

<p>1949  *Mar. 30, 31  April 1, 4,  5, 6, 7, 8, 11,  12  *Dec. 5</p>	<p>NORANDA MINES LIMITED }  (DEFENDANT) .....</p>	<p>APPELLANT;</p>
	<p>AND</p>	
	<p>MINERALS SEPARATION NORTH }  AMERICAN CORPORATION }  (PLAINTIFF) .....</p>	<p>RESPONDENT.</p>

ON APPEAL FROM THE EXCHEQUER COURT OF CANADA

*Patents—Infringement—Validity of Patent—Use of xanthates in froth-fotation concentration of ores—To determine whether a patent “correctly and fully describes the invention” the specification must be read as a whole—Claims which include substances harmful to the process are invalid—The Patent Act, 1923, S. of C., c. 23, ss. 7(1), 14(1)—The Patent Act, 1935, S. of C., c. 32, s. 61(1) (a).*

The respondent claimed a patent for improvements in the froth-fotation concentration of ores by the use of certain sulphur derivatives of carbonic acid and sued the appellant for infringement. The appellant contended that the patent as a whole was invalid in that it did not correctly and fully disclose the invention and that of the claims sued on, 6, 7 and 9 were too broad and 8 was not infringed. The disclosure set forth that certain sulphur derivatives of carbonic acid had been found to increase greatly the efficiency of the froth-fotation process when used with frothing agents and paragraph 4 read: “The invention is herein disclosed in some detail as carried out with salts of the sulphur derivatives of carbonic acid containing an organic radical, such as an alkyl radical and known as xanthates, as the new substance. These form anions and cations in solution.”

Claim 6 read: “The process of concentrating ores which consists in agitating a suitable pulp or an ore with a mineral-frothing agent and an alkaline xanthate adapted to co-operate with the mineral-frothing agent.” The improvement in the concentration as set out in claim 7 was to be “in the presence of a xanthate”; in claim 8, “in the presence of potassium xanthate”; and in claim 9, “in the presence of xanthate and a frothing agent.”

*Held:* (Kerwin J. dissenting), that in determining whether a patent “correctly and fully describes the invention,” the Specification, including the disclosures and claims, is to be read as a whole.

*Held:* also that claims 6, 7, 8 and 9 were invalid since they included substances i.e., xanthates, admittedly harmful to the process.

*Per:* Kerwin J., dissenting,—“Xanthate” as used in claim 9 must be read as limited by the definition in the disclosures, and as it is a technical word for which there is no precise meaning, the inventor supplied one in paragraph 4 of the disclosures—the term thus limited did not include cellulose xanthates and heavy metal xanthates.

\*PRESENT: Kerwin, Rand, Kellock, Estey and Locke JJ.

APPEAL from a judgment of the Exchequer Court, Thorson J., President, (1) holding that claim 9 of Letters Patent No. 247,576 was valid and had been infringed by the appellant.

*P. C. Finlay K.C.* and *Christopher Robinson* for the appellant.

*E. G. Gowling K.C.* and *Cuthbert Scott* and *J. C. Osborne* for the respondent.

KERWIN J.: (dissenting) The defendant in this action, Noranda Mines Limited, appeals against a judgment of the Exchequer Court (1) declaring that claim 9 of Canadian Letters Patent of Invention dated March 10, 1925, was valid and had been infringed by the appellant and ordering the usual consequential relief. The letters patent were issued as the result of an application filed October 23, 1924, for an invention of Cornelius H. Keller relating to Froth Flotation Concentrates of Ores. The respondent is the plaintiff Minerals Separation North American Corporation to whom Keller assigned all his right, title and interest in and to the invention, and to whom the letters patent were issued. Claims 6, 7 and 8 were also in suit but the trial judge, the President of the Exchequer Court, decided that the first of these was void for avoidable obscurity and that, in view of his conclusion as to claim 9, it was unnecessary to deal with 7 and 8. The appellant admits infringement on claim 9 and as I have come to the conclusion that it is valid, no opinion is expressed as to the other three.

Froth flotation is a method of treating an ore so as to separate the gangue from the values, and which method reduces the bulk of material that has to be subsequently smelted to obtain the desired metal. The operation is accomplished by the addition of a frothing agent to the pulp to which the ore had already been reduced and by such a violent agitation of the pulp that, at the top, a voluminous froth is formed, having the property of tending to cause the values to adhere to the bubbles as they rise through the pulp. The froth is removed and, after the required number of treatments, the minerals contained therein are known as the concentrate.

(1) [1947] Ex. C.R. 306.

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For my purpose the process may be thus baldly stated because although it was fully developed in the evidence and is set forth in detail in the reasons for the judgment appealed from, there is no dispute between the parties as to its existence in that form at the earliest time of any importance in the litigation, that is March, 1915, which is relied upon by the appellant as being the time when the use of xanthates in froth flotation concentration of ores was known by one R. B. Martin. In fact the first ground of appeal of the appellant is that the President was in error in holding the contrary. Before proceeding, the other three grounds of alleged error may be stated:—

2. In holding that the specification of the patent in suit described the invention in the manner required by the statute;

3. In holding that claim 9 was limited by the disclosure to a certain kind of xanthates;

4. In holding that the disclosure was limited to a certain kind of xanthates which did not include cellulose xanthate and heavy metal xanthates.

It will be convenient to examine the last three of these allegations before turning to the first but attention should now be directed to subsection 1 of section 7 and subsection 1 of section 14, of the *Patent Act*, chapter 23 of the 1923 Canadian Statutes, which was the enactment in force at the time of the application for, and granting of, the patent in suit. These enactments are as follows:—

7. (1) Any person who has invented any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvements thereof, not known or used by others before his invention thereof and not patented or described in any printed publication in this or any foreign country more than two years prior to his application and not in public use or on sale in this country for more than two years prior to his application may, on a petition to that effect, presented to the Commissioner, and on compliance with the other requirements of this Act, obtain a patent granting to such person an exclusive property in such invention.

14. (1) The specification shall correctly and fully describe the invention and its operation or use as contemplated by the inventor. It shall set forth clearly the various steps in a process, or the method of constructing, making or compounding, a machine, manufacture, or composition of matter. It shall end with a claim or claims stating distinctly the things or combinations which the applicant regards as new and in which he claims an exclusive property and privilege.

It is upon subsection 1 of section 14 that the appellant relies in connection with its last three submissions and I therefore refer immediately to the disclosure. Paragraphs 2 to 7 inclusive thereof read:—

2. The invention relates to the froth-flotation concentration of ores, and is herein described as applied to the concentration of certain ores with mineral-frothing agents in the presence of certain organic compounds containing sulphur.

3. It has been found that certain sulphur derivatives of carbonic acid greatly increase the efficiency of the froth-flotation process when used in connection with mineral-frothing agents. The increased efficiency shows itself sometimes in markedly better recoveries, sometimes in effecting the usual recoveries with greatly reduced quantities of the usual mineral-frothing agents, and sometimes in greatly reducing the time needed for agitation to produce the desired recoveries.

4. The invention is herein disclosed in some detail as carried out with salts of the sulphur derivatives of carbonic acid containing an organic radical, such as an alkyl radical and known as xanthates, as the new substance. These form anions and cations in solution. Excellent results were also obtained by agitating ore pulps with the complex mixture produced when 33½ per cent of pine oil was incorporated with an alcoholic solution of potassium hydrate, and xanthates or analogous substances were produced by adding carbon disulphide to this mixture.

5. The galena-bearing froth obtained with xanthates or analogous substances used at the rate of 0.2 pounds per ton of ore had a characteristic bright sheen, like a plumbago-bearing froth, and seemed to make a more coherent froth than when other materials were used on the same ore.

6. In general the substances referred to are not mineral-frothing agents,—producing only a slight scum, and some evanescent frothy bubbles, when subjected to agitation which would produce mineral-bearing froth on an ore pulp in the presence of a mineral-frothing agent. The substances are effective in enabling a selective flotation of lead and zinc; and cause uncombined silver, if present, to tend to go into the lead concentrate rather than with the zinc, where these are separated in separate concentrates. Usually pre-agitation is unnecessary, the brightening and other effects seeming to be practically instantaneous. The pulps may be either acid, alkaline or neutral according to circumstances.

7. Two sticks of caustic potash weighing perhaps 15 grams were partly immersed in about 80 cc. of commercial carbon disulphide and kept for about ten days in a closed bottle containing some air in the warm region of the laboratory where were the hot plates used for drying. These eventually yielded a yellow or orange salt which was used with pine oil at the rate of approximately half a pound to a ton of ore in concentrating Hibernia ore from Timber Butte Mining Company. The test was with a neutral pulp, and the concentrates were seen to be clean with brightened lead sulphide particles.

