

First Currency Choice Pte Ltd
v
Main-Line Corporate Holdings Ltd
and another appeal

[2007] SGCA 50

Court of Appeal — Civil Appeals Nos 4 and 5 of 2007

Andrew Phang Boon Leong JA, V K Rajah JA and Belinda Ang Saw Ean J

31 October 2007

Patents and Inventions — Defence — Plea of innocent infringement — Publication of patent specification — Degree of knowledge imputed to alleged infringer upon publication

Patents and Inventions — Infringement — Whether alleged infringers' product infringing proprietor's patent — Applicable principles

Patents and Inventions — Validity — Whether proprietor's patent invalid on grounds of obviousness and insufficiency — Applicable principles

Facts

The respondent was the proprietor of a patent which provided for dynamic currency conversion for card payment systems (“the Patent”). The Patent relied on automatically extracting information from the payment card and comparing the information with a table known as the “Bank Reference Table” (“BRT”) to ascertain the relevant currency. The appellants were held liable for infringing the Patent by offering for use a card currency recognition system (“the FCC system”) which performed the same function as the Patent. The trial judge was of the view that the Patent was indeed novel and involved an inventive step as the automatic detection of the payment card’s operating currency through the extraction of information from the card was not obvious. The trial judge further held that the Patent specification disclosed the invention sufficiently and the challenge on the ground of insufficient disclosure failed accordingly.

The appellants appealed against the trial judge’s decisions on the following grounds: (a) that the invention did not involve any inventive step; (b) that there was insufficient disclosure of the invention in the Patent specification; and (c) that the FCC system did not infringe the Patent because it performed the automatic currency identification in a slightly different sequence from that of the Patent. The appellants’ primary contention was that information making up the BRT was essentially the “Bank Identification Number” (“BIN”) which was already part of the state of the art at the priority date. However, the respondent focused on the automation of the card currency detection process as the inventive step.

Held, dismissing the appeals:

(1) A purposive construction of the claims should be adopted so as to determine the essential features of an invention. Regard ought to be given to the

context sculpted by the patent specification although the specification should not override the claims when the latter's ordinary and natural meaning was otherwise clear: at [25] and [33].

(2) In assessing obviousness of an alleged invention, it must always be remembered that simplicity was not equivalent to obviousness. On the facts, the automatic detection of a payment card's operating currency at the point of sale represented a clear advance on the state of the art at the priority date, which, at that time, only comprised systems that required manual currency selection. A step must have been employed to effect that automation, and it was self-evident that that had to be a new technical step: at [51] and [52].

(3) With regard to the issue of insufficient disclosure, on the evidence, all the appellants' witnesses had little difficulty in reading and understanding the Patent specification and the claims therein. The patentee need not foresee every possible way of implementing the invention. The inventor could not be expected to relieve the competent workman from all steps to assess the efficacy of the description in the specification: at [64], [65] and [67].

(4) A patent specification sufficed if it was clear and complete enough. Absolute clarity and completeness were not uncompromisingly required: at [73].

(5) To determine whether there was infringement of a patent, the scope of the monopoly claimed in the patent must first be determined. The claims in a patent specification were important because what was not claimed was deemed to be disclaimed. If the alleged infringement fell within the words of one of the claims, the patent was infringed. The issue of infringement was a question of fact. It was clear from the evidence that the FCC system infringed the Patent: at [76] and [82].

(6) The publication of a patent application was significant because it could serve as a form of notice (either actual or constructive) to the infringer, thereby modifying the protection afforded by the plea of innocent infringement. Knowledge might, in appropriate cases, be imputed to the infringer upon publication of the patent application in question. The plea of innocent infringement was not available to an infringer who had been informed of the existence of a patent application in respect of the article in question: at [88] and [92].

Case(s) referred to

Bean Innovations Pte Ltd v Flexon (Pte) Ltd [2001] 2 SLR(R) 116; [2001] 3 SLR 121 (folld)

Benmax v Austin Motor Coy Ld (1953) 70 RPC 143 (folld)

Biogen Inc v Medeva plc [1997] RPC 1 (folld)

British Thomson-Houston Company Ld v Corona Lamp Works Ld (1922) 39 RPC 49 (refd)

Catnic Components Limited v Hill & Smith Limited [1982] RPC 183 (folld)

DSM NV's Patent [2001] RPC 35 (refd)

Dyson Appliances Ltd v Hoover Ltd [2001] RPC 26 (folld)

Electric & Musical Industries Ld v Lissen Ld (1938) 56 RPC 23 (refd)

- FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd* [2006] 1 SLR(R) 874; [2006] 1 SLR 874 (folld)
- Genelabs Diagnostics Pte Ltd v Institut Pasteur* [2000] 3 SLR(R) 530; [2001] 1 SLR 121 (folld)
- Genentech Inc's Patent* [1989] RPC 147 (folld)
- General Tire & Rubber Company, The v The Firestone Tyre And Rubber Company Limited* [1972] RPC 457 (folld)
- Glaxo Group Ltd's Patent* [2004] RPC 43 (refd)
- Innovative Scuba Concepts, Inc v Feder Industries, Inc* 26 F 3d 1112 (Fed Cir, 1994) (folld)
- John Khalil Khawam And Company v K Chellaram & Sons (Nig) Limited* [1964] 1 WLR 711 (folld)
- Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2005] RPC 9 (folld)
- Lancer Boss Ltd v Henley Forklift Co Ltd* [1975] RPC 307 (folld)
- Lux Traffic Controls Limited v Pike Signals Limited* [1993] RPC 107 (refd)
- McGhan Medical UK Limited v Nagor Limited* Case No CH 1999 1720 (28 February 2001) (refd)
- Mentor Corporation v Hollister Incorporated* [1993] RPC 7 (folld)
- Merck & Co Inc v Generics (UK) Ltd* [2004] RPC 31 (refd)
- Merck & Co Inc v Pharmaforte Singapore Pte Ltd* [2000] 2 SLR(R) 708; [2000] 3 SLR 717 (refd)
- Monsanto Co v Merck & Co Inc* [2000] RPC 709 (folld)
- Ng Kok Cheng v Chua Say Tiong* [2001] 2 SLR(R) 326; [2001] 3 SLR 487 (refd)
- Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560; [2003] 2 SLR 560 (folld)
- Pfizer Ltd's Patent* [2001] FSR 16 (refd)
- PLG Research Ltd v Ardon International Ltd* [1995] RPC 287 (folld)
- Rodi & Wienenberger AG v Henry Showell Ltd* [1969] RPC 367 (folld)
- Rosedale Associated Manufacturers Ld v Carlton Tyre Saving Coy Ld* [1960] RPC 59 (refd)
- Technograph Printed Circuits Limited v Mills & Rockley (Electronics) Limited* [1972] RPC 346 (refd)
- Vickers, Sons And Co, Limited v Siddell* (1890) 7 RPC 292 (folld)
- Wheatley v Drillsafe Ltd* [2001] RPC 7 (refd)
- Wilbec Plastics Limited v Wilson Dawes (Sales and Contracts) Limited* [1966] RPC 513 (distd)
- Windsurfing International Inc v Tabur Marine (Great Britain) Ltd* [1985] RPC 59 (folld)

