 362.
3 (1894) 11 R.P.C. 93 at 112, 261.
4 (1896) 13 R.P.C. 301 at 331, 559, at 571, 579.
5 (1911) 28 R.P.C. 181 at 217.
6 (1928) 45 R.P.C. 1 at 25.
7 (1936) 53 R.P.C. 109 at 118.
8 [1932] Ex. C.R. 89 at 98, 100; (1934) 51 R.P.C. 349 at 367.
9 [1933] Ex. C.R. 141 at 146; [1934] S.C.R. 436 at 443.
10 [1939] Ex C.R. 227; [1940] S.C.R. 386.

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In *Clark v. Adie* (*supra*) Lord Cairns did not specifically refer to the doctrine of mechanical equivalency but it is implied in his statement. Indeed, it is only a particular application of the general doctrine enunciated by him. That this is so was stated by Romer L.J. in *R.C.A. Photophone, Ld. v. Gaumont-British Picture Corporation Ld. and British Acoustic Films, Ld.*[1] where he said of it:

> The principle is, indeed, no more than a particular application of the more general principle that a person who takes what in the familiar, though oddly mixed metaphor is called the pith and marrow of the invention is an infringer. If he takes the pith and marrow of the invention he commits an infringement even though he omits an unessential part. So, too, he commits an infringement if, instead of omitting an unessential part, he substitutes for that part a mechanical equivalent.

There was recognition of this fact in *Marconi v. British Radio Telegraph and Telephone Company Ld.*[2] There Parker J. stated the general principle that Lord Cairns had laid down in these terms:

> It is a well-known rule of Patent law that no one who borrows the substance of a patented invention can escape the consequences of infringement by making immaterial variations. From this point of view, the question is whether the infringing apparatus is substantially the same as the apparatus said to have been infringed

and then said

> where the Patent is for a combination of parts or a process, and the combination or process, besides being itself new, produces new and useful results; everyone who produces the same results by using the essential parts of the combination or process is an infringer, even though he has, in fact, altered the combination or process by omitting some unessential part or step and substituting another part or step, which is, in fact, equivalent to the part or step he has omitted.

This statement, which is confirmatory of the rule laid down by Cotton L.J. in *Proctor v. Bennis et al.*[3], is in my opinion, the best statement of the doctrine of equivalency that can be found in the reports. Its application of course is subject to the limitation implied in the statement, which Parker J. put explicitly as follows:

> The question . . . is a question of the essential features of the invention said to have been infringed. If that part of the combination, or that step in the process for which an equivalent has been substituted, be the essential feature, or one of the essential features, then there is no room for the doctrine of equivalents.

[1] (1936) 53 R.P.C. 167 at 197. [2] (1911) 28 R.P.C. 181 at 217.
[3] (1887) 4 R.P.C. 333.

Thus it is established law that if a person takes the substance of an invention he is guilty of infringement and it does not matter whether he omits a feature that is not essential to it or substitutes an equivalent for it. The case of *The Incandescent Gas Light Company Ld. v. The De Mare Incandescent Gas Light System, Ld. et al* (*supra*) is an early illustration of the former and the case of *Benno Jaffe und Darmstaedter Lanolin Fabrik v. John Richardson and Co. (Leicester), Ltd.* (*supra*) and early illustration of the latter.

In the *Incandescent Gas Light Company* case (*supra*) Willis J. held that the defendants had taken the substance of the patentee's invention, notwithstanding the fact that they used a prescription that was somewhat different from that described in the specification and omitted a substance that had been specified in the specification and accordingly included in the patentee's claim. On appeal to the Court of Appeal[1] his judgment was unanimously affirmed.

And in the *Benno Jaffe und Darmstaedter Lanolin Fabrik* case (*supra*) the facts were that the defendants adopted in substance the whole process of the patent, the only difference being that instead of using a centrifugal machine they substituted a settling tank to do what the centrifugal machine was intended to do. Romer J. held that the use of the centrifugal machine was not of the essence of the invention and that since the defendants had taken the essence they had infringed. At page 112, he said:

> They appear to me to have taken the essence, or what is sometimes called the pith and marrow, of the invention. The use of the centrifugal machine was not of the essence of the invention. That machine was a well known method of separating mechanically materials of different specific gravity, and was, to my mind, referred to in the Specification as being and because it was the most speedy and efficient known means for effecting the separation. The mechanical separation, by allowing gravity to act on such materials when deposited in a vessel in the ordinary way is a well known equivalent, though not so speedy and efficacious, and the Defendants cannot by adopting this, when they in all essential matters take and use the Plaintiff's invention, be heard to say that they are not using that invention or infringing the patent.

The Court of Appeal[2] affirmed the decision of Romer J., holding that the use of the centrifugal machine was not an essential part of the invention, that the defendants had taken every step of the plaintiff's process except the centrifugal machine, that the substitution of a depositing tank

[1] (1896) 13 R.P.C. 559. [2] (1894) 11 R.P.C. 261.

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for the centrifugal machine was the substitution of a mere manufacturing equivalent and that the defendants had accordingly infringed. I might add that the language of Romer J. is, *mutatis mutandis,* appropriate to the facts of the present case.