Paragraph 8 states that for laboratory purposes potassium xanthate was prepared in the manner described and

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the subsequent paragraphs set forth certain tests, and the specification ends with eleven claims, of which the ninth only need be noticed:—

9. The improvement in the concentration of minerals by flotation which comprises subjecting the mineral in the form of a non-acid pulp to a flotation operation in the presence of a xanthate and a frothing agent.

In its attack the appellant has sought to place each of the paragraphs of the disclosure set out above in a straight jacket and by a meticulous examination of every word has endeavoured to show that Keller never put his finger on what he had discovered. That this is not a proper way to read the specification is made clear by a number of authorities, to one only of which is it necessary to refer. In *Smith Incubator Co. v. Seiling* (1) Chief Justice Duff states at 255:—

It is now settled law that, for the purpose of ascertaining the meaning of the claims, the language in which they are expressed must be read in light of the specification as a whole, but it is by the effect of the language employed in the claims themselves, interpreted with such aid as may properly be derived from the other parts of the specification, that the scope of the monopoly is to be determined.

And at page 260, the present Chief Justice notes:—

As often observed, of course, the claims must be construed in the light of the rest of the specification; and that is to say, that the specification must be considered in order to assist in comprehending and construing the meaning—and possibly the special meaning—in which the words or the expressions contained in the claims are used.

In accordance with this principle, “xanthate” as used in claim 9, must be read as limited by the definition in the disclosure. This is not inconsistent with the decision of this Court in *B.V.D. Company Limited v. Canadian Celanese* (2) as xanthate is a technical chemical word for which there is no precise meaning and, therefore, the inventor supplied one in paragraph 4 of this disclosure. I agree that the words “such as” mean “of the type of”. So read, Keller has made it clear to any one versed in the art that his invention consists of a new and useful improvement in froth flotation concentration of ores by the use of a mineral frothing agent with sulphur derivatives of carbonic acid containing an organic radical of the type of an alkyl radical which forms anions and cations in solution. Without detailing the evidence which appears in the President’s

(1) [1937] S.C.R. 251.

(2) [1937] S.C.R. 221.

reasons, I may state that I am satisfied that Keller's disclosure was limited to a certain kind of xanthates, which did not include cellulose xanthates and heavy metal xanthates.

I now turn to the first argument of the appellant that the use of xanthates in flotation was known in 1915 by Martin and that, therefore, Keller had not, in compliance with subsection 1 of section 7 of the *Patent Act*, invented any new and useful process not known by others before his invention. Martin was not called as a witness. He had been engaged by the respondent's predecessor in March, 1915, under an employment agreement, and by another agreement of the same date had given an option to a related English company for the purchase, subject to a shop right to Utah Copper Company, of all inventions previously made by him relating to the treatment of ores and to flotation concentrates and reagents. On the same day, Martin disclosed his alleged inventions to Higgins, the chief metallurgist for the respondent's predecessor. Among these was the only one requiring mention, "NATROLA", the name he had used at Utah Copper Company for a composition he later called "STANOL". At the trial, Higgins said Martin had been provided with laboratory accommodation, chemicals and ores, and that he had supervised Martin's work but that STANOL had been found by Higgins, Martin, and a third party to be of no use. Later, at Higgin's suggestion, Martin incorporated in a document dated August 15, 1915, and known as Bulletin 2, descriptions of his flotation reagents, including Stanol. Applications for patents covering other alleged inventions of Martin were prepared and according to the testimony of Mr. Williams, the respondent's patent attorney, they represented all that Martin had succeeded in demonstrating to be of any value of the inventions brought by him to his employer. Bulletin 2 was discussed between Higgins and Martin when the former found that there were so many formulae in the document that he concluded that they could not all be equally effective and he asked Martin to put the best of each one of them in a book of reference. Some time before October 21, 1915, this book was prepared and handed to Higgins and in it are set out certain notations showing what was most useful in each

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of the preparations contained in Bulletin 2. This was followed by Bulletin 3 in which STANOL is not mentioned. On October 22, 1915, Bulletin 4 was delivered by Martin to Higgins and on page 9 is mentioned "STANOL" and stated that it was not satisfactory on ore at Anaconda Mine. Bulletin 4 is the last one in which mention is made of STANOL notwithstanding that Martin prepared and delivered eighty-eight bulletins in all. Although applications were prepared for KOTRIX and certain reconstructed oils which had been disclosed by Martin, he and Higgins decided that there was nothing of value in STANOL to patent. It appears that shortly after the issue of the Keller patent in the United States, Martin resigned his position with the respondent and subsequently was instrumental in having declared an interference between the Keller United States patent and Martin's own application for a patent. This interference was dissolved without a determination of the question of priority.

Nowhere did Martin claim that STANOL was xanthate. He was thinking of STANOL only and while he theorized as to there being some xanthate in it and that it should be effective in flotations, the evidence all leads to the conclusion that he did not know the value or use of xanthate as such; that is, he did not know the invention that Keller later made. It should be added that there is no suggestion that Keller ever saw Martin's bulletins or books. This makes it unnecessary to consider the respondent's argument that even if Martin did know, section 61(1)(a) of the present *Patent Act*, 1935, c. 32, although enacted in 1932 by c. 21, sec. 4 (after the patent in suit was issued) applies so as to render such knowledge unavailing unless Martin had disclosed or used his process in such manner that it had become available to the public.

The appeal should be dismissed with costs.

The judgment of Rand and Locke JJ. was delivered by:—

RAND, J.:—The first objection raised by the validity of the patent is that the inventor, in the specification, has failed to satisfy the requirement of the statute that he describe his invention correctly and fully. Both at the trial and before us the defendant pressed the question, what is the invention? And to deal with that initial challenge adequately a statement of the main facts must be given.

The invention is stated to be an improvement in a process known as the froth flotation of minerals, a method of separating them which in its modern form dates from the year 1905. These minerals are chemical compounds containing metals such as gold, silver, copper, lead, etc.; and they are found generally in a mixture with other substances, chiefly silicas, called an ore body. The minerals may be thickly or thinly scattered throughout the ore; but their extraction from the mixture is a preliminary to the direct recovery of the metal from the compound in which it appears.

The flotation process consists, first of crushing and grinding the ore to varying degrees of fineness: the material is then thoroughly mixed with water into what is called a pulp: an oil or similar substance is added: air is introduced, and the whole well agitated. Masses of bubbles are formed, apparently with an oily film, which, laden with mineral particles, rise to the top in a dark scum called the concentrate. This scum is collected, the froth matter is driven off, and the residue of mineral is then ready for the smelter.

The oil or other substance added is primarily a frothing agent: but it has also more or less a collecting function, that is, it produces an attraction between the air bubbles and the mineral particles which causes the latter to cling to the former. The theory of this attraction seems not to be agreed upon, nor whether the emulsified oil in any degree films the particles. But I infer that it is a real attraction, probably of an electro-magnetic nature, and is not merely a mechanical involvement of the particles in the surface tension of the bubbles. The attraction may also be selective: that is, the copper, say, may be caught up in priority to the lead. Some agents are more effective in producing froth than collecting the mineral while others have a converse action: and a combination of two or even more may be used. So many factors of difference in the minerals and in the ores are found, that each mine tends to work out its own best method; changes in the chemical composition may take place more or less constantly, both slowly and rapidly, and local adaptation may become a factor in good operation. For instance, mineral may oxi-

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dize. Now oxide minerals, in which an oxide of the metal sought predominates, cannot directly be recovered in flotation: the bubbles do not collect the particles. In sulphide minerals, on the other hand, they do. Oxides are therefore washed or filmed with a sulphidizing agent and they then are amenable. The choice of agents to be used may thus, by similar and other conditions, be influenced.

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The search then became one for more effective collector agents, including agents for sulphidizing, substances that would, at the cheapest cost, gather to the concentrate the greatest quantity of values, or minerals, and the least of the waste or gangue: and the whole field of organic and inorganic chemistry was opened to the exploration.

In this state of things, the scientists of the respondent took up the hunt. In 1922, September 19, one of them, a chemist named Keller, in search of a sulphidiser, issued a direction to his associate in metallurgy to test a salt known as potassium xanthate for that purpose. In the course of the next year a great many experiments with xanthate and similar substances were carried out in the company's laboratories at San Francisco and New York. It was discovered that certain xanthates, although not sulphidizing agents, did produce a remarkable increase in the flotation efficacy of frothing or collecting agents. They were not capable of producing froth and did not, apparently, react through coating the particles of mineral. Their property of enhancing the process was demonstrated in March, 1923; and after continuing tests and the exploration of peripheral areas throughout the summer and autumn, application for a patent was made in the U.S.A. on October 21, 1923.