Legislation referred to

- Patents Act (Cap 221, 2005 Rev Ed) ss 14, 14(2), 15, 25(3)(b), 25(4), 25(5), 25(5)(b), 69(1), 76, 76(1), 76(3), 76(4), 80(1)(c), 85(1), 113(1)
- Patents Act 1949 (c 87) (UK) ss 32(1)(e), 32(1)(f), 32(1)(i)
- Patents Act 1953 (NZ) ss 21(1), 21(1)(b), 21(1)(e)
- Patents Act 1977 (c 37) (UK) ss 3, 14(3), 14(5), 14(5)(b), 62(1), 72(1)(c)
- Patents Act 1990 (Cth) ss 7(2), 40(2), 40(3), 59(c)

Alban Kang Choon Hwee, Koh Chia Ling and Arthur Yap (Alban Tay Mahtani & de Silva) for the appellant in Civil Appeal No 4 of 2007;
Ang Wee Tiong (Tan Kok Quan Partnership) for the appellant in Civil Appeal No 5 of 2007;
Wong Siew Hong (instructed) and G Radakrishnan (Rada & Associates) for the respondent in both appeals.

[Editorial note: The decision from which this appeal arose is reported at [2007] 1 SLR(R) 1021.]

31 October 2007

Judgment reserved.

V K Rajah JA (delivering the judgment of the court):

Introduction

1 A recent article published in *The Economist Technology Quarterly* (8 September 2007) at 23–24, “A patent improvement”, provides an excellent conspectus of the congenital difficulties in regulating a patent system as follows:

An efficient patent system is essential for the promotion of innovation. Patents give inventors a temporary monopoly on a new idea in return for disclosing how it works, so that others can subsequently build upon it. But if a patent is granted for something that is not novel (people are already doing it), or is obvious (any Tom, Dick, or Harry in the field could think it up), it can hamper innovation by turning a widely used invention or process into one person’s monopoly. The trouble is that examiners cannot always tell when a patent is unwarranted.

To prove that an invention is not novel, the patent examiner must find evidence that others have already done everything claimed in the patent, a quest known as a “prior art” search. Prior art is also the basis for determining whether some new step claimed in the invention is obvious – and therefore not worthy of a patent. But prior art can be elusive. It might be buried in an obscure technical journal, in conference slides, or in a doctoral thesis tucked away in a university library. It could even be embodied in a machine taken off the market years earlier. Finding prior art is hardest in fields where patenting is fairly new, such as software, biotechnology, financial services and business methods.

These insightful observations neatly encapsulate the pragmatic rationale underpinning as well as the intrinsic tensions in the modern approach towards administering a patent protection scheme – namely, striking the right balance between stimulating the creative energies of inventors, while promoting the free flow of ideas and encouraging entrepreneurship. Striking the appropriate balance is certainly not a prosaic task. Even experts in the state of prior art often differ enormously on whether a particular claim is predicated on an inventive step, let alone whether a claim is made

with sufficiency. The courts often have the unenviable task of choosing between seemingly intractable opposing views. That said, often, apparently complex technical issues when properly understood and assessed, do yield to common-sense and relatively straightforward answers.

2 The present legal skirmish between the principal parties is but part of a wider legal feud now taking place in a number of different jurisdictions. This is not unusual in today's "flat" world, where businesses have similar interests and rights to protect in several different jurisdictions. A "flat" world is, however, far from being an "ideal" world, where the outcome would be similar regardless of where the legal jousting takes place. In a "flat" world, the outcomes of the parties' legal differences may not, eventually, be the same in each jurisdiction because of varying statutory matrices and prevailing administrative practices. Ultimately, it must also be acknowledged that an adjudication on patent rights is predicated upon not only the applicable regulatory framework and practices, but also the evidence presented as well as the submissions made to the tribunal concerned. Care must therefore be taken by counsel when referring to and/or relying on another apparently similar decision on the "same" issue from another jurisdiction. With this brief preface, we now turn to the facts.

3 The present appeals were brought by United Overseas Bank Limited ("UOB"), the appellant in Civil Appeal No 5 of 2007, and First Currency Choice Pte Ltd ("FCC"), the appellant in Civil Appeal No 4 of 2007, collectively known as "the appellants", against the decision of the trial judge in *Main-Line Corporate Holdings Ltd v United Overseas Bank Ltd* [2007] 1 SLR(R) 1021 ("the Judgment"). Briefly, the learned trial judge, after an 18-day trial, found in favour of Main-Line Corporate Holdings Limited ("the respondent") and granted an injunction against further infringement of the respondent's Singapore Patent No 86037 (WO 01/04846 A1) titled "Dynamic Currency Conversion for Card Payment Systems" ("the Patent") by the appellants. He also ordered an inquiry before a registrar on damages or an account of profits, and dismissed the appellants' counterclaim for invalidation of the Patent.

4 There were three main grounds of appeal:

(a) whether, on a proper construction of the claims in the specification of the Patent ("the Patent Specification"), the Patent involved an inventive step and was therefore valid;

(b) if ground (a) was answered in the affirmative, whether the Patent Specification sufficiently disclosed the invention in the Patent ("the Invention") for it to be performed by a skilled person and was therefore valid; and

(c) if both grounds (a) and (b) were answered in the affirmative, whether the appellants had in fact infringed the Patent.

The facts

5 The facts of this case were uncomplicated. FCC is a Singapore-registered company, with its main business being the provision of dynamic currency conversion payment services to retailers. It was registered in Singapore on 9 June 2001. It is the creator and proprietor of the “First Currency Choice System” (“the FCC system”), which was made available in Singapore around 2001. UOB, a leading local bank incorporated under Singapore law, has employed the FCC system provided by FCC since 11 October 2001.