And it is also established law that a plaintiff can resort to the doctrine of equivalency only in respect of a feature of the invention claimed by him that is not essential to it. In every case where it is sought to apply the doctrine a particular issue arises, namely, whether the feature of the invention in respect of which an equivalent is alleged to have been used is essential to the invention. Thus, for example, in the present case, the particular issue is whether the means of suspension of the transmitter coil referred to in Claim 8 is an essential feature of the invention. If it is, the doctrine of equivalency is inapplicable; if it is not, then it must be determined whether the means of ensuring the verticality of the transmitter coil used by the defendants is an equivalent of the means referred to in the Claim.

The doctrine of equivalency has been applied in a great many cases. Most of the decisions previously referred to as instances in which the principle enunciated by Lord Cairns in *Clark v. Adie* (*supra*) was followed are instances of its application.

Counsel for the defendants sought several avenues of escape from it. He relied particularly on the decision of the Court of Appeal in *Submarine Signal Co. v. Henry Hughes & Son Ld.* (*supra*). His submission was, in effect, that since Claim 8 describes the element of the means of suspension of the transmitter coil particularly and differently from its description in the other claims it cannot be said that the element thus particularly and differently described is not essential to the invention defined in it, that, consequently, the principle of mechanical equivalency is inapplicable and that since the defendant does not use the means of suspension of the transmitter coil described in the Claim the defendants do not infringe it.

I do not agree that the *Submarine Signal Co.* case (*supra*) supports this submission. In that case letters patent were granted in respect of "improvements in or relating to measurement by the use of sound waves". There were 12 claims in the patent of which claims 1, 2, 3, 7 and 9 and 11 were

in suit. Claims 1, 2 and 3 were for a means for measuring by the use of sound waves in which a sound was emitted and its return or echo was received by a receiving mechanism or a receiving transmitter and an indicating instrument. Claims 7 and 9 were for a means for measuring sound waves comprising a sound emitter and a receiving mechanism or device. Claim 11 was for a means for measuring by the aid of sound waves in which an electric oscillator was used. It read as follows:

> 11. Means for measuring by the aid of sound waves, in which an electric oscillator is adapted to be intermittently excited by the aid of a rotating contact device and the echo is received by the oscillator (or by an independent receiving transmitter) intermittently connected to an indicating or recording instrument through part of the said rotating contact device, which is provided with movable contact brushes the displacement of which measures the time interval between the sound emission and the reception of its echo.

In the trial Court claims 1, 2, 3, 7 and 9 were held invalid but claim 11 was held valid and infringed by the defendants who had not used an electric oscillator but a mechanical equivalent of it. In the Court of Appeal it was held that claim 11 must be limited to the particular kind of sound emitter described in it as an electric oscillator, that, consequently, the doctrine of mechanical equivalents was inapplicable and that since the defendants had not used an electric oscillator as their sound emitter they had not infringed the claim. Lord Hanworth held that claim 11 indicated a particular combination in which an electric oscillator was intermittently excited by the aid of the rotating device and that there was no similitude between the instrument used by the defendants and that indicated in claim 11. Lawrence L.J. considered that the first integer of the combination described in the claim was an electric oscillator adapted to be intermittently excited by the aid of a rotating device and that this integer dominated the whole claim. He referred to the fact that in the claims preceding claim 11 the general expression "sound emitter" was used but in claim 11 it was changed to the particular one and held that the obvious inference to be drawn from the change was that the claim was intended to be limited to a particular kind of emitter described as an electric oscillator and, that being so, there was no room for the application of the doctrine of mechanical equivalents. Romer L.J. held that since the patentee in

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claim 11 had substituted the expression "an electric oscillator" for the expression "sound emitter" he must have intended something by that change and that it was useless for him to say that an electric oscillator was not of the essence of the invention claimed in claim 11.

It is, in my opinion, impossible to read the judgments in the *Submarine Signal Co.* case (*supra*) without coming to the conclusion that the Court of Appeal considered that the "electric oscillator adapted to be intermittently excited by the aid of a rotating contact device" was not only an essential integer of the invention defined in claim 11 but also, as Lawrence L.J. put it, the dominating one. Moreover, it would be reasonable, in my opinion, to deduce from the reasons for judgment that the decision of the Court of Appeal would have been the same even if claim 11 had been the only claim in the patent.

I find support for this opinion in the statement of Romer L.J. in *R.C.A. Photophone, Ld. v. Gaumont-British Corporation Ld. and British Acoustic Films, Ld.*[1] There, seemingly, he found it necessary to explain his reasons for judgment in the *Submarine Signal Co.* case (*supra*) as follows:

> I thought that the patentee had clearly indicated that an electric oscillator was an essential feature of the invention described in his eleventh claim. I consequently held that the defendant, who had not used an electric oscillator, but something that might properly be described as a mechanical equivalent of it, had not infringed. Further reflection has not caused me to change the view that I then expressed. The patentee in that case had made the electric oscillator part of the pith and marrow of his invention and the principle of mechanical equivalent was inapplicable.