Since the discovered salts have neither frothing nor sulphidizing powers, they are not directly effective on oxide ores until first sulphidized, and they must be combined with a frothing agent: their role is to influence favourably the process as it was carried on with oils and other substances at the time of the invention. They are therefore new factors whose effect is made upon the existing process, in which they appear to play a part analogous to that of a catalytic agent.

Now it is obvious that in the field of chemistry family relationship in compounds is likely to be characterized by similar significant reaction results; and that a xanthate has

such modifying powers leads at once to the notion of a chemical group which, possessing certain characteristic qualities, may be efficacious in producing the same effects. So it happened with Keller. Having made an important discovery, he set about to distribute the field of such agents not only as a contribution to the operation but also to protect his invention against encroachment. The invention became therefore the discovery of a series of modifiers and the initial question raised is whether there has been a sufficient description of that series. In such a case an inventor cannot be called on to investigate and to name every possible substance individually of the group; he may do that by a description and that description may be of attributes or by classification.

The argument tended to assume that the "correct and full" description required by section 14 of chapter 23 of the *Patent Act*, 1923 must be in what has been called the narrative portion of the specification. But the statute makes no such provision; the specification is to end with the claims, but it is in the specification that the description must be given: and to the whole of it we are entitled to look to ascertain what the invention is. The language of Duff C.J. in *Smith Incubator Co v. Seiling*, (1) at p. 257, in which he speaks of the specification "as a whole", seems to me to have been carefully phrased to avoid the restrictive interpretation suggested.

The specification recites that "it has been found that certain sulphur derivatives of carbonic acid" are effective for the purposes of flotation. It then proceeds to reduce this general statement to defined particulars by furnishing examples of derivatives which embody the special property, by indicating certain characteristics and lastly by delimiting, in the claims, the boundaries, within the field of the derivatives, of the group for which the inventor asserts monopoly. The introductory sentence to the claims, "Having described certain embodiments of the invention, what is claimed is", clearly, I think, relates the claims to the description as well as the delineation of the exclusive field. What the disclosure lacks to a full description is the completion of enumeration; at this point description has become enumeration, and that is furnished by the claims.

(1) [1937] S.C.R. 251.

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I take the disclosure to imply in fact that the invention consists of those sulphur derivatives of carbonic acid which are described or defined in the claims. So far as a claim may include, for instance, a useless or an antagonistic substance, it is, as a definition of the monopoly, defective, but its descriptive function remains. The only question then is whether when the description contains a substance of no value or use the patent *ipso facto* is invalid as not specifying the invention correctly and fully. The special circumstance here is that the invention is a distributive discovery; (a), (b), (c) and (d) are asserted individually and severally; the first three have in fact been invented and are correctly and fully described; but the inventor has also described as invention, (d), which he has not invented. Assuming a claim which does not include (d), it is as if the inventor had declared, I assert I have also invented (d) but I do not claim it. Only if we treat the invention as being of the group as an entirety, can it be said that the description is not correct; but that is not what the specification here intends. The substances are to be viewed as quasi-independent inventions but by the necessities of the case they can distributively be made the subject of a single patent.

The invention is therefore the use in flotation of those substances taken distributively which are sulphur derivatives and which are of such nature or characteristics, are so combined, and react in such conditions as are expressed in the specification as a whole. To require the full detailed description to be given in the so-called narrative would necessitate a virtual repetition of the claims. Taking the specification in its totality, Keller has, I think, met the requirement of the statute: no competent metallurgist would have any difficulty in grasping the discovery in all its essentials.

Against this conception, it is said that the expression "sulphur derivatives of carbonic acid" is ambiguous, on which there would be wide divergencies of opinion in metallurgists or chemists. But it is agreed by Dr. Purves, for the appellant, that a sulphur derivative is one in which the oxygen of the formula  $H_2CO_3$  is replaced by sulphur. The initial replacements would result in  $H_2CO_2S$ ,  $H_2COS_2$  and  $H_2CS_3$ , mono-, di-, and tri-thio-carbonates. Dr.

Purves, however, in a chart of resultant combinations, in the mono- and di-groups substituted chlorine or an ammonium radical for OH: in doing that he violated, I think, the primary premise of sulphur substitution for the oxygen. In this I accept the opinion of Higgins, the chief metallurgist of the respondent, that "derivative" means exactly what it says, and that the introduction of Cl and NH<sub>2</sub>, though it does produce a derivative containing sulphur, does not produce a sulphur derivative of carbonic acid; it would properly be called a chlorine or other derivative of a sulphur derivative; but to that the statement of the discovery does not extend.

The invention was one of great value to the mining industry and brought in a group of agents of which there had been no previous knowledge or experience. It was not only natural but legitimate that the inventor should have endeavoured to protect his discovery. Precise description in such an uncharted field is hedged with difficulty; and although overreaching must draw its penalty, we are not called upon to employ microscopic means of discovering it nor to insist upon a pedantic accuracy to satisfy a formal symmetry.

A great deal of the evidence was taken up with matter arising out of the 4th paragraph of the specification which reads:—

The invention is herein disclosed in some detail as carried out with salts of the sulphur derivatives of carbonic acid containing an organic radical, such as an alkyl radical and known as xanthates, as the new substance. These form anions and cations in solution. Excellent results were also obtained by agitating ore pulps with the complex mixture produced when 33½ per cent of pine oil was incorporated with an alcoholic solution of potassium hydrate, and xanthates or analogous substances were produced by adding carbon disulphide to this mixture.

The respondent took the position that here was an exclusive description of xanthate for the purposes of the specification; that the xanthates intended to be denoted by that term were those containing an alkyl radical, which in solution formed anions and cations. These compounds, it may be stated, are salts of xanthic acid. That restrictive definition was considered necessary seemingly to support claim 9 which speaks of "a xanthate", by excluding certain xanthates which admittedly are of no value, such as cellulose and certain of the heavy metal compounds. This re-

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duction of the discovery to special xanthates and "similar substances" mentioned in paragraphs 4 and 7 appears to me to be incompatible with the plain meaning of the language of the paragraphs as well as of the specification generally. What the narrative does is to furnish the circumstances and results in tests of certain "embodiments" of the invention, or, as one might say, of certain members of the group discovered. The reference may be taken as limited to such xanthates; but they are named only as illustrative examples: they, only, are disclosed in some detail; but that the language is intended to furnish a conventional meaning of xanthate to be carried forward into the claims is a conclusion which I am quite unable to draw.

The claims which the defendant is charged with infringing are numbers 6, 7, 8 and 9. The first, 6, is as follows:—

The process of concentrating ores which consists in agitating a suitable pulp of an ore with a mineral-frothing agent and an alkaline xanthate adapted to co-operate with the mineral-frothing agent to produce by the action of both a mineral-bearing froth containing a large proportion of a mineral of the ore, said agitation being so conducted as to form such a froth, and separating the froth.

It was attacked as ambiguous in the expression "alkaline xanthate". Admittedly xanthates are neither alkaline nor acid: they are neutral; and the adjective, as every competent metallurgist would know, cannot be taken to indicate such a characteristic of the substance. Nor do I think it can be taken to refer to the condition of the pulp. But, in some sense it does clearly qualify xanthate and I find no difficulty in satisfying myself in what that lies. Throughout the disclosure it appears that xanthates of potassium and sodium were used exclusively in the experiments. These are two alkali metals which in the standard formula for xanthate replace the hydrogen atom associated with sulphur. The disclosure also describes how these xanthates were made by the inventor, which was by first dissolving the hydrate of the one or the other in ethyl alcohol and then adding carbon disulphide. From these facts and the somewhat free and imprecisely adapted use of adjectival language by chemists, as well as the general knowledge of the chemistry of xanthates, I think it a reasonable inference that the language is intended to describe xanthates in which the metal or radical which replaces the hydrogen atom is that which comes from an alkali, those

in the making of which an alkali is used. Several alternatives were suggested. The meaning attributed by the respondent was alkali metals, which are those present in alkalies: the appellant suggested, in addition, alkaline earths which are earths, i.e. oxides, of chlorine and certain allied elements, and which exhibit properties midway between alkalies and earths: but I am unable to take the word to relate to either of these classes. Claim 5, in specifying an "alkali metal" salt, seems to conclude the question against the first; and the second falls through its own remoteness.

It was contended by Mr. Robinson that, on the respondent's interpretation, the inclusion of ammonium xanthate invalidated the claim because that substance was of no value in flotation. The evidence relied on is the report of Keller in which he describes the combination of ammonium hydrate with alcohol and carbon disulphide to produce what he took to be xanthate. But both Higgins and Dr. Purves agree that ammonium xanthate cannot be so produced and that Keller was wrong in his chemistry. Whatever the product his mixture gave him, whether good or bad for his purpose, it was not xanthate; and ammonium xanthate has not been shown to be of no utility.