6 The respondent, a company incorporated in Ireland, is one of the corporate vehicles used for holding the intellectual property assets of a group of Irish companies called the “Fintrax Group”. A major portion of the group’s business is in multiple-currency credit card payment systems. The respondent is the proprietor of the Patent. The Patent was granted in Singapore on 30 June 2003, with its priority date being 12 July 1999 (“the priority date”). The respondent also holds a similar patent in Europe (“the European Patent”), which was granted by the European Patent Office on 5 December 2001, although it is currently facing post-grant opposition there.

7 Between July 1999 and June 2000, UOB entered into negotiations with the respondent for a licence to use the Invention. A non-disclosure agreement was signed between the parties, and the respondent disclosed considerable confidential technical and proprietary information about the patented system as well as demonstrated how the system worked. However, these negotiations came to naught. Slightly over a year later, on 11 October 2001, UOB entered into an agreement with FCC, under which the latter would offer the then newly-available FCC system for use at various merchant outlets linked with UOB. The FCC system was first offered for use at these merchant outlets in December 2001.

The respondent’s objections to the FCC system

8 Before proceeding, it would be helpful to set out the known currency conversion systems available at the material time for use at points of sale. According to the respondent, automatic currency detection was unknown in Asia until the introduction of the Invention, which eliminated the need for action by the merchant. Prior to that, the system of currency conversion practised in Singapore was entirely manual in nature. The merchant would have to know that the payment card (*ie*, a credit, charge or debit card) presented was a foreign one and then manually determine the operating currency of that card.

9 The Patent covered a method and system of determining the operating currency of a payment card at the point of sale between the merchant and the cardholder by automatically extracting a series of digits

known as the “identifier code” from the payment card number (which is also known as the “Primary Account Number” (“the PAN”)) and comparing the identifier code with a table known as the “Bank Reference Table” (“BRT”) so as to ascertain the relevant currency. The BRT, a table specially constructed by the respondent, stored a portion of the PAN (*ie*, the “issuer code”) of and an associated currency code for each bank listed in the table. The identity of the bank as well as the operating currency of the card would be determined through a “look up-and-associate” process. The Invention provided an accurate means of automatically determining the preferred currency for a card transaction between a local merchant and a foreign cardholder. It also eliminated the frailty of operator error that was inherent in the manual system of currency conversion.

10 The Invention was thus designed to identify the payment card’s currency denomination, and not just the issuer’s identity. It was undisputed that identification of the issuer was already possible at the priority date by deciphering the “Bank Identification Number” (“BIN”), which is made up of the first six digits of the PAN. At that point in time, the BIN was generally used to identify the issuing bank (but not the operating currency) of the card for the purposes of authorisation and settlement.

11 The respondent alleged that the appellants had infringed the Patent by offering for use in Singapore the FCC system, a card currency recognition system said to perform the same function as the Invention. In particular, the respondent alleged that the appellants had infringed claims 1 and 14 of the Patent Specification. Claim 1 attested that the Invention was:

A data processing method for determining a preferred currency for association with [a] charge, debit or credit card transaction between a merchant and a charge, debit or credit card cardholder comprising the steps of[:]

obtaining the card number of the card from the cardholder, characterised [*sic*] in that the method further comprises the steps of[:]

identifying an identifier code from [the] said card number[:]

determining the operating currency for [the] said identifier code, by comparing [the] said identifier code with entries in a table, wherein each entry in the table contains an issuer code or range of issuer codes and a corresponding currency code, and setting the currency for association with the card transaction as the determined operating currency for the issuer code.

Claim 14 was identical to claim 1, except that it referred to a *system* for determining the preferred currency for a card transaction.

12 Thus, the respondent, in its action against the appellants, sought:

(a) a declaration that the Patent was valid and had been infringed by the appellants;

- (b) an injunction restraining the appellants from further infringing the Patent; and
- (c) damages or an account of the profits made by the appellants by reason of the said infringement of the Patent.

13 In their defence, the appellants contended that the Patent was not valid. They centred their defence on the lack of novelty and inventive step in claims 1 and 14 of the Patent Specification. They also argued that there was insufficient disclosure of the Invention in the Patent Specification. Lastly, they averred that even if the Patent was found to be valid, the FCC system did not infringe the Patent as it performed automatic currency detection in a sequence different from that performed by the Invention. In particular, they argued that the FCC system relied on BINs and BIN tables to identify the payment card's operating currency.

The decision below

14 The learned trial judge held that the evidence adduced by the appellants was not sufficient to either qualify them as prior users of the Invention or establish the existence of the alleged prior art. He unequivocally affirmed that the Invention was indeed novel (see [67] of the Judgment).

15 The learned trial judge further found that the Patent involved an inventive step as the automatic detection of a payment card's operating currency through the extraction of information from the card was not obvious. He based his decision primarily on his finding at [69]–[70] of the Judgment that:

The inventive concept in the [P]atent relates to the automatic detection or recognition of the card's currency so as to offer the cardholder a choice of the currency in which to pay for the transaction in question. This was made possible by means of the BRT constructed specially by the [respondent] from information gleaned from various sources. As at the priority date, all that was available was some sort of manual system for the selection of currency. ... While moving from a manual system to an automatic one may be the obvious *wish* in almost every process, what has to be obvious is the *step* in making that transition. I do not think that the notional person skilled in the art would have naturally gravitated towards the idea in the [P]atent to make that transition. ...

The materials cited by the [appellants] on this point of challenge to the [P]atent ... do not make the way to the solution of automatic recognition of currency an obvious one. The skilled person would still have to determine what sort of data was needed to fulfil the task and how the database could be assembled. This was not something he could easily pick up from the alleged prior art documents or from common general knowledge. The BRT, as an amalgamation of information from diverse sources (including cardholders), did not exist at the priority

date and no one before the [respondent] thought of assembling such information to accomplish the task of automatic recognition of a card's currency. *The BRT may include the typically six-digit BIN table but it is not the BIN table.*

[emphasis added in bold italics]

16 On the question of whether the Patent Specification disclosed the Invention sufficiently, the trial judge found that practically all the appellants' witnesses had little difficulty reading and understanding the Patent Specification and the claims therein. He held at [72] of the Judgment that:

The terms "identifier code", "issuer code" and "issuer identifier code" are elaborated on in the [P]atent (see p 11 thereof). To a lay person, the explanations in the [P]atent would probably not give him a complete understanding of the [I]nvention but we must remember that we are here concerned with the notional person skilled in the art. *That person, like many of the witnesses for FCC, would have no difficulty performing the [I]nvention after having studied the specifications in the [P]atent.*

[emphasis added]

Accordingly, the challenge on the ground of insufficient disclosure failed.