There is no sugegstion in this statement that Romer L.J. had based his decision on the fact that the patentee had described an element of the invention particularly and differently from the description of the same element in another claim.

Consequently, I have no hesitation in finding that the *Submarine Signal Co.* case (*supra*) is not an authority for saying that if an element in a combination is particularly described in a claim and differently from its description in another claim or in other claims it thereby becomes an essential element in the invention defined in the claim so as to oust the application of the doctrine of equivalency. Such a statement would, in my opinion, be contrary to prin-

[1] (1936) 53 R.P.C. 167 at 197.

ciple and authority. The essentiality of an element in a combination cannot possibly be determined automatically by such an arbitrary test. The nature of the element and its importance in the combination must be considered.

Moreover, the decision in the *Submarine Signal Co.* case (*supra*) is not applicable to the present case. There, as Romer L.J. explained, the patentee had clearly indicated that the electric oscillator described in claim 11 was an essential element of the invention defined in it, but it would be a distortion of language to say that the patentees in the present case had similarly clearly indicated that the means of suspension of the transmitter coil referred to in Claim 8 was an essential element of the invention defined in it, when, as I have already stated, it was common knowledge in the art that the transmitter coil should be in a vertical plane and there was nothing new or inventive in ensuring its verticality by the force of gravity and when its use makes no difference in the result of the combination of which it is only an accessory element as compared with that of the defendants' transmitting unit with a different but equivalent means of ensuring the verticality of the transmitter coil and its orientability in azimuth.

Counsel for the defendants urged that the doctrine of equivalency had its origin at a time when it was not necessary to include claims in the patent specification and the courts, consequently, had to look to the disclosures to see what the essence of the invention covered by the specification was, that after claims were made obligatory in 1883 there was not the same need for the doctrine since the inventor could define his invention by his claims and thus himself do what the courts had previously done, *vide British United Shoe Machinery Company Ld. v. A. Fussell & Sons Ld.*[1], that as claims became more precise there was correspondingly less need for the doctrine, that the later decisions applying it were holdovers from the earlier period, that the doctrine had been in a deep sleep in Great Britain since the decision in the *Rheostatic v. McLaren* case (*supra*) in 1936 and in Canada since the decision in the *Dominion Manufacturers Ltd.* case (*supra*) in 1934, that the doctrine was antithetical to the modern concept of patent law requiring definiteness in claims since its application would

[1] (1908) 25 R.P.C. 631 at 650.

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allow the elimination of limitations in claims and make for uncertainty in their scope, that it was no longer necessary to protect the inventor since he had the power to define his invention in his claims, either broadly or subject to limitations as he might choose to do, and that, in any event, it should not be applied in the present case since the inventors had determined the essentiality of the means of suspending the transmitter coil by prescribing that it be suspended to hang "freely".

These submissions are important and require careful consideration. It may be conceded that there is not the same need at the present time for the application of the doctrine of equivalency as there was before the inclusion of claims in a patent specification became obligatory and the inventor was required to define his invention in them. But, while that is so, there is no justification for holding that the doctrine has been abrogated: *vide* the statement of Duff C.J. in *Smith Incubator Co. v. Seiling*[1]. As already stated, the doctrine is only a particular application of the general doctrine that a patent may be infringed by taking the substance of the invention covered by it and, consequently, it must continue to exist as long as the general doctrine survives. The doctrine was approved by Lord Morton of Henryton in *Raleigh Cycle Coy. Ld. et al. v. H. Miller and Coy. Ld.*[2] And its continued existence was recognized by the Supreme Court of Canada in *Scully Signal Co. v. York Machine Co. Ltd.*[3], although it was not applied in the circumstances of that case.

In the United States the doctrine is in full force: *vide*, for example, *Graver Tank & Mfg. Co., Inc., et al. v. The Linde Air Products Company*[4]. There Mr. Justice Jackson, delivering the opinion of the Supreme Court of the United States said, at page 330:

> The essence of the doctrine is that one may not practice a fraud on a patent. Originating almost a century ago in the case of *Winans v. Denmead*, 15 How. 330, it has been consistently applied by this Court and the lower federal courts, and continues today ready and available for utilization when the proper circumstances for its application arise. "To temper unsparing logic and prevent an infringer from stealing the benefit of an invention" a patentee may invoke this doctrine to proceed against the producer of a device "if it performs substantially the same function in substantially the

[1] [1937] S.C.R. 255 at 258.
[2] (1948) 65 R.P.C. 141 at 160.
[3] [1955] S.C.R. 518.
[4] (1950) 85 U.S.P.Q. 328.

same way to obtain the same result." *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (3 U.S.P.Q. 40, 44). The theory on which it is founded is that "if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape." *Machine Co. v. Murphy* (97 U.S. 120, 125).

This statment is plainly applicable in the present case. *Vide*, also, *Ingersoll Milling Machine Co. v. General Motors Corp.*[1]

The general doctrine was applied recently by the Court of Appeal in *Multiform Displays Ld. v. Whitmarley Displays Ld. (formerly Reay and Davis Limited)*[2] and the fact that its judgment was subsequently reversed by the House of Lords[3], which held that the "pith and marrow" of the invention there in question had not been taken, does not detract from the fact that the existence of the general doctrine has been recognized in England as recently as 1957.