But it would appear that whether we take the expression to signify alkali or alkali metal, the same objection arises. The evidence discloses that cellulose xanthate is a product from ingredients of which the alkali, sodium hydrate, is one; it is then a xanthate embraced within both meanings; and since admittedly it is harmful to the process, the claim cannot stand.

But with this, the language "with a mineral-frothing agent and an alkaline xanthate adapted to co-operate with the mineral-frothing agent to produce by the action of both a mineral-bearing froth containing a large proportion of a mineral of the ore" must be considered. At trial, the appellant challenged this language as insufficient in not specifying which xanthates were "adapted" and which not. In this interpretation "adapted" relates to the properties of the xanthate necessary to co-operative action, and its effect would be that it would restrict xanthates to those that could be successfully used. Mr. Gowling, in his factum, states that "it simply means that the purpose of mixing the two

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substances is to enable them to co-operate together to give the desired result." I must confess to a difficulty in appreciating the sense intended to be conveyed by this but, in my opinion, in any admissible sense the clause cannot be taken validly to restrict the scope of "alkaline xanthate" to those that will co-operate, and the clause does not, therefore, affect the conclusion otherwise reached.

The second claim, 7, reads:—

The improvement in the concentration of minerals by flotation which comprises subjecting the mineral in the form of a non-acid pulp to a flotation operation in the presence of a xanthate.

This is met by the formidable objection that "a xanthate" means *any* xanthate including cellulose xanthate. It may be convenient to state here that "cellulose" xanthate is a description in terms of the organic radical used; but xanthates are also known in terms of their metal or of both the metal and radical. The only answer to this is the special interpretation given paragraph 4 with which I have already dealt. The common knowledge contained in the working chemistry dictionaries in 1923 extended to a great many xanthates besides those of soluble metals or alkyl radicals. They had become in fact known to Keller. For these as well as the reasons already given, I must give the language its ordinary meaning and hold the claim invalid.

A second objection is that the claim extends to the use of xanthate without a frothing agent. If it stood alone, I should be disposed to interpret "flotation operation" as including a frothing function. But the express mention of a "frothing agent" in claim 9 in collocation with "flotation operation" implies there either some special conjunction with the xanthate or that two frothing agents are contemplated, or that "flotation operation" is not intended to embrace frothing. The duty of an inventor is to define intelligibly and consistently the boundaries of his exclusive area, and it would be doing violence to this requirement to accept either of the first two suggested meanings; I must then take it that where a frothing agent is not mentioned it is intended to be excluded as a requirement. On this ground, also, the claim fails.

Claim 8 is as follows:—

The improvement in the concentration of minerals by flotation which comprises subjecting the mineral in the form of a non-acid pulp to a flotation operation in the presence of potassium xanthate.

It raises the same question of frothing agent just considered and for the same reason it is defective.

It was urged that the appellant did not use potassium xanthate within six years preceding the commencement of action. The respondent's answer was both that Exhibit M2 shows that use and that sodium xanthate is a chemical equivalent. The contradiction arises from the fact that the defendant takes potassium xanthate in the claim to mean potassium ethyl xanthate and the respondent that it covers potassium xanthate with any alkyl radical. Paragraph 8 of the specification sets out the method followed by Keller to make potassium xanthate and the ingredients used show that he made potassium ethyl xanthate. But that was for laboratory purposes only and there is no implication that it is the only potassium xanthate or that for the purposes of the specification potassium xanthate means that with the ethyl radical. Both amyl and hexyl radicals are mentioned in Exhibit No. 6 listing the xanthates made before 1923. Notwithstanding the evidence of Higgins, that, in common parlance among metallurgists, in the absence of reference to the radical, ethyl is understood, I think the respondents are right in their interpretation.

This in turn raises the question of potassium cellulose xanthate. The metal used in cellulose xanthate, in the manufacture of rayon, is sodium: but the evidence of Bennett is that potassium xanthate of cellulose has the same effect on flotation as the sodium compound, a conclusion which would follow from the fact, agreed upon, that in these compounds the two metals are interchangeable.

Assuming the expression signifies ethyl xanthate, the contention that sodium is, for this purpose, an equivalent must be considered. Both sodium and potassium xanthates, presumably ethyl, are disclosed as having been made and tested and found beneficial to flotation. Potassium was evidently more fully explored than sodium although the latter would appear to be the cheaper product. Both were thought, no doubt, to be protected under claim 7: and we are entitled to ask, why, then, the special claim for the one and not the other. It may be that potassium xanthate was looked upon as the central and basic discovery which would carry with it any such equivalent. But that is a speculation which I do not feel at liberty to act upon. An

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equivalent is a known substitute means to a certain end; but here sodium xanthate is known as a modifying agent only as it has been discovered as part of the invention. To select one of two substances so discovered is impliedly to exclude the other: otherwise it would be to patent the invented substance not directly but as an equivalent; but the specification makes it quite clear that these two substances are not being dealt with in that manner.

The claim, then, is too broad and fails.

The last is 9:—

The improvement in the concentration of minerals by flotation which comprises subjecting the mineral in the form of a non-acid pulp to a flotation operation in the presence of a xanthate and a frothing agent.

This the President held valid. He accepted the contention that paragraph 4 defines and limits xanthates for the purposes of the specification, i.e. those containing an alkyl radical and forming anions and cations in solution. With this I have already dealt. It is a matter of interest that on the original application in the United States, the words were, "as carried out with salts of the alkyl sulphur derivatives"; to change this to "salts of the sulphur derivatives \* \* \* containing an organic radical, such as an alkyl radical" is, in my opinion, to put the actual intention of the draughtsman in the Canadian document beyond controversy; and interpreting the paragraph in the context of the specification as plain and unambiguous language, I find it to carry out that intention.

On the plain language of this claim, it is bad: there were known to Keller many xanthates which were of no value to the process. In opening the case, counsel for the respondent, speaking of claim 7, stated that "a xanthate" meant "any xanthate" and that I think is precisely what it means in 9. The reconstruction of paragraph 4 now put forward appears to me as an artificial patchwork which imputes meaning beyond the capacity of the words to bear.

As is seen, the claims fail chiefly because of the inclusion of xanthates which are antagonistic or useless to the flotation. That of cellulose is most prominent, and in this it is the radical, cellulose, that provides the destructive element. There are at least sixteen organic radicals with which before 1923 xanthate had been made; in the tests of Keller the ethyl radical was used almost exclusively: but cellulose

which had become well-known through the development of rayon was in fact tested and found hostile. In other xanthates it is the metal that is known to furnish that character.

These conclusions diverge from those of the President on the point of the interpretation of paragraphs 4 and 7; and as the language of these paragraphs is set against that of the claims, we have a good example of the sort of thing mentioned by Earl Loreburn in *Natural Colour v. Bioschemes* (1):—"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." As in *B.V.D. v. Canadian Celanese* (2) the claims are wide and general; and for the reasons there given, they cannot be restricted by the language of the disclosure.

Several other objections were raised, the most important of which was that the invention had already been known by Martin, a chemist employed by the parent company of the respondent; but in view of the conclusion reached on the claims, consideration on these grounds becomes unnecessary.

The appeal must, therefore, be allowed and the action dismissed with costs throughout.

KELLOCK J.: The specification states that one, Keller, has invented "certain" new and useful improvements in "froth-flotation concentration of ores" and he declares that what follows is a "clear, full and exact description of the same". The next paragraph reads:

This invention relates to the froth-flotation concentration of ores, and is herein described as applied to the concentration of certain ores with mineral-frothing agents in the presence of certain organic compounds containing sulphur.

So far, it would appear that the "invention" with which the paragraph opens, is something different from the "certain organic compounds containing sulphur" with which

(1) (1915) R.P.C. 256.

(2) [1937] S.C.R. 221.

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the paragraph concludes. In paragraph 3, however, the inventor states what he has found in the following language:—

It has been found that certain sulphur derivatives of carbonic acid greatly increase the efficiency of the froth-flotation process when used in connection with mineral-frothing agents.

The paragraph then gives particulars of the respects in what this increased efficiency shows itself. Paragraph 4 then follows:—

The invention is herein disclosed in some detail as carried out with salts of the sulphur derivatives of carbonic acid containing an organic radical, such as an alkyl radical and known as xanthates, as the new substance. These form anions and cations in solution. Excellent results were also obtained by agitating ore pulps with the complex mixture produced when 33½ per cent of pine oil was incorporated with an alcoholic solution of potassium hydrate, and xanthates or analogous substances were produced by adding carbon disulphide to this mixture.

In paragraph 5 the inventor says:

The galena-bearing froth obtained with xanthates or analogous substances used at the rate of 0.2 pounds per ton of ore had a characteristic bright sheen, like a plumbago-bearing froth, and seemed to make a more coherent froth than when other materials were used on the same ore.