17 Finally, on the issue of whether the FCC system did in fact infringe the Patent, the trial judge held in the affirmative (see [73] of the Judgment). He found that the FCC system fell squarely within the embrace of claims 1 and 14 of the Patent Specification, and was unimpressed by the appellants' argument that the FCC system performed automatic currency identification in a slightly different sequence from that performed by the Invention. The trial judge concluded that there was infringement so long as the FCC system performed the same function as the Patent by using the integers of the claims in the Patent Specification and the variations or additional features in the FCC system did not alter the essence of the Invention.

Arguments raised in the appeals

18 Before us, the appellants again canvassed most of the issues raised in the court below, namely:

- (a) whether the Invention involved any inventive step;
- (b) whether there was sufficient disclosure of the Invention in the Patent Specification, in particular, in claims 1 and 14; and
- (c) whether the appellants' offer of the FCC system for use in Singapore infringed the Patent.

Essentially, the crux of the parties' arguments boiled down to issue (a): What, if any, was the inventive step involved in the Patent? The appellants' primary argument was that the Invention relied on the BRT to detect the

operating currency of a payment card and this lacked an inventive step because the BRT was essentially the BIN table. At the priority date, BIN tables were part of the state of the art, and thus, the Invention would have been obvious to the notional skilled person. In contrast, the respondent focused on the automation of the card currency detection process as the inventive step.

Abandonment of the lack of novelty argument

19 It was interesting that on appeal, the appellants abandoned one of their principal contentions raised during the trial, *ie*, the argument that the Patent failed on the ground of lack of novelty (see [13] above). For the purposes of the appeals, the appellants chose to proceed only on the grounds of the obviousness of the Invention and its insufficient disclosure in the Patent Specification. The appellants further submitted that in the event that the Patent was found to be valid, they had not infringed the Patent. Counsel for FCC, Mr Alban Kang (“Mr Kang”), in the course of his elaborate oral arguments, attempted to faintly suggest that in choosing not to pursue the point of lack of novelty, the appellants were not conceding that the Patent was novel. However, when considering the question of the obviousness of an invention, it is assumed that the invention is novel and differs in some identifiable respect from the prior art (see *Genelabs Diagnostics Pte Ltd v Institut Pasteur* [2000] 3 SLR(R) 530 (“*Genelabs Diagnostics*”) at [51]). Thus, Mr Kang’s suggestion was unsustainable.

20 In any event, the issue of novelty was a non-starter. The appellants themselves had, in a 2003 brochure promoting the FCC system, glowingly described this system as:

[A]n *innovative* new service that allows travelers to choose to pay in their home currency when purchasing goods and services from affiliated merchants. [emphasis added]

It was plain to us that both the appellants and the respondent were enthusiastically claiming that their respective products were new and innovative. Thus, the controversy over novelty should not even have arisen at the trial stage. Unfortunately, it appeared that the issue of novelty was the focal consideration in the court below, and much unnecessary time and barren labour was expended there in addressing this issue.

Our decision

21 As mentioned above (at [18]), the nub of the present appeals centred on what exactly was the inventive step involved in the Patent. In determining the inventive step in a patent, the patent specification, and, in particular, the claims therein, cannot be overlooked. In the present case, claims 1 and 14 of the Patent Specification (see [11] above) were the primary claims in dispute.

General principles of patent construction

22 As emphasised in Simon Thorley *et al*, *Terrell on The Law of Patents* (Sweet & Maxwell, 16th Ed, 2006) (“*Terrell*”) at para 6-01, one of the most significant issues in patent litigation is the determination of the true construction of a patent specification, and, in particular, its claims. This is because the monopoly and scope of protection granted by a patent is defined by its claims (see *Electric & Musical Industries Ltd v Lissen Ltd* (1938) 56 RPC 23 (“*Lissen*”) at 39, which was followed in *Bean Innovations Pte Ltd v Flexon (Pte) Ltd* [2001] 2 SLR(R) 116 (“*Bean Innovations*”). Once the scope of the claims has been ascertained, the questions of whether the claims are obvious, whether a piece of prior art anticipated the claims and whether there has been an infringement of the patent can then be answered in concrete terms.

23 In the present case, the claims of the Invention and its description were contained in the Patent Specification in accordance with the requirements of s 25(3)(b) of the Patents Act (Cap 221, 2005 Rev Ed) (“the Act”). Section 113(1) of the Act states that the claims in a patent specification can be interpreted by the description and any drawings contained in the specification, and the extent of the protection conferred by the patent in question or the application for that patent shall be determined accordingly. In ascertaining the true construction of a patent specification, the claims themselves are the principal determinant, while the description and other parts of the specification may assist in the construction of the claims (see *Bean Innovations* ([22] *supra*) at [20]). However, while the claims and the description are to be read together and construed contextually, they are intended to serve different functions. As explained by Laddie J with his customary acuity in *Merck & Co Inc v Generics (UK) Ltd* [2004] RPC 31 at [38]:

The purpose of a patent is to convey to the public what the patentee considers to be his invention and what monopoly he has chosen to obtain. These are not necessarily the same. The former is primarily to be found in the specification [*ie*, the description] and the latter is primarily to be found in the claims.

24 As the necessary background of the words used in the claims may be affected or defined by what is said in the body of the patent specification, the claims should not be viewed independently, but should instead be construed as part of the whole specification (*Rosedale Associated Manufacturers Ltd v Carlton Tyre Saving Coy Ltd* [1960] RPC 59 at 69). However, it is not permissible to put a gloss on or expand the claims by relying on a statement in the specification. If the claims have a plain meaning, then reliance ought not to be placed on the language used in the body of the specification so as to make them mean something different (see *Lissen* ([22] *supra*) at 57). Claims must be read and given their ordinary and

natural meaning without incorporating extracts from the body of the specification into them.

25 More importantly, the courts have consistently endorsed adopting a “purposive construction” of the claims so as to determine the essential features of an invention. This approach received authoritative judicial affirmation in the seminal decision of the House of Lords in *Catnic Components Limited v Hill & Smith Limited* [1982] RPC 183, where Lord Diplock said at 242–243:

[A] patent specification is a unilateral statement by the patentee, in words of his own choosing, addressed to those likely to have a practical interest in the subject matter of his invention (i.e. “skilled in the art”), by which he informs them [of] what he claims to be the essential features of the new product or process for which the letters patent grant him a monopoly. It is those novel features only that he claims to be essential that constitute the so-called “pith and marrow” of the claim. A patent specification should be given a purposive construction rather than a purely literal one derived from applying to it the kind of meticulous verbal analysis in which lawyers are too often tempted by their training to indulge.