And finally I refer to the decision of the Court of Appeal in *Birmingham Sound Reproducers Ld. v. Collaro Ld.* and *Collaro Ld. v. Birmingham Sound Reproducers Ld.*[4] In that case counsel for the respondent made submissions similar to those of counsel for the defendants in the present case but they were not accepted. At page 244, Lord Evershed M.R. made the following statement:

> In our judgment, it is not open to this Court on the authorities to accept Sir Lionel's submission to the effect that the doctrine of "pith and marrow" or "substance" is dead. Nor do we propose to attempt any comprehensive definition of its scope. We think it can, generally speaking, be taken to be confined to unessential differences, though we appreciate that the distinction between that which is essential and that which is unessential may be difficult to draw.

There is no difference in principle between this statement and that of Parker J. in the *Marconi* case (*supra*).

Consequently, I have no hesitation in finding that the doctrine of equivalency is still in effect in Canada and "available for utilization when the proper circumstances arise".

And I disagree with the submission that the doctrine is antithetical to the modern concept of patent law that claims must be definite and that it is no longer necessary in view

[1] (1953) 97 U.S.P.Q. 110 at 129; (1953) 98 U.S.P.Q. 54.
[2] [1956] R.P.C. 143.
[3] [1957] R.P.C. 260.
[4] [1956] R.P.C. 232.

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of the statutory requirement that an inventor must define his invention. In my opinion, the retention of the doctrine is still necessary to give inventors the protection against infringers to which they are entitled and its abandonment would encourage piracy of inventions by taking their substance and omitting or varying some non-essential feature. In amplification of this opinion I adopt the statement of Mr. Justice Jackson in the *Graver Tank* case (*supra*), at page 330:

> Courts have also recognized that to permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing. Such a limitation would leave room for—indeed encourage—the unscrupulous copyist to make unimportant and insubstantial changes and substitutions in the patent which, though adding nothing would be enough to take the copied matter outside the claim, and hence outside the reach of law. One who seeks to pirate an invention, like one who seeks to pirate a copyrighted book or play, may be expected to introduce minor variations to conceal and shelter the piracy. Outright and forthright duplication is a dull and very rare type of infringement. To prohibit no other would place the inventor at the mercy of verbalism and would be subordinating substance to form.

Moreover, the desired objective of the statutory requirement that the inventor must define his invention in his claims, namely, that the public should know the precise limits of the monopoly granted by the patent is sufficiently safeguarded by the fact that the doctrine is applicable only in respect of those features of an invention that are not essential. Thus, as I see it, the retention of the doctrine with this limitation on its applicability, far from being antithetical to any concept of patent law, supports the basic principle that the inventor is entitled to adequate protection of the monopoly granted to him in consideration of the contribution to society that his invention has made.

It follows that in every case where it is sought to apply the doctrine of equivalency it must be determined whether the feature in respect of which it is sought to be applied is an essential one.

It is in this area that it is difficult to reconcile the decisions. There are some statements to the effect that the Court must look only to the language of the claim to ascertain what the essence of the invention defined by it is. The outstanding statement of this sort is that of Romer L.J. in

R.C.A. Photophone, Ld. v. Gaumont-British Picture Corporation Ld. and British Acoustic Films, Ltd.[1], where he said:

> it is not the province of the Court to guess what is or what is not the essence of the invention; that is a matter to be determined on an examination of the language used by the patentee in formulating his claims.

And in *J. K. Smit & Sons, Inc. v. McClintock*[2] Duff C.J. quoted with approval the remarks of Romer L.J. in which this statement was included.

The first part of the statement, namely, that it is not the province of the Court to guess what is or what is not the essence of the invention, cannot be challenged. Its truth is manifest but it does not necessarily follow that its essence is a matter to be determined on an examination of the language used by the patentee in formulating his claims. If the statement means that the determination of the essence of the invention must in all cases be made exclusively and solely "on an examination of the language used by the patentee in formulating his claims", without resort to any other aid and without regard to any evidence of fact, then, in my opinion, it is too wide and not in accordance with established authority.

I find it difficult to think that Lord Romer intended his statement to have as wide an application as his words indicate. It must be kept in mind that a patent specification, which includes the claims, is addressed to persons skilled in the art and must be construed in the light of the common knowledge which such persons are assumed to have. There are, no doubt, cases in which a claim is expressed in such plain and common language and the essence of the invention is so clear that the claim can be construed and the essence of the invention determined without any aid beyond the language of the claim. In such cases there is no difficulty in following the instruction contained in Lord Romer's statement. But in the majority of cases if the Court is to construe the claim in the light of the common knowledge of the art and as persons skilled in the art would understand it, the Court must, as far as possible, be put into the same position as a person skilled in the art would be. How else could it perform its function properly? This means that there must be evidence of the state of the art at the date

[1] (1936) 53 R.P.C. 167 at 197. [2] [1940] S.C.R. 279 at 284.