In paragraph 6 he says:

In general the *substances* referred to are not mineral-frothing agents \* \* \* The substances are effective in enabling a selective flotation of lead and zinc \* \* \* Usually pre-agitation is unnecessary \* \* \* The pulps may be either acid, alkaline or neutral according to circumstances.

In my opinion, taking the view for the moment that “the invention” is to be found in paragraph 4, such invention is really twofold—(1) the use of xanthates, and (2), the use of the “analogous substances” in flotation. I do not think either can properly be described as primary or secondary. The inventor in paragraph 5 says that either produce the results therein described, and in paragraph 6 he says that “the substances”, i.e., both the xanthates and the analogous substances, are not mineral-frothing agents and may be used in acid, alkaline or neutral pulps.

As the claims here in question relate to xanthates only, I do not consider it necessary to consider further the “analogous substances” in view of the conclusion to which I have come with respect to the claims.

With respect to xanthates, the respondent contends that paragraph 4 is to be read as saying that “the invention” consists of xanthates containing an alkyl radical and a

soluble metal. This, in effect, is the view which commended itself to the learned trial judge. Appellant on the other hand, says that the paragraph does not so state and that "the invention" is not defined by the paragraph, but is only described as carried out with certain substances, the ambit of the invention being left vague. Appellant further says that if the paragraph is a definition, the expression "such as an alkyl radical" is used in the sense of "for example" and the organic radicals mentioned in the paragraph are not limited to alkyl but extend to all organic radicals or, alternatively, if limited by the expression, the radicals are all organic radicals of the type of alkyl. In appellant's contention these include all aliphatic radicals which react chemically in the same way as alkyl radicals. Appellant further submits that the second sentence of the paragraph is not part of the definition but even if it is properly to be so considered cellulose xanthate would be included and cellulose xanthate is not only useless but positively harmful in flotation.

The first question to be considered therefore, is the proper construction of paragraph 4. I deal first with the opening sentence of the paragraph.

According to *Murray's English Dictionary*, 1919 Edition, "such" is a demonstrative word used to indicate the quality or quantity of a thing by reference to that of another or with respect to the effect that it produces or is capable of producing. Head 9 deals with uses of the words "such as" marked by special word-order and in sub-paragraph (d) which follows upon illustrations of attributive use after a substantive, the authors state that the expression such as "is used to introduce examples of a class:—for example, e.g."

Had the expression used in paragraph 4 read "such an organic radical as an alkyl radical" the situation might have been more in favour of the respondent's contention but the expression actually used "an organic radical, such as an alkyl radical" points to the construction that the patentee was using the phrase "an alkyl radical" by way of example or illustration only. If "an alkyl radical" and an alkyl radical only had been intended it would have been simple to so state, but in the absence of any context other

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than that furnished by the first sentence of the paragraph itself, the patentee appears not to be limiting himself to alkyl radicals but is including the larger field.

It is well settled that the specification is to be read as a whole and the claims, of course, are part of the specifications. In *Consolidated Pneumatic Tool Company Ltd. v. Clark* (1) Warrington J., as he then was, said:

\* \* \* the Claims are to be looked at as intended to define the invention, to point out what it is that the inventor regards as new, and for which he claims protection, and the general rule in dealing with claims is to treat what is not claimed as being disclaimed.

In *Jackson v. Wolstenhulmes* (2), Cotton L.J. said at 108:

The object of a claim is this, to restrict and cut down what might be suggested as the claim made by the previous part of the description, so as to show what it does consist of, and to prevent the patent from being defeated in consequence of words being used which might lead to the inference that something which was not *intended to be claimed* was claimed, and thus the patent being defeated by there being included in the previous part of the specification that which was not new but old.

Perhaps the most authoritative statement is that of Lord Russell of Killowen in *Electric and Musical Industries v. Lissen* (3), as follows:

The function of the claims is to define clearly and with precision the monopoly claimed, so that others may know the exact boundaries of the area within which they will be trespassers. Their primary object is to *limit* and not to extend the monopoly. What is not claimed is disclaimed. The claims must undoubtedly be read as part of the entire document and not as a separate document; but the forbidden field must be found in the language of the claims and not elsewhere. It is not permissible, in my opinion, by reference to some language used in the earlier part of the specification to change a claim which by its own language is a claim for one subject-matter into a claim for another and a different subject-matter, which is what you do when you alter the boundaries of the forbidden territory. A patentee who describes an invention in the body of a specification obtains no monopoly unless it is claimed in the claims.

In *Smith Incubator Co. v. Seiling* (4), Duff C.J.C., at 256 quoted Lord Loreburn in *Ingersoll Sergeant Drill Co. v. Consolidated Pneumatic Tool Co. Ltd.* (5) as follows:

We are asked to construe the claim with reference to the specification, *not in order to understand what the former says*, but to make it say things which in fact it does not say at all.

The claims then define and limit the ambit of the invention and may be read with the disclosure in the earlier part of the specification "in order to understand what the former says".

(1) (1906) 23 R.P.C. 666.

(2) (1884) 1 R.P.C. 105.

(3) (1938) 56 R.P.C. 23 at 39.

(4) [1937] S.C.R. 251.

(5) (1907) 25 R.P.C. 61 at 84.

Accordingly, one finds that claim 10 claims the use of "a sulphur derivative of carbonic acid containing an organic radical", *simpliciter*. The same is true of claim 11, the only difference being that it is "a salt of a sulphur derivative of carbonic acid containing an organic radical" which is there claimed. One contrasts with this language that which is found in claim 3 where the wording is "a salt of an *alkyl* sulphur derivative of carbonic acid". In these circumstances I do not think it open to the patentee to say that when he said in paragraph 4 "an organic radical, such an alkyl radical" he used that wording as the equivalent of "an alkyl radical" *simpliciter*. To permit this would enable the patentee to say under claim 10 or 11 as against an infringer using an organic radical in his process but not an alkyl radical, that paragraph 4 extended to all organic radicals and that the phrase "such as an alkyl radical" had been used as an illustration only. Alternatively also, it would be open to him to put forward the present argument that paragraph 4 meant "an alkyl radical" *simpliciter* and that claims 10 and 11 were obviously too wide and should not have scared off anyone from using anything except an alkyl radical. There is a well settled principle which prevents language being so used by a patentee whose obligation under section 14 of the *Patent Act* of 1923 is to "correctly and fully describe the invention as contemplated by the inventor" and to "set forth *clearly* the various steps in a process, or the method of constructing, making or compounding a machine, manufacture or composition of matter". The specification must "end with a claim or claims stating *distinctly* the things or combinations which the applicant regards as new and in which he claims an exclusive property and privilege".

In *Natural Colour Kinematograph Co. Ltd. v. Bioschemes Ltd.*, (1), at 266, Lord Loreburn 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.

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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 on the Pleading, 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 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. It is necessary to emphasize this warning.

In the case at bar if the present contention of the respondent as to his meaning is correct, there was no more difficulty at the date of the application than now in so expressing it, but in my view, upon the internal evidence furnished by the specification itself, that is not what the draughtsman had in mind in the preparation of the first sentence of paragraph 4.

This conclusion is confirmed by a reference to what occurred in connection with the application in the United States, which antedated the application in Canada. In the original application the wording used in paragraph 4 was "the invention is herein disclosed in some detail as carried out with salts of the *alkyl* sulphur derivatives of carbonic acid known as xanthates as the new substance". This was subsequently amended by striking out the word "alkyl" where it appeared before the word "sulphur" and by inserting after the word "said" the words "containing an organic radical, such as an alkyl radical" so as to produce the form of wording in the Canadian application. As I have already stated, I have reached my conclusion as to the construction of the Canadian patent upon the internal evidence of that patent itself. The American proceedings merely illustrate that the respondent intended the meaning that, in my opinion, the language he adopted in the Canadian patent properly bears. I think therefore that the invention described in the first sentence of paragraph 4 extends to all organic radicals.

Coming to the second sentence, "These form anions and cations in solution" the respondent says that this sentence limits the substances referred to in the first sentence and

that these substances must be soluble, as that term would be understood at the date of the patent by a skilled workman in the flotation field. Again it may be pointed out that it would have been a simple matter for the patentee to have spoken in the first sentence of paragraph 4 of "soluble salts of sulphur derivatives of carbonic acid containing an alkyl radical and known as xanthates". Appellant says that he did not do so and that the second sentence forms no part of the description of the xanthates referred to in the first sentence. That is that the second sentence cannot be read as meaning that the only substances referred to by the patentee are those which have some particular degree of solubility. The appellant contends, further, however, that even if the second sentence of the paragraph is part of the definition cellulose xanthate is included.