This was reiterated more recently in *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2005] RPC 9 (“*Kirin-Amgen*”) as constituting the bedrock of all patent construction. Lord Hoffmann elaborated on this principle at [32] as follows:

Construction, whether of a patent or any other document, is of course not directly concerned with what the author meant to say. There is no window into the mind of the patentee or the author of any other document. Construction is objective in the sense that it is concerned with what a reasonable person to whom the utterance was addressed would have understood the author to be using the words to mean. Notice, however, that it is not, as is sometimes said, “the meaning of the words the author used”, but rather what the notional addressee would have understood the author to mean by using those words. The meaning of words is a matter of convention, governed by rules, which can be found in dictionaries and grammars. What the author would have been understood to mean by using those words is not simply a matter of rules. It is highly sensitive to the context of, and background to, the particular utterance. It depends not only upon the words the author has chosen but also upon the identity of the audience he is taken to have been addressing and the knowledge and assumptions which one attributes to that audience.

26 This sensible approach has also been adopted by this court in *FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd* [2006] 1 SLR(R) 874 (“*FE Global Electronics*”), where it was held at [14] that the purposive construction of patent claims was preferred as “it balance[d] the rights of the patentee and those of third parties”. A purposive construction

of the claims would give the patentee the full extent, but no more than the full extent, of the monopoly which a reasonable person skilled in the art, reading the claims in context, would think that he (the patentee) was intending to claim. As Lord Hoffmann candidly acknowledged in *Kirin-Amgen* ([25] *supra*) at [48], this principle is easy to articulate, but more difficult to apply in practice. Nevertheless, as Lord Hoffmann also (quite correctly) stressed, this difficulty, which is present in any interpretative exercise, should not be exaggerated.

27 Clearly then, the starting point in patent construction is to ask the threshold question: What would the notional skilled person have understood the patentee to mean by the use of the language of the claims? In this endeavour, the language that the patentee has adopted is more often than not of utmost importance (see *Kirin-Amgen* ([25] *supra*) at [34]).

The notional skilled person with the common general knowledge of the art

28 As stated above, the “audience” whom the patentee is addressing is the person skilled in the art (*per* Lord Hoffmann in *Kirin-Amgen* ([25] *supra*) at [33]; *FE Global Electronics* ([26] *supra*) at [14]). As a general rule, the notional skilled person should be taken to be the workman or technician who is aware of everything encompassed in the state of the art and who has the skill to make routine workshop developments, but not to exercise inventive ingenuity or think laterally (*per* Laddie J in *Pfizer Ltd’s Patent* [2001] FSR 16 at [62]–[63]). His level of skill will depend on the scope of the subject matter of the patent in question (see *Dyson Appliances Ltd v Hoover Ltd* [2001] RPC 26 (“*Dyson v Hoover*”) at [30]). The notional skilled person is, thus, usually defined according to the qualities which he possesses. As stated in *McGhan Medical UK Limited v Nagor Limited* Case No CH 1999 1720 (28 February 2001) at [23]–[24] and followed in *Ng Kok Cheng v Chua Say Tiong* [2001] 2 SLR(R) 326 at [21]:

This notional person is deemed to possess the common general knowledge of the subject matter in question. It is through the eyes of the skilled addressee that the [p]atent will fall to be interpreted. And it is by the standards of this person that the question of inventive step is to be judged when this topic is addressed in the counterclaim.

A patent is addressed to persons who are likely to have a practical interest in its subject matter or to act on the directions given in it for it to be put into practice. The addressee is deemed to be unimaginative and uninventive but is equipped nevertheless with a reasonable degree of intelligence and with a wish to make the directions in the patent work.

The approach taken by the notional skilled person in construing the claims in a patent specification has been broadly described in the following practical terms (see *Kirin-Amgen* ([25] *supra*) at [33]):

[H]e reads the specification on the assumption that its purpose is ... both to describe and to demarcate an invention – a practical idea which the patentee has had for a new product or process – and not to be a textbook in mathematics or chemistry or a shopping list of chemicals or hardware. It is this insight which lies at the heart of “purposive construction”.

29 Mr Kang placed much emphasis on the identity of the notional skilled person. He insisted that the trial judge had failed to identify the notional skilled person and, therefore, had not construed the claims in the Patent Specification in the context of the notional skilled person and the common general knowledge of the art. Mr Kang contended that it was insufficient for the trial judge to simply say that the Invention was not obvious to a person skilled in the art without giving any further elucidation. We noted, however, that although the trial judge did not expressly define the notional skilled person, it was plainly apparent from the Judgment that he was very much alive to the concept of the notional skilled person and had indeed applied his mind to this concept in making his findings. The trial judge expressed his thoughts on this at [69]–[71] of the Judgment, where he stated:

I do not think that the notional person skilled in the art would have naturally gravitated towards the idea in the [P]atent to make that transition. ...

... The skilled person would still have to determine what sort of data was needed to fulfil the task and how the database could be assembled. This was not something he could easily pick up from the alleged prior art documents or from common general knowledge. ...

I am, therefore, satisfied that the invention in the [P]atent is innovative and does involve an inventive step as it was not obvious to a person skilled in the art at the relevant time.

It was axiomatic that the trial judge had a keen appreciation of who the notional skilled person was. With respect, there was really no substance in Mr Kang’s complaint.

30 The relevant art and the field in which the notional skilled person operates should also be apparent from the patent specification itself (see *Terrell* ([22] *supra*) at para 6-32). In the present case, the field of the Invention was stated in the Patent Specification as:

[R]elat[ing] to Card Payment Systems for use in a multi-currency environment. In particular, the present invention provides a system and method for identifying an appropriate currency for individual transactions conducted using a card payment system ...

31 It is crucial to distinguish between the attributes and the common general knowledge of the notional skilled person. Mr Kang argued that the notional skilled person for the purposes of the present appeals was a team

consisting of a software programmer with the requisite programming skills and a person with knowledge of the payment card business domain. The former was necessary because the Invention concerned automatic card currency detection, while the latter was needed because the Invention was to be used for card payment at points of sale. However, it appeared to us, from the Patent Specification, that it would be more appropriate to define the notional skilled person as a software programmer who had the requisite programming skills and possessed the common general knowledge of the payment card business domain. Having said that, in the present matrix, nothing really turned on whether the yardstick applied was that of a skilled team or a skilled individual. The notional skilled person is a legal construct which does not equate with the lowest common denominator of knowledge within a team if, indeed, a notional team is contrived in a particular matter.