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of the patent and such other information as may be necessary to a proper construction of the claim and determination of the essence of the invention defined in it. Consequently, Lord Romer's statement ought not to be read by itself but rather as subject to the qualification that I have indicated.

The proper approach to the ascertainment of the essential features of an invention was stated by Parker J. in the *Marconi* case (*supra*), in the following terms, at page 218:

> to ascertain the essential features of an invention, the specification must be read and interpreted by the light of what was generally known at the date of the Patent.

Moreover, the statement is inconsistent with the decisions in which certain features of an invention have been held to be non-essential, notwithstanding their inclusion in a claim defining it. Here I should refer to the particular submission of counsel for the defendants that the doctrine of equivalency should not be applied in the present case by reason of the fact that the inventors had themselves determined the essentiality of their means of suspending the transmitter coil by prescribing that it was to be suspended to hang "freely" and could not be heard to say that this requirement was not an essential feature of the invention. I have no hesitation in rejecting the submission thus made. There are several reasons for doing so. In the first place, it is contrary to principle. Its acceptance would be tantamount to holding that a person could escape a charge of infringement merely by varying some feature of an invention regardless of whether it was essential in fact or not. Moreover, it is contrary to the established authority of such cases as *Clark v. Adie* (*supra*) and the many cases that have followed it. To argue that because a feature of an invention is included in a claim it must be regarded as essential to the invention defined in it is to deny the whole doctrine of infringement by taking the substance of the invention, for that doctrine assumes that there may be features of the invention that are not essential to it notwithstanding their inclusion in a claim defining it.

The cases in which the doctrine of equivalency has been applied demonstrate that the mention of a feature of an invention in a claim does not necessarily make it essential to the invention. There would be no room at all for the

doctrine of equivalency if the law were otherwise. This was demonstrated as early, at least, as 1894 in the *Benno Jaffe und Darmstaedter Lanolin Fabrik* case (*supra*), to which I have already referred.

The decision in *Marconi v. British Radio Telegraph and Telephone Company Ld.* (*supra*) is a further illustration. In that case claim 1 of the plaintiff's patent read as follows:

> 1. A transmitter for electric wave telegraphy consisting of a spark producer having its terminals connected through a condenser with one circuit of a transformer the other circuit being connected to a conductor and to earth or a capacity the time period of electrical oscillations in the two circuits being the same or harmonics of each other.

and the plaintiff alleged that the defendant had infringed his patent by the sale of a transmitter in which the circuits were linked together by an auto-transformer, instead of by a two-coil transformer as described in claim 1. Parker J. held that the use of a two-coil instrument was not an essential feature of the plaintiff's invention and that the defendant had infringed the patent, notwithstanding the difference in the necessary inductive linkage.

The decision in *The Rheostatic Company Limited* case (*supra*) is to the same effect. There the Lord Justice Clerk (Aitchison) said, at page 118:

> The broad test of infringement is whether the alleged infringer has taken the real substance of the invention as claimed, what Lord Cairns called "the pith and marrow" of the invention. The devices need not be absolutely similar, there may be variation, either addition or subtraction or substitution, and in each case it must be a question of fact whether the variation makes any real difference or is merely a distinction without a difference. An infringement is rarely an exact replica of the device infringed . . .

This statement was approved by Lord Hill Watson in *Lyle and Scott Ld. et al. v. Wolsey Ld. et al.*[1]

There is a further illustration of the same kind in *Dominion Manufacturers Ltd. v. Electrolier Manufacturing Co. Ltd.* (*supra*). This was an action for infringement of a patent relating to handles for use on caskets and other receptacles. Claim 2 was as follows:

> 2. A handle comprising a base member having an opening and provided with a pivot bar extended across the opening; and a grip insertible into the opening and having a slot receiving the pivot bar, the slot defining a bendable finger in the grip, the finger having a lug adapted to engage

[1] (1954) 71 R.P.C. 395 at 417.

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the base member at the lower edge of the opening, the finger and the lug co-operating with the base member, when the grip is raised, to secure a bending of the finger, a partial closing of the slot and a pivotal mounting of the grip on the bar.

The defendant's handle differed from the plaintiff's in that the two members of its handle were locked by a mechanical operation instead of by hand, as described in the claim. The then President of this Court held that this difference was not sufficient to save the defendant from the charge of infringement, its means of locking the handle being the equivalent of the means used by the plaintiff. His decision was affirmed by the Supreme Court of Canada. At page 443, Rinfret J., as he then was, said:

> What the appellant did—and in that his infringement truly consists—was to take the idea which formed the real subject matter of the invention. It does not matter whether he also adopted the substitution of the two holes for the bar in the pivoting means. The precise forms of these means was immaterial.