In 1923 the only xanthate in commercial use according to the evidence was cellulose xanthate which was used in the rayon industry. Keller himself experimented with cellulose xanthate prior to July of that year but did not find it useful and, according to the evidence of the witness, Bennett, cellulose xanthate is not only useless but absolutely harmful for flotation purposes. This is accepted by the respondent and is the subject of an express finding by the learned trial judge.

As to the word "soluble" the evidence is that it would be interpreted in accordance with the use to be made of the information. Dr. Purves said that to a practical organic chemist if a substance is soluble to the extent of a few tenths of one per cent it would satisfy his understanding of the term. There is no contradiction of this or that a metallurgist would have any different view. The witness Bennett, a practical metallurgist, used a one per cent solution of cellulose xanthate in tests performed by him. In the respondent's factum it is stated that "flotation re-agents do not necessarily have to be very soluble: 2 pounds of re-agent to one ton of ore, i.e., 4 tons of water are ordinarily used".

Respondent contends, however, that such a solution is not a true solution but a colloidal one and the respondent's witness, Higgins, said that in 1923 colloids were avoided like poison in flotation. I do not think that this evidence is sufficient to remove cellulose xanthate from the ambit of

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paragraph 4 of the specification, if it is otherwise included as I think it is. The utility of the use of any xanthate in flotation was entirely new in 1923 and I do not think it can be said that a metallurgist, on reading the specification at that time would, without test, have excluded cellulose xanthate from paragraph 4 merely because it was a colloid. He would have no experience or knowledge of xanthate and therefore the language of paragraph 4 would, in my opinion, be taken by him as including cellulose xanthate. There are two matters in evidence which confirm this view. The first has already been referred to, namely, that Keller experimented with cellulose xanthate before discarding it. In the second place, in Bennett's view a metallurgist in 1923 would have tested cellulose xanthate before he would know whether it was useful or not. I therefore think that it has been made out that cellulose xanthate comes within the meaning of paragraph 4, even taking the view that the second sentence is part of the description of xanthates covered by the paragraph.

It is contended on the part of the respondent however, that any practical metallurgist, on reading the specification, would first try potassium and sodium xanthate and would go no further and that the difficulty of storing and transporting cellulose xanthate, its cost and other considerations would exclude it in his mind.

In *Norton and Gregory Ld. v. Jacobs* (1) Sir Wilfred Greene, M.R., said at 276:

The fact that a skilled chemist desiring to use the invention would reject certain reducing agents as being unsuitable is one thing; it is quite a different thing to say that a claim must in point of construction be cut down so as to exclude those reducing agents because a skilled chemist would not use them. To adopt the latter proposition would not be to construe the Specification but to amend it, \* \* \*

As pointed out by Lord Normand in *Raleigh Cycle Co. v. H. Miller & Co. Ltd.* (2) at 318, the above observation, while directed to the construction of claims, applies with equal force to the disclosure. The decision of Warrington J. in *Thermit Ld. v. Weldite Ld.* (3), is distinguishable. See also *Vidal Dyes Syndicate Ld. v. Levinstein Ld.* (4) per Fletcher Moulton L.J., at page 272. In my opinion therefore the invention described in the specification extends to cellulose xanthate.

(1) (1937) 54 R.P.C. 271.

(2) [1948] 1 A11 E.R. 308.

(3) (1907) 34 R.P.C. 441.

(4) (1912) 29 R.P.C. 245.

Coming then to the claims, those which are in question are 6, 7, 8 and 9. With respect to claim 6, the material words are "alkaline xanthate". According to the respondent, what was intended was "alkali-metal Xanthate", and in the opinion of Mr. Higgins the term used would be so understood by a metallurgist. It is admitted that "alkaline xanthate" is a contradiction in terms, as all xanthates are neutral. According to Dr. Purves, a number of possible constructions could be given to the words. In claim 5 the phrase "alkali-metal salt" is used. It therefore seems that when the draughtsman of the specification intended "alkali-metal" he knew how to so express himself. When he used the word "alkaline" in claim 6 the presumption is that something else was intended. This is left in ambiguity. Even if the contention of the respondent be accepted that "alkaline" is to be read "alkali-metal" the latter expression would include sodium and potassium cellulose xanthate. From any point of view, therefore, the claim in my opinion is invalid.

Claims 7 and 9 may be considered together. The relevant expression is "a xanthate". The respondent seeks to read these claims as limited to the xanthates described in paragraph 4 of the disclosure. For the reasons already given in considering the proper construction to be placed upon that paragraph, these claims are invalid as extending to cellulose xanthate. Apart from this, my opinion on the authorities is that the expression "a xanthate" in the above claim is not to be so limited. In my view the case does not come within the principle applied in *Western Electric Co. v. Baldwin* (1), but rather within that applied in the *B.V.D. Co. v. Canadian Celanese Ltd.* (2).

In *Baldwin's* case the question related to the construction of claim 2, which read:

The combination with a plurality of thermionic repeaters connected in tandem, the first repeater of the series having a high-voltage output and the last repeater of the series having a high-current output

It was held that the language of the claim was to be interpreted by the specification as a whole and that the thermionic repeaters mentioned in the claim must be taken to be thermionic repeaters having the characteristics

(1) [1934] S.C.R. 570.

(2) [1937] S.C.R. 221.

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ascribed "by definition" in the specification. It will be sufficient to quote the specification itself, in part:

It has been discovered that audions of the usual type may be so constructed that, *without the use of transformers*, they will step up the input voltage of either direct current or alternating current of any frequency in one step to as much as 30 times its original value, or in two successive steps to as much as 500 times its original value. The voltage amplification thus secured is entirely free from wave distortion whatever may be the initial frequency and wave form. *This type of audion will, for convenience, be hereinafter referred to as the high-voltage output audion.*

It has furthermore been discovered that audions may be constructed which will step down the input voltage, for example, to one-third of its original value. This last mentioned type of audion has a high-current and a low voltage output. Because of its low output impedance, i.e., the low impedance between its cathode and anode, such type of audion can be worked efficiently into a line of like impedance. *This new type of audion will, for convenience, hereinafter be referred to as the high-current output audion.*

\* \* \*

It has been discovered that a combination of one or more of the *aforementioned* high voltage output type of audions working into *one of the high-current output type*, will operate, without transformers, from a line of low impedance, for example, 250 ohms, into a like line with a resultant current much greater, fifty or more times greater, than would flow in the second circuit if it were directly connected to the first circuit. The present invention is directed to such combination of two different types of repeaters, preferably, audions.

In giving the judgment of the court Sir Lyman Duff, C.J., said at page 578:

To revert to the definitions of the combination to which, as the specification says, "the invention is directed," it would be difficult to find any construction, consistent with the grammatical sense of the words, that would exclude the absence of transformers from the essential features of the combination in respect of which protection is claimed. First of all, he defines the "high-voltage output audion"; and *an element of that definition* is that "without the use of transformers" it will perform certain operations on the input current.

Then, there is a definition of the "high-current output audion," which does not explicitly make the absence of transformers *an essential element*, but which, as already indicated, appears very *clearly to do so* when it is read with the specification as a whole properly construed.

Then, after mentioning that the patentee has applied for patents in respect of these types of audions, he proceeds to describe the combination, and the combination, which is the invention for which he desires protection, is of one or more of the *aforementioned* high voltage output type of audions (a type which, by *definition*, is of such a construction that it performs the function assigned to it in this circuit arrangement *without the use of transformers*) with one of the high-current output type.

And at page 583:

I have no doubt whatever that, on a proper construction of the specifications as a whole, the combination mentioned in the second claim is the combination described in the passage just quoted; or that the

"thermionic" repeaters mentioned in the claim must be taken to be thermionic repeaters having the characteristics ascribed by *definition* to those with which the inventor has succeeded in securing the results which he says are secured by his invention. As a matter of construction, the point does not really appear to me to be open to serious argument.

In my opinion the result of the judgment is that the court found that "a high voltage output" repeater and a "high-current output" repeater, as those expressions were used in claim 2 were to be construed by the definition contained in the disclosure which, as the disclosure itself says would be the expressions "hereinafter" used as meaning the types defined.