Construction of the claims in the Patent Specification

32 Claim 1 of the Patent Specification has already been set out above at [11]. Its essential features or integers were identified by the learned trial judge at [10] of the Judgment as being:

- (a) identifying an identifier code from the said card number;
- (b) determining the operating currency for the said identifier code;
- (c) comparing the said identifier code with entries in a table (the Bank Reference Table), wherein each entry in the table contains an issuer code or range of issuer codes and a corresponding currency code; and
- (d) once the card currency is identified, setting the transaction to that currency as its operating currency.

Among these elements of claim 1, integer (c) (as set out above) was undoubtedly the most crucial one. Reading claim 1 in its natural and ordinary meaning, it appeared that the Invention entailed using a series of numbers extracted from the payment card number (*ie*, the PAN) to establish the operating currency of the card by comparing that series of numbers with entries in a table (*ie*, the BRT). Claim 34 of the Patent Specification further stated that a feature of the Invention was a “computer program encoding a set of computer instructions for determining a preferred currency for association with a card transaction between a merchant and a cardholder”. The natural inference to be drawn from this was that the fundamental component of the Invention lay in its automation feature.

33 Regard ought to be given to the context sculpted by the patent specification, although, as pointed out above (at [24]), the specification should not override the claims when the latter’s ordinary and natural meaning is otherwise clear. In this case, it was stated in the description of the Patent that the purpose of the Patent was to provide a:

[M]ethod and system ... for determining the currency of a cardholder at the point of sale *automatically*, using only a payment card's details.

...

Preferably, the steps of the method of the invention [would be] performed substantially in an automatic fashion without input from the terminal operator. [emphasis added].

34 Thus, while the claims in the Patent Specification did not expressly allude to an automatic currency conversion system, any ambiguity in this area was resolved by the accompanying description. Accordingly, on a fair reading, the Patent covered a method and system for automatic currency detection at the point of sale by, first, obtaining the PAN of the payment card; second, extracting an identifier code from the PAN; and, third, ascertaining the operating currency of the payment card by comparing the identifier code with the BRT.

35 Having established the identity of the notional skilled person possessing the common general knowledge at the priority date and the scope of the claims in the Patent Specification based on a purposive construction, the substance of the appellants' contentions – *ie*, that the Patent was invalid on the grounds of obviousness and insufficient disclosure of the Invention – will now be addressed.

Obviousness

36 In reviewing the validity of a patent apropos of its obviousness, it is necessary to bear in mind the rationale underpinning the requirement of obviousness. According to Millett LJ (as he then was) in *PLG Research Ltd v Ardon International Ltd* [1995] RPC 287 (“*PLG Research*”) at 313–314:

[T]he public should not be prevented from doing anything which was merely an obvious extension or workshop variation of what was already known at the priority date. ...

...

... There are many cases in which obviousness has been held not to have been established, even though the prior art relied upon was very close ... Where the prior art yields many possible starting points for further development, it may not be obvious without hindsight to select a particular one of them for the development which leads to the invention claimed. If the patentee has come up with a solution to his problem which is no more than an obvious extension or workshop variation to some piece of the prior art, he cannot have a monopoly for his solution whether or not the skilled man would be likely to have known of the prior art in question. On the other hand, if it is found that, even if he had known of it, the skilled man would not have regarded it as the obvious starting point for the solution of the problem with which he was confronted, this will usually demonstrate that his

discovery was not an obvious extension or mere workshop variation of that prior art.

37 Section 15 of the Act provides that an invention must involve an inventive step. An “inventive step” is, in turn, defined as one which is:

[N]ot obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 14(2) and without having regard to section 14(3).

According to s 14(2) of the Act, the “state of the art” refers to matters made available to the public, whether in Singapore or elsewhere, at any time before the priority date of the invention in question (see also [58] below). The requirement of obviousness is separate and distinct from that of novelty. An invention is not novel if it is shown that the patent claimed included within its scope something which already formed part of the state of the art (see *Terrell* ([22] *supra*) at para 7-06).

38 At first blush, there does not appear to be a clear distinction between the requirements of novelty and obviousness because both the question of whether an invention is novel and that of whether it involves an inventive step appear to be determined by the state of the art at the priority date. This can be rather confusing because it is well established that the test for obviousness is significantly narrower than that for novelty. It is also trite law that the state of the art, as contemplated by s 15 of the Act, ought to be viewed in relation to the common general knowledge of the notional skilled person, as opposed to that of “the public” (see s 14(2)). This would exclude knowledge which is not available to the public. While this genre of knowledge (*ie*, knowledge which is not available to the public) is excluded from the common general knowledge which the notional skilled person is deemed to possess for the purpose of assessing obviousness, such knowledge is nonetheless taken into account in assessing whether an invention is novel under s 14 of the Act. As explained by Aldous J (as he then was) in *Lux Traffic Controls Limited v Pike Signals Limited* [1993] RPC 107 at 133, the requirement of novelty entails that:

[A]n anticipating description in a book will invalidate a patent if the book is on a shelf of a library open to the public, whether or not anybody read the book and whether or not it was situated in a dark and dusty corner of the library.

39 This conundrum was observed by Lord Reid in *Technograph Printed Circuits Limited v Mills & Rockley (Electronics) Limited* [1972] RPC 346 (“*Mills & Rockley (Electronics) Limited*”), where he stated that it was doubtful whether the words “having regard to what was known or used” which appeared in both sub-ss (e) and (f) of s 32(1) of the Patents Act 1949 (c 87) (UK) (“the 1949 English Act”), the then statutory equivalents of ss 14 and 15 of the Act, were intended to bear the same meaning in each case. He justified his views as follows (at 355):

If they were [intended to mean the same thing,] there would now be little, if any, difference between novelty and obviousness. Obviousness would cover practically every case of lack of novelty. In head (e) [which deals with novelty] these words are used in an artificial sense and are held to include matter which in fact no one in the United Kingdom ever knew or was likely to know, such as the contents of some foreign specification which no one had ever looked at and which the most diligent searcher would probably miss. I think that in head (f) [which deals with obviousness] the words should have the more natural meaning of what was or ought to have been known to a diligent searcher.

40 However, Lord Reid’s approach was seriously queried in the same case by Lord Diplock, who proposed that the phrase “what was known or used” should not be treated differently under the two subsections. This has led some academics to question the suitability of using the concept of common general knowledge to test whether an alleged invention involves an inventive step (see, *inter alia*, Lorraine Keenan, “Time to Put Windsurfing to Bed?” *Intellectual Property & IT Law* (31 January 2002)). Interestingly, in Australia, in an attempt to resolve this dilemma, the Patents Act 1990 (Cth) (“the Australian Act”) encapsulated the concept of common general knowledge in a statutory form. Section 7(2) of the Australian Act, which deals with the concept of “inventive step”, states that:

For the purposes of this Act, an invention is to be taken to involve an inventive step when compared with the prior art base unless the invention would have been obvious to a person skilled in the relevant art in the light of the common general knowledge as it existed in the patent area before the priority date of the relevant claim ...