And so also in the case of *Samson-United of Canada Ltd. et al. v. Canadian Tire Corpn. Ltd.* (*supra*). There the issue really was whether a certain bow-like slot in which the patentee's rubber blades were inserted was an essential to the invention defined in claim 8. The then President of this Court held that it was not and that the variations adopted by the defendant were the equivalent of the features in the plaintiff's device. His decision was affirmed by the Supreme Court of Canada. There Duff C.J., speaking of the means referred to, said, at page 387:

> I have come to the conclusion, however, that this is only a particular means for maintaining the cupped shape of the base and body of the blade and thereby imparting to it the necessary rigidity; and, as a particular means only for maintaining this rigidity which is the essential thing, it is non-essential . . . The substance of the invention lies in shaping the blade in such fashion as to maintain the rigidity of its base and body while leaving the edges sufficiently flexible to be harmless. In that I think there was novelty and invention and, in substance, this has, I think been taken.

The fact that the slot was included in claim 8 did not make it essential to the invention.

Thus it is established beyond dispute that the inclusion of a particular feature of an invention in a claim does not necessarily make it an essential one so as to exclude the application of the doctrine of equivalency.

Some other way of ascertaining whether a particular feature of an invention is an essential one or not must be used. The proper course to be followed becomes clear when a distinction is drawn between the construction of a claim defining an invention and the ascertainment of whether such invention has been infringed. The determination of what the invention is must be made "on an examination of the language used by the patentee in formulating his claims", as Lord Romer stated, for it is only the invention as defined in a claim that falls to be considered. But the ascertainment of whether the invention has been infringed, once the claim defining it has been properly construed, is a different matter.

In my opinion, Lord Romer's statement, if read by itself, did not observe this distinction. The distinction is of the utmost importance for infringement is a question of fact. And since there is infringement if the substance of the invention is taken it becomes necessary to ascertain what the substance of the invention is and that question is one of fact. This was plainly stated by James L.J. in *Clark v. Adie* (*supra*) in the terms already cited:

> it will be in every case a question of fact whether the alleged piracy is the same in substance and effect, or is a substantially new and different combination.

And since infringement by using a mechanical equivalent of a non-essential feature of the invention is merely a particular form of infringement by taking the substance of the invention it follows as a matter of course that the question whether the particular feature is essential to the invention or not is one of fact. Certainly, there can be no doubt of this in cases where the invention is a combination and the feature is an element of it.

There is support for this opinion in a long line of authorities. There is, of course, the classic statement of Lord Cairns in *Clark v. Adie* (*supra*), at page 120, which I have already cited.

There is also the admonition of Wills J. in *The Incandescent Gas Light Company* case (*supra*), at page 330, that in determining whether there has been infringement by taking the substance of an invention it is necessary to consider "the relative magnitude and value of the things taken and of those left or varied". This seems sound for how else

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can a realistic view be taken of what is essential to the invention and what is not? After this admonition, Wills J. went on to say, at page 330:

> It is seldom that the infringer does the thing, the whole thing, and nothing but the thing claimed by the specification. He always varies, adds, omits, and the only protection the Patentee has in such a case lies, as has been often pointed out by every Court, from the House of Lords downwards, in the good sense of the tribunal which has to decide whether the substance of the invention has been pirated.

There is thus no doubt that Wills J. considered that the question whether a particular feature of an invention is an essential one or not is one of fact.

The same opinion is implied in the definition of what constitutes an essential element of a combination invention laid down by Lord Davey in *Consolidated Car Heating Company v. Came*[1] in the following terms:

> it must be a material element for the successful working of the machine, and not a mere detail in the complete machine which may be varied or omitted altogether without serious detriment to the successful working of it.

It is obvious from this definition that the determination of whether a particular feature of a combination invention is of the essence of the invention cannot possibly be made solely "on an examination of the language used by the patentee in formulating his claims". It must depend on the facts of the particular case. There is another important passage in Lord Davey's judgment. It had been contended on behalf of the appellant that the respondent had taken the substance of the invention and it appears that the Chief Justice of the Quebec court from which the appeal was taken had considered that the matter was to be determined simply on reading the specification. Lord Davey disagreed with this view. At page 765, he said:

> Their Lordships cannot adopt the view apparently taken by the learned Chief Justice that the matter is to be determined simply on reading the Specification. They think that according to established authority the Court is bound to decide, as a fact, whether the alleged infringer has taken the substance of the invention, and in forming an opinion on that question to have regard to the evidence as to the existing state of knowledge on the subject at the date of the Patent, and as to the operation of the machine.

Aside from the fact that Lord Davey was delivering the judgment of the Judicial Committee of the Privy Council in

[1] (1903) 20 R.P.C. 745 at 746.

an appeal from Canada, his statement is more in accord with the weight of authority than the statement of Lord Romer to which I have referred. Moreover, Lord Davey found as a fact that a particular feature of the invention before the Board was a very material element in it and that since the respondent's device did not include that feature he had not infringed. Lord Davey's statement plainly indicates that there is no general rule for determining whether a particular feature of an invention is essential to it or not. The determination depends on the facts of each case.

A similar opinion was expressed by Lord Wright M.R. in the *R.C.A. Photophone* case (*supra*) where he said, at page 189:

> It has often been said that no general definition can be given of what are mechanical (or chemical, or optical, or electrical) equivalents. In each case of alleged infringement the Court must decide according to its good sense and on the special facts of each case whether the defendant's invention is, in substance, the same as or different from that of the plaintiff's. In old days the question was one of fact for the jury. The cases cited are merely illustrations of what decisions, in other circumstances, have been arrived at. But it is clear that there can be no question of mechanical equivalent unless the change in the infringing machine is merely a colourable difference in some part or integer, and the machine as a whole is intended to produce the same result by what, to the instructed mind, are the same means.