When one turns to the *Canadian Celanese* case, the distinction between that case and *Baldwin's* case is obvious. In fact, although three of the members of the court who decided the *Celanese* case had sat on the former appeal, the *Baldwin* case was not mentioned. The disclosure in the patent, which it was claimed by the respondent had been infringed, described the invention as associating a woven, knitted or other fabric, made of *yarns* of a thermoplastic cellulose derivative, with other fabrics. The claim, however, did not mention yarns at all but merely referred to "a thermoplastic derivative of cellulose". It was held that the use of the cellulose derivative in the form of yarns, filaments or fibres was of the very essence of the invention but that the claims must be interpreted as they stood. In both the British and United States patents the claims had expressly mentioned yarns, or filaments or fibres. At page 237 Davis J., giving the judgment of the court said:

We are invited to read through the lengthy specification and import into the wide and general language of the claims that which is said to be the real inventive step disclosed. But the claims are unequivocal and complete upon their face. It is not necessary to resort to the context and as a matter of construction the claims do not import the context. In no proper sense can it be said that though the essential feature of the invention is not mentioned in the claims the process defined in the claims necessarily possesses that essential feature. The Court cannot limit the claims by simply saying that the inventor must have meant that which he has described. The claims in fact go far beyond the invention. Upon that ground the patent is invalid.

The same result was reached by the Court of Appeal in England in a similar case, *Molins and Molins Machine Co. Ltd. v. Industrial Machinery Co., Ltd.* (1).

In my opinion, in the case at bar, we "cannot limit the claims by simply saying that the inventor must have meant

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that which he has described". "A xanthate" is what the patentee claims. This would include at least one xanthate which will not work. The claim is therefore invalid.

With respect to claim number 8, which is limited to "potassium xanthate", the appellant says it has not infringed this claim as it has not used potassium xanthate, although it has used sodium xanthate. The respondent contends however, that sodium xanthate is the chemical equivalent and that the appellant's use constituted an infringement. The question in my opinion resolves itself, first, into the question as to whether the respondent has, upon the true construction of the specification as a whole, excluded from claim 8 everything but the specific substance there mentioned and, in my opinion, it has. There are in all eleven claims in the specification and both potassium and sodium xanthate would be included in the general language used in everyone of them with the exception of the particular claim in question, assuming that some meaning can be given to the expression "alkaline xanthate" in claim 6. Further, one finds the general expression "a xanthate" in claims 7 and 9 and, as just mentioned, the expression "alkaline xanthate" in claim 6. I think, therefore, that it is impossible to contend that in using the expression "potassium xanthate" in claim 8, anything else but that substance was intended to be included.

In the result the respondent fails to obtain protection with respect to a very useful invention which became dominant in the art but this result comes about in my opinion from the failure to observe the requirements of the statute calling for clear expression as to the invention and the claims. There was no difficulty in the adoption of reasonably clear language in the present case.

I would allow the appeal and dismiss the action both with costs.

ESTEY J.: This is an appeal from a judgment in the Exchequer Court awarding damages against the appellant for infringement of respondent's Canadian Letters Patent No. 247,576, dated March 10, 1925. This patent was applied for by Cornelius H. Keller under date of October 23, 1924, in respect of "improvements in froth flotation concentration of ores." The improvements were effected by the introduction of "xanthates or analogous substances"

into the froth flotation process. That such improvements were effective is clearly established and infringement is admitted if the patent is valid.

The appellant's contention is that the specification does not adequately describe the invention nor set forth the claims within the meaning of sec. 14(1) of the *Patent Act*, S. of C. 1923, c. 23, and therefore the patent is invalid.

14 (1) The specification shall correctly and fully describe the invention and its operation or use as contemplated by the inventor. It shall set forth clearly the various steps in a process, or the method of constructing, making or compounding, a machine, manufacture, or composition of matter. It shall end with a claim or claims stating distinctly the things or combinations which the applicant regards as new and in which he claims stating distinctly the things or combinations which the applicant regards as new and in which he claims an exclusive property and privilege.

The purpose of this section is set forth in 22 Halsbury, p. 161, art. 388:

In order that the public may have sufficient and certain information respecting what they are prohibited from doing whilst the privilege continues, the patentee must particularly describe and ascertain the nature of his invention. In order that, after the privilege is expired, the public may be able to do what the patentee has invented, he must particularly describe and ascertain the manner in which the same is to be performed.

The appellant's first contention, therefore involves a construction of the specification. My lord the Chief Justice in commenting upon the construction of the specification in *French's Complex Ore Reduction Co. v. Electrolytic Zinc Process Co.*, (1) stated at p. 470:

It should not be construed astutely. The patent should be approached, in the words of Sir George Jessel "with a judicial anxiety to support a really useful invention" (*Hinks & Son v. Safety Lighting Co.*) (2) but, on the other hand, the consideration for a valid patent is that the inventor must describe in language free from ambiguity the nature of his invention, including the manner in which it is to be performed; and he must define the precise and exact extent of the exclusive property and privilege which he claims. Otherwise the specification is insufficient and the patent is bad.

The respondent's contention is that the foregoing sec. 14(1) is complied with; that the language of paras. 2 and 3 of the disclosure portion of the specification when read together do limit the substance used to "certain sulphur derivatives of carbonic acid," and that in para. 4 the inventor sets forth his invention.

4. The invention is herein disclosed in some detail as carried out with salts of the sulphur derivatives of carbonic acid containing an organic radical, such as an alkyl radical and known as xanthates, as the new substance.

(1) [1930] S.C.R. 462.

(2) (1876) 4 Ch.D. 607 at p. 612.

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These form anions and cations in solution. Excellent results were also obtained by agitating ore pulps with the complex mixture produced when 33½ per cent of pine oil was incorporated with an alcoholic solution of potassium hydrate, and xanthates or analogous substances were produced by adding carbon disulphide to this mixture.

It will be observed that in the foregoing para. 4 the inventor speaks of "xanthates or analogous substances." Inasmuch as the alleged infringements are restricted to the use of xanthates, we are here concerned only with xanthates.

The "certain sulphur derivatives" in para. 3 are in this paragraph restricted to "salts of the sulphur derivatives of carbonic acid containing an organic radical, such as an alkyl radical and known as xanthates, as the new substance." The parties did not agree as to the meaning of the phrase "sulphur derivatives." However, the evidence is to the effect that the more accurate construction of this phrase would restrict it to those derivatives in which the S or S's alone displace one or more O's in carbonic acid ( $H_2CO_3$ ). The sulphur derivatives thus obtained are five in number and they are the only sulphur derivatives of carbonic acid.

The displacement of the oxygen by the sulphur may take place according to five different formulae and the five resulting acids are known as thiocarbonic acid (the prefix "thio" meaning "sulphur"). These five acids are known as mono-thio carbonic acid ( $H_2CO_2S$ ), di-thio carbonic acid ( $H_2COS_2$ ), and tri-thio carbonic acid ( $H_2CS_3$ ), each of the former having two formulae.

From the di-thio carbonic acid having a central carbon with sulphur bonded by two bonds on the left, one with the SH group and one with the OH group, xanthic acid is formed when the hydrogen of the OH group is replaced by an alkyl radical. Then when the H in the SH group is replaced by a metal the result is a di-thio carbonate, or a salt properly described as a "sulphur derivative of carbonic acid." If the metal used be potassium the result is "potassium xanthate."

The next requirement of para. 4 is that these salts contain "an organic radical such as an alkyl radical." It is around the construction of this phrase "such as an alkyl radical" that much of the controversy centres. The first contention is with respect to the meaning of the word "alkyl." The parties hereto agree that all organic chemical

compounds contain carbon and that a radical is an incomplete fragment of a molecule. The respondent's witness Higgins explained that "organic alkyl radicals" are "the residue of the saturated hydro carbon groups." In these saturated hydro carbon groups if all of the C bonds are taken up the result is a product of which methane ( $\text{CH}_4$ ) is one. If, however,  $\text{CH}_3$  is formed, one C bond remains unattached and you have the methyl radical ( $\text{CH}_3$ ). The ethyl radical is  $\text{C}_2\text{H}_5$ . In every radical there is at least one bond of C unattached. The other radicals of the saturated hydro carbon group are propyl, butyl, amyl and hexyl. Higgins would restrict the "alkyl radicals" to these six.

Appellant contends that Higgins' definition of "alkyl radical" is too narrow and that all "aliphatic radicals" should be included under the word "alkyl" when properly defined.

By agreement the parties filed a list of ninety-one xanthates, being the only xanthates that in 1923 could be found referred to in scientific literature and that in all of these the radicals are "aliphatic," (as distinguished from the other classification of "radicals" known as "aryl"). These were grouped under sixteen headings, according to their radicals, and six of these groups were the above mentioned "alkyl radicals." The appellant contends that all of the ninety-one xanthates should be included in the "alkyl" group. If, however, Higgins' definition is accepted, only six of the groups are classified as having "alkyl radicals." The appellant's experts admitted that the Higgins definition "is a good definition and it is the strictest, most precise, narrowest definition which is accepted in textbooks," and again, "It is clean-cut and very often quoted and very frequently used." The appellant's experts were able, however, to cite authorities which did use the word in a wider sense than that used by Higgins. The evidence of Dr. Purves is pertinent in this regard. He says that all of the radicals in the ninety-one xanthates are "aliphatic" and "all infringe that strict definition in one respect or another."