41 In any event, the English courts have remained fixated with the use of the notional skilled person’s common general knowledge in the test for obviousness, despite the above criticisms. There are, admittedly, inherent difficulties in defining both “common general knowledge” and “state of the art”. Nevertheless, the explanation proffered by Lord Reid in *Mills & Rockley (Electronics) Limited* ([39] *supra*) appears to be the preferable approach as it injects substance into the legislative intent underlying s 15 of the Act. The reliance on common general knowledge in the test for obviousness is also embodied in the oft-cited four-step “Windsurfing test” laid down by the English Court of Appeal in *Windsurfing International Inc v Tabur Marine (Great Britain) Ltd* [1985] RPC 59 (“Windsurfing”) at 73–74 (and adopted by this court in *Merck & Co Inc v Pharmaforte Singapore Pte Ltd* [2000] 2 SLR(R) 708 at [50]):

There are, we think, four steps which require to be taken in answering the jury question. The first is to identify the inventive concept embodied in the patent in [the] suit. Thereafter, the court has to assume the mantle of the normally skilled but unimaginative addressee in the art at the priority date and to impute to him what was, at that

date, common general knowledge in the art in question. The third step is to identify what, if any, differences exist between the matter cited as being “known or used” and the alleged invention. Finally, the court has to ask itself whether, viewed without any knowledge of the alleged invention, those differences constitute steps which would have been obvious to the skilled man or whether they require any degree of invention.

42 An appraisal of the relevant English and Singapore decisions dealing with the issue of obviousness suggests that the courts often refer to the first three questions in the *Windsurfing* test (see [41] above) in a matter-of-fact way before proceeding almost immediately to deal with the fourth and final question: Is the alleged invention obvious? Some critics have gone further to say that the courts are often merely paying lip service to the *Windsurfing* test.

43 In this respect, the *Windsurfing* test ([41] above) has been criticised for over-elaborating the statutory definition of “inventive step” without reducing the confusion and uncertainty that has long been associated with it. David I Bainbridge in *Intellectual Property* (Pearson, 6th Ed, 2007) at p 400 contends that the first three steps of the *Windsurfing* test are, in reality, redundant. He notes that s 3 of the Patents Act 1977 (c 37) (UK) (“the 1977 English Act”) (which is equivalent to s 15 of the Act) seems straightforward and requires a one-step test only, namely, whether the alleged invention is “not obvious to a person skilled in the art”. The *Windsurfing* test, in Bainbridge’s view, does not provide any intrinsic guidance on the statutory provision itself, but “merely affords a structured method of assessing whether the requirement of inventive step has been satisfied” (see *Intellectual Property* at p 400). Bainbridge further cautions that in breaking down the test in s 3 of the 1977 English Act, there is a latent danger that artificiality will be introduced, which might distort the test. He persuasively suggests (*ibid*) that a simpler formulation is to ask:

[W]hether, from the point of view of a person who had total knowledge of the state of the art, the invention was obvious at the priority date. It goes without saying that the person concerned cannot be endowed with inventive faculties ...

It is also pertinent to note that the European Patent Office does not appear to have adopted a structured approach along the lines of the *Windsurfing* test in determining whether an invention involves an inventive step.

44 Nonetheless, the *Windsurfing* test ([41] above) appears to be here to stay. It was astutely observed by the English Court of Appeal in *Wheatley v Drillsafe Ltd* [2001] RPC 7 at [45] that the failure to follow the structured *Windsurfing* approach led the trial judge in that case to apply *ex post facto* reasoning erroneously, resulting in a failure to distinguish what was actually known from what was common general knowledge. When all is said and done, the *Windsurfing* approach has its advantages. The first three steps of

this test lay the ground work for the final question – which is ultimately the only critical question – namely: Is the alleged invention obvious? (See *Terrell* ([22] *supra*) at para 7-53.) As aptly pointed out by Neuberger J in *DSM NV's Patent* [2001] RPC 35 at [58]:

By adopting the structured approach, one ensures that there is a measure of discipline, reasoning and method in one's approach. Indeed, it helps to ensure that there is consistency of approach in different cases involving the issue of obviousness.

45 Be that as it may, simplicity is certainly to be appreciated, and, in assessing the obviousness of an alleged invention, it may sometimes suffice in straightforward cases to refer to the test formulated by Lord Herschell in *Vickers, Sons And Co, Limited v Siddell* (1890) 7 RPC 292, where he stated (at 304) that an invention lacked an inventive step if what was claimed was “so obvious that it would at once occur to anyone acquainted with the subject, and desirous of accomplishing the end”. Quite often, it is difficult, in practice, to break down the *Windsurfing* test ([41] above) into its component parts. Thus, while the *Windsurfing* test remains a useful guide, it is no more than that. Above all, it should be borne in mind that the *Windsurfing* test is merely a manifestation of judicial inventiveness on how best to pragmatically interpret and elucidate the requirements of s 15 of the Act.

What was the inventive step in the Invention?

46 The appellants did not accept that the inventive step in the Invention, as identified by the trial judge, was the automatic detection or recognition of a payment card's operating currency, which was “made possible by means of the BRT constructed specially by the [respondent] from information gleaned from various sources” (see [69] of the Judgment). The appellants contended that the trial judge had erred in law in misidentifying the concept of the Invention. They took the view that the inventive step was neither the creation and use of the BRT nor the automation of the currency detection process. Rather, the inventive step was the concept of using a logical structure for bank code comparison and currency association.

47 The foundation for the appellants' arguments was the assertion that the portion of the PAN stored in the BRT was essentially the BIN. It was undisputed that the use of BINs to identify the issuer of the payment card was part of the state of the art at the priority date (see [10] above) and, hence, formed part of the common general knowledge of the notional skilled person. Following from that premise, the appellants argued that there was no difference between the Invention and the state of the art and, hence, no inventive step. This was because, so the appellants explained, the issuer code field in the BRT was essentially the BIN field. Since, as at the priority date, the BIN was already being used for bank code comparison and manual currency association, it would have been obvious to the

notional skilled person that one could likewise determine the operating currency of a payment card by relying on its BIN.