Reference may also be made again to the statement of the Lord Justice Clerk (Aitchison) in the *Rheostatic Company Limited* case (*supra*), at page 118, which I have cited earlier.

That infringement is a question of fact was plainly stated in the House of Lords by Lord Morton of Henryton in *Raleigh Cycle Coy. Ld. et al. v. H. Miller and Coy. Ld.*[1] And there is also the earlier statement in the House of Lords by Viscount Dunedin in *British Thomson-Houston Co. Ld. v. Metropolitan-Vickers Electrical Co. Ld.*[2] where he said:

> The law as to infringement of combinations is well settled. Of course, if the infringer takes the combination stock lock and barrel there is no question, but it is very easy to modify a combination and the modification may be effected by either addition or subtraction. The question for the Court is not that of detecting absolute similarity, but is that of seeing whether the pith and marrow of the combination, to use Lord *Cairns'* phrase, has been taken, and if that has been done there is an infringement in spite of any modification.

[1] (1948) 65 R.P.C. 141 at 160. [2] (1928) 45 R.P.C. 1 at 25.

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I have no hesitation in finding as a fact that the feature of the invention defined in the claim referred to as "means to suspend said transmitting coil to hang freely in a vertical plane but orientable in azimuth" is not an essential one. The essence of the invention is a transmitting unit that is portable and at the same time effects frequency regulation of the generator by a resonant load imposed on it by the transmitter coil. All that the feature in question is intended to secure is that the transmitter coil should be held in a vertical plane and be orientable in azimuth. The importance of having the transmitter coil in a vertical plane while readings are being made as well known in the art. Cartier stated that it had to be vertical and Lundberg's evidence was to the same effect. There was, therefore, nothing new or inventive in the idea of having a means of ensuring such verticality. The evidence also shows that there were various ways of maintaining the transmitter coil in a vertical plane. So long as there are such means it does not matter what means is used. The means described in the claim is a convenient one in that it achieves the desired verticality by the force of gravity. There was nothing new or inventive in this. There are other kinds of means, including that used by the defendants, which would also serve the purpose. Under the circumstances, I do not see how the means referred to in the claim could possibly be considered an essential feature of the invention defined therein. It is merely an accessory which could be replaced by a mechanical equivalent without making any real difference to the invention and I so find.

Whether the means of maintaining the verticality of the transmitter coil used in the defendant's transmitting unit is a mechanical equivalent of the means referred to in the claim is clearly a question of fact. And there cannot be any doubt that it is. In the defendant's case, as already explained, a spirit level is used to ensure the desired verticality whereas in the plaintiff's case the same result is accomplished by the force of gravity. In each case the transmitter coil is maintained in a vertical plane while readings are being made so that neither means makes any different contribution to the correctness of the readings from that made by the other.

Moreover, the difference in the means of maintaining the transmitter coil in a vertical plane has no bearing on the essence of the invention defined in the claim. The basic issue is whether the defendant's transmitting unit as a whole is substantially the same as the plaintiff's, notwithstanding the difference referred to. Each transmitting unit is a combination. In *The King v. American Optical Co.*[1] I set out the test of what constitutes a combination invention as follows:

> It is not necessary to the validity of a combination invention that its elements should be new. Indeed, all of them may be old . . . If the combination is the invention, then it is immaterial that the elements are old; . . . It is essential to the validity of a patent for a combination invention, apart from considerations of novelty and inventive ingenuity that the combination should lead to a unitary result rather than a succession of results, that such result should be different from the sum of the results of the elements and that it should be simple and not complex. The elements may interact with one another provided they combine for a unitary and simple result that is not attributable to any of the elements but flows from the combination itself and would not be possible without it.

If this test is applied to each of the transmitting units the simple and unitary result is the same in each case, namely, portability of the transmitting unit and at the same time frequency regulation of the generator by a resonant load imposed on it by the transmitter coil, as previously explained. There was no doubt about the matter of portability. That was plainly the same in each case. And the evidence of Mr. Cartier and Mr. Doeringer, to which I have already referred, proves conclusively that the feature of frequency regulation of the generator by the transmitter coil was the same in each case, namely, that the load imposed by the transmitter coil on the generator and by it on the motor operates as a control of the frequency of the generator and effects frequency regulation of it.

Since the essence of the defendant's transmitting unit is thus the same as that of the plaintiff's invention there cannot be any difference in the results of their respective operations in the field since in each case the transmitter coil is maintained in a vertical plane while readings are being taken and in each case the transmitter coil is orientable in azimuth. The case falls squarely within the statement of Parker J. in the *Marconi* case (*supra*) which I cited earlier.

[1] [1950] Ex. C.R. 344.