The learned President accepted the respondent's contention that the specification should be construed as not to include all "organic aliphatic radicals" and that "such as" means "of the type of" and in this I am in agreement, and the further discussion is on that basis. It is, however, of

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some significance that Keller and his associates would know of the different senses or meanings given to the phrase "alkyl radical" by the authorities when they adopted the phrase "such as an alkyl radical," and yet not only made no effort to specifically declare that they adopted the Higgins meaning but, as will immediately appear, actually added to the confusion. That the phrase "such as an alkyl radical" was deliberately chosen is apparent from an examination of the application filed for the United States patent on October 23, 1923, where as originally filed the paragraph corresponding to para. 4 under discussion read "with salts of the alkyl sulphur derivatives of carbonic acid known as xanthates," which did definitely limit the xanthate to those having an "alkyl radical." That application, however, was amended by striking out the word "alkyl" and inserting after the word "acid" the words "containing an organic radical such as an alkyl radical" and adding the sentence "These form anions and cations in solution." The language of the amendment was adopted in the Canadian application dated one year later, October 23, 1924. It is no longer "alkyl sulphur derivatives" but "sulphur derivatives containing an organic radical such as an alkyl radical." The deliberate insertion of the words "such as an alkyl radical" under these circumstances cannot be construed other than that the inventor intended to include more than "alkyl radicals," but that he did not intend to include all organic radicals.

Throughout the evidence the respondent appears to treat the words "such as" to mean not "of the type of" but rather as meaning "restricted to" or "synonymous" with "alkyl radical." This is emphasized by the evidence of Higgins, specifically referring to para. 4, where he states: "That is a more detailed description of his agent, and this introduces, in addition to the sulphur and the metal, the alkyl radical." Again, when his attention was directed to the formula of a di-thio carbonate here in question, he stated the radical "had to be an alkyl radical" in order that the xanthate here desired might be obtained.

Then again, this para. 4 must be read and construed as part of the entire specification. *French's Complex Ore Reduction Co. v. Electrolytic Zinc Process Co., supra.* The respondent contends that the invention is described in

paras. 2, 3 and 4 of the disclosure and that in para. 8 thereof he sets forth how he prepared potassium xanthate in the laboratory. The opening words of the first three of these paragraphs are significant: "2. This invention relates to \* \* \*; 3. It has been found that certain sulphur derivatives \* \* \*; 4. The invention is herein disclosed in some detail as carried out with salts \* \* \*" In para. 8 the inventor states: "For laboratory purposes potassium xanthate was prepared as follows \* \* \*" This language does not suggest that this was "the method" but rather that it was but "a method." Then at the conclusion of this disclosure he states: "Having thus described certain embodiments of the invention, what is claimed is \* \* \*" All of the foregoing goes far to support the appellant's contention that the inventor never does define or describe his invention but contents himself with setting forth his findings in a series of experiments. However, approaching the case as presented by the respondent, the foregoing adds to the ambiguity and confusion and does not, nor does any other part of the specification, assist in determining the meaning of the phrase "such as an alkyl radical."

The specification must be construed as a whole, but here nothing is found in the claims portion that defines or clarifies the phrase "such as an alkyl radical." Claim No. 3 is limited to "a salt of an alkyl sulphur derivative." This again is the very language and limitation in the United States application before the amendment. Claims 4 and 5 refer to ethyl-sulphur derivatives of carbonic acid. These are the more restricted but in other claims the language is sufficiently wide and comprehensive to include xanthates with radicals other than the "alkyl." In Claims 6, 7, 8 and 9 here in issue, being the only claims in which "xanthates" are specifically mentioned, one finds in para. 6 the phrase "an alkaline xanthate." Xanthates are neutral and this phrase is admittedly contradictory and would be so recognized by one skilled in the art. It was suggested by the respondent that the phrase "alkali xanthate" was intended and the appellant admits such would be a reasonable construction. The phrase "alkali xanthate" would include the "alkali metal xanthates" which may have "alkyl" or one

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of the other radicals mentioned in the course of this litigation. It would include the "cellulose xanthate" which does not contain an "alkyl radical" but which forms a colloidal solution and is admittedly harmful in the flotation process. Respondent, however, submitted that it was excluded by the draftsmen inserting the words "adapted to co-operate with the mineral-frothing agent," which in this Claim No. 6 immediately follows the words "alkaline xanthate." Then in Claims 7 and 8 the word "xanthate" is used without any limitation whatever, and here again it would include xanthates with other than "alkyl radicals."

The terms "potassium xanthate" and "sodium xanthate" are used repeatedly throughout both the disclosure and claims without any word of limitation as to their radical content. Likewise, the terms "alkaline xanthate" (construed to mean "alkali xanthate") and "xanthate" appear in the claims without limitation as to their radical content. These terms were in 1923 well known and understood by chemists and metallurgists, certainly to the extent that every one of these xanthates might have "alkyl" or practically any of the other "aliphatic radicals." Keller does not discover a new xanthate but what he discovers is a new use of xanthate by his introduction of it into the froth flotation process. Therefore those skilled in the art in reading this specification would conclude that the xanthates used were not those which had only the "alkyl radical."

A specification may be so drafted as to indicate a special or limited sense in which the terms may be used but here the inventor, so far from doing that, has first adopted clear and definite language, discarded it, and in lieu thereof has adopted terms which are ambiguous and which ambiguity, under the circumstances that here obtain, must have been then apparent. In this regard the language of Lord Parker in *Natural Colour Kinematograph Co. Ltd. v. Bioschemes Ltd.* (1) is pertinent:

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.

(1) (1915) 32 R.P.C. 256 at p. 269.

and also the language of Earl Loreburn at p. 266:

If he uses language 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 our own Courts, Mr. Justice Maclean in the Exchequer Court stated:

If the specification uses language which when fairly read, is avoidably obscure or ambiguous, the patent is void, whether the defect be due to design, or to carelessness, or to want of skill; nothing can excuse the use of ambiguous language when simple language may easily be employed, due allowance of course, being made where the invention is difficult to explain and there is a resulting difficulty in the language. *De Forest Phonofilm of Canada Ltd. v. Famous Players Can. Corp. Ltd.*, (1).

The specification as phrased gives no information as to what is meant or included in the phrase "such as an alkyl radical." Keller found that xanthates with an "alkyl radical" soluble in water effected a substantial improvement in the froth flotation process and the evidence at the trial would indicate that so far as xanthates were concerned that constituted his invention. The language of the specification, however, is not so restricted. The language there adopted leads the reader into a field that was unknown to the inventor and which in the specification is not defined. In fact beginning with the phrase "sulphur derivatives" almost every important phrase, as already indicated, is so used that issues such as are here raised were almost inevitable. That in itself is indicative of ambiguity and the absence of that clarity which sec. 14(1) of the *Patent Act* contemplates.

This is not a case where the language is open to one or more constructions and the Court, in the language of Lindley L.J., in *Needham and Kite v. Johnson & Co.* (2): " \* \* \* would put upon it that construction which makes it a valid patent rather than a construction which renders it invalid." The language here used is so vague and ambiguous that in order to attribute to it that clarity and certainty required by the statute we must erase or eliminate the words "such as" and therefore amend rather than con-

(1) [1931] Ex. C.R. 27 at p. 43. (2) (1884) 1 R.P.C. 49 at p. 58.

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strue the language of the specification and thereby restrict the xanthates used in the improvement to those having an "alkyl radical."

Apart from what has already been said, there is another ambiguity inherent in this phrase, and that is the test to be applied to determine what "alkyl" is "such as an alkyl radical." Should the radical be composed of the same or similar ingredients, or whether its effect in chemical reactions should be as the "alkyl radical" is left entirely to conjecture. Moreover, the evidence is to the effect that once you go beyond the "alkyl radical" as defined by Higgins, it is impossible to find a point where a line can be drawn until the xanthates containing all of the "organic aliphatic radicals" are included. The respondent in this action makes no such claim. Even if one adds the limitation in para. 4 that they form anions and cations in solution, the specification does not correctly and fully describe the invention as required by sec. 14(1) (above quoted) of the *Patent Act*.

As already indicated, the ambiguity persists throughout both the disclosure and claims portion of the specification, and in the claims 6, 7, 8 and 9 herein in question it is not stated "distinctly the things or combinations which the applicant regards as new and in which he claims an exclusive property and privilege," within the meaning of sec. 14(1).

The appeal should be allowed with costs.

*Appeal allowed and action dismissed with costs throughout.*

Solicitors for the appellant: *Holden, Murdoch, Walton, Finlay and Robinson.*

Solicitors for the respondent: *Ewart, Scott, Kelley and Howard.*