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This is thus plainly a case where the doctrine of mechanical equivalency is properly applicable. Indeed, it is the very kind of case in which its retention is desirable. Just because the defendant has chosen a different means of ensuring the verticality of the transmitter coil from that referred to in the claim the defendants should not be allowed to escape from the charge of infringement since the difference does not make any change in the essential elements of the two transmitting units and the two combinations function in substantially the same way to accomplish the same result. Nor should the defendants be allowed to escape by reason of the fact that their means of ensuring the verticality of the transmitter coil is not as convenient as the plaintiff's.

Consequently, I find as a fact that the defendant's transmitting unit is substantially the same as the plaintiff's and that the defendants have taken the substance of the invention defined in Claim 8. The defendants have therefore infringed the plaintiff's rights under it.

I now turn to the question whether the plaintiff's rights under Claim 11 have been infringed. In the statement of admissions, filed as Exhibit 2, the defendants made the following admission:

> 2. That the defendant, Sharpe Geophysical Surveys Limited employs the following prospecting method. It uses (a) a vertically supported transmitting coil which is orientable in azimuth and transmits a low frequency alternating magnetic field (e.g. approximately 900 cycles per second), and (b) a detecting coil mounted on a pole with its principal plane at right angles to the longitudinal axis of the pole. In use, the pole is generally in line with the plane of the transmitting coil. A clinometer is mounted on the pole.
>
> In order to detect the influence of a conductor metal on the electromagnetic field created by the transmitter coil, the operator swings the search coil by placing a free end of the pole on the ground and swinging the pole from its point of support on the ground. The disturbance produced by the conductor material is observed by observing the angular position out of the vertical of the axial pole for minimum signal in the search coil.

In my opinion, this admission substantially supports the plaintiff's contention that the said defendant has infringed its rights under the Claim.

The prospecting method referred to in Exhibit 2 was described in detail in the defendant's Booklet "C", filed as Exhibit 4. I have already described the manner in which its transmitter coil is set up and Figure 9 of Exhibit 4 shows that in the field the transmitter coil is held in a vertical position. The booklet specifies that it is energized by means

of a small portable gasoline motor driven generator, which indicates the creation of a low frequency alternating magnetic field within the meaning of the Claim. Figure 8 of Exhibit 4 shows the receiver coil mounted on a staff with a clinometer at the top. It has attachments similar to those on the plaintiff's receiving unit. The receiver coil itself, according to Figure 8, is about one-third up the staff, but Mr. Doeringer described it as being about a foot and a half from the bottom. It is clear from Exhibit 4 that the alignment feature specified in Claim 11 was adopted. It is also clear that when the operator of the receiver coil was ready to make a reading at a station after the transmitter coil had been orientated towards the receiver coil he tilted the receiver staff to right or left about its point on the ground until he found the position of "The Null Point" and then made his reading for the station based on the angle of deviation shown by the needle of the clinometer.

Counsel for the defendants contended that the prospecting method in question differed from that defined in Claim 11 in two respects and, consequently, did not infringe it. His first ground of defence was that the Claim was limited to a method in which the transmitter coil was "suspended to hang vertically" and that the transmitter coil under consideration was not so suspended. I have already dealt with a similar contention in respect of Claim 8 and I repeat my opinion that the transmitter coil when in use was suspended, notwithstanding the fact that it was rigidly bolted to the mast that rose from the base plate of the tripod on which the coil was mounted. And I draw attention again to the fact that the defendant's own Exhibit 4 describes its transmitter coil as being suspended from a mast. Moreover, there is no doubt that it was suspended to hang. And Exhibit 4 establishes by its description and its figures that when the transmitter coil was in use in the field it was suspended so that it hung vertically. The fact that this was brought about by the use of a spirit level to make sure that the base plate of the tripod was horizontal does not alter the fact that when the transmitter coil was being used in the prospecting method that is said to infringe Claim 11 it was suspended in such a way that it did hang vertically. It was, therefore, within the express terms of the Claim relating to it.

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The other ground of defence was that it could not properly be said that the receiver coil, being only a foot and a half from the ground, although Figure 8 of Exhibit 4 shows that it was considerably higher, was swung on an extended axis. Counsel for the defendants conceded that if the portion of the pole or staff below the receiver coil could properly be called its extended axis there would be infringement. In my judgment, there is no doubt that the portion in question, even if only a foot and a half long, could properly be described as an extension of the receiver coil's axis and the statement in Exhibit 4 that the operator of the receiver coil tilted the staff on which it was mounted to right or left about its point in the ground is just another way of saying that he swung the receiver coil on its extended axis. The purpose and result of the operation were the same in the one case as in the other.

Thus I find that the defendant Sharpe Geophysical Surveys Limited infringed the plaintiff's rights under Claim 11. And it follows that it also infringed its rights under Claim 12.

There will, therefore, be judgment in favor of the plaintiff that Claims 8, 11 and 12 are valid and have been infringed as stated and that the plaintiff is entitled to the relief sought by it except as to damages. If the parties are unable to agree on the amount of the damages or the amount of profits, if the plaintiff elects the latter, there will be a reference to the Registrar or a Deputy Registrar to determine the same and judgment for such amount of damages or profits as found on the reference. The plaintiff is entitled to costs to be taxed in the usual way.

Judgment accordingly.