48 The appellants relied, *inter alia*, on Patent No WO 95/12169 (“the Visa/Levine Patent”) in support of their argument that the alleged inventive step was already part of the state of the art. The application for the Visa/Levine Patent was initially filed in the US on 25 October 1993. Subsequently, an application for an “international” patent was filed with the International Bureau of the World Intellectual Property Organization pursuant to the Patent Cooperation Treaty (19 June 1970) <<http://www.wipo.int/pct/en/texts/index.htm>> on 14 October 1994. The Visa/Levine Patent concerned a process which provided electronic access to pre-paid funds for use as cash or in paying for goods and services. It was limited to the making of withdrawals from an automated teller machine (“ATM”), which would dispense money in the currency of its location. The Visa/Levine Patent relied on the concept of using the BIN for bank code comparison and currency association, albeit in the context of ATM transactions carried out with a foreign payment card (as opposed to the present context, namely, payment transactions between merchants and cardholders at points of sale). The appellants acknowledged that the Visa/Levine Patent concerned a different process, but argued that the idea behind it was nevertheless similar to the Invention.

49 With respect, that could not be the case. Just because two patents may contain one, or even some, common element(s) does not mean that the two patents are therefore identical or even similar. Millett LJ’s statement in *PLG Research* ([36] *supra*) at 314 on this point is most instructive:

In considering whether the claims in the present case contained any inventive step, it is important to appreciate that (i) the inventive concept consisted of the selection and combination of a number of features, (ii) there was a multiplicity of possible starting points in the prior art each of which differed from the patented invention but in a different way and (iii) the relevant features of the prior art [were] interdependent, so that changing one of the features invalidate[d] the teaching of the prior art in respect to others.

50 Further, it has been authoritatively declared by the English Court of Appeal in *The General Tire & Rubber Company v The Firestone Tyre And Rubber Company Limited* [1972] RPC 457 (“*General Tire & Rubber Co*”) at 482 that individual patent specifications and their contents do not normally form part of the notional skilled person’s common general knowledge, although there may be specifications which are so well known amongst those versed in the art that, upon proof of that state of affairs, they form part of such knowledge. In the present case, the appellants were unable to establish any factual basis for asserting that the Visa/Levine Patent’s specifications were part of the common general knowledge. We agreed with the trial judge that “clear and satisfactory evidence” (see [55] of the

Judgment) was necessary to establish a claim of prior user or, for that matter, prior art so as to prove, in turn, the relevant general knowledge (see *Innovative Scuba Concepts, Inc v Feder Industries, Inc* 26 F 3d 1112 at 1115 (Fed Cir, 1994)). Without clear evidence, it would not be appropriate, in the circumstances of this case, to find that the respondent knew or ought to have known of the Visa/Levine Patent, and/or hold that this patent fell within the scope of the common general knowledge which formed part of the then prevailing state of the art.

Was the inventive step obvious?

51 This final component of the *Windsurfing* test (see [41] above) formed the crux of the present appeals. It is up to the court to decide the question, which is “a kind of jury question” (*Windsurfing* ([41] *supra*) at 71): Is the invention in question obvious? The importance of striking the apposite balance between encouraging and stifling innovation has been succinctly summarised in *Glaxo Group Ltd’s Patent* [2004] RPC 43 at [41] as follows:

It is a question of fact in every case. Both the Scylla of considering nothing obvious except that to which the skilled man is driven and the Charybdis of considering every invention obvious that can be decomposed into a sequence of obvious steps must be avoided. The former is unfair to industry because it stifles natural development. The latter is unfair to investors and not countenanced by English patent law ...

Furthermore, in assessing the obviousness of an alleged invention, it must always be remembered that simplicity is not equivalent to obviousness.

52 The appellants submitted that on a true construction of the claims in the Patent Specification, the issuer code was the BIN. As such, the use of the BIN for bank code comparison and currency association was no different from the use to which it (*ie*, the BIN) was already being put or for which it was already known as at the priority date. Further, it was argued that even if the trial judge’s construction of the issuer code as consisting of the BIN plus a portion of the PAN was right, the use of the issuer code for currency identification would still have been obvious to the skilled person since the underlying task was to obtain bank code entries that were distinct from one another. In contrast, the respondent took the position that the automatic detection of a payment card’s operating currency at the point of sale represented a clear advance on the state of the art at the priority date, which, at that time, only comprised systems that required manual currency selection. According to the respondent, a step must have been employed to effect that automation, and it was self-evident that this had to be a new technical step.

53 During cross-examination, one of the appellants’ key witnesses, Mr Chandrakant Agnihotri (“Mr Agnihotri”), the head of technology and service systems in FCC, reluctantly acknowledged that “[t]he whole idea

behind the BIN [was] for the purposes of routing authorisation and settlement at the end of the day”, and that “the concept of BINs [had] not been established by the card schemes for the purposes of enabling the merchant to undertake identification of the cardholder’s currency at the point of sale”. Thus, the essence of the contention of the appellants in relation to BINs was, ironically, undermined by their very own evidence. The judge, quite rightly, took this into account (see the passage from the Judgment quoted in [15] above).

54 The crucial point was that at the material time, no other party had introduced an automatic system to implement the process of deciphering a payment card’s operating currency. Although the step might have seemed, when all was said and done, Lilliputian, it was no less significant a step forward, a step which nobody else had taken before (see *Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560 (“*Peng Lian Trading*”) at [31]). A helpful analogy can be drawn with the decision in *FE Global Electronics* ([26] *supra*). In that case, it was held that the patentee had an inventive concept for a new type of data storage device that was quite different from and more convenient to use than the conventional data storage devices. This court went on further to say that, admittedly, all the elements required for that invention were available to those skilled in the art. Yet, before the patentee applied for the patent in question, no one else had thought of combining those elements together to form a new type of data storage device. Although some might have viewed the invention as a simple one, this court noted that simplicity in itself had never been a bar to inventiveness, and reiterated that *ex post facto* analysis could often be unfair to inventors (*FE Global Electronics* at [45]–[46]; *Peng Lian Trading* at [29]). Indeed, it cannot be gainsaid that the hallmark of many truly remarkable inventions is precisely their simplicity.

55 In the present appeals, the Patent revolved around a concept for a new type of dynamic currency conversion system, namely, an automatic system of currency conversion, which was more convenient to use than the manual system of currency conversion. The inventive concept was not the BRT alone. In any event, although BINs and BIN tables had been used in the field of payment systems prior to the Invention, no one had, apparently, previously thought of employing the BIN to identify the operating currency of a payment card. The Invention, counsel for the respondent, Mr Wong Siew Hong, submitted, represented a genuine advance from the then available state of the art. We concurred with this submission. Thus, we were unable to agree with the appellants’ contention that the Invention was obvious, and therefore upheld the trial judge’s finding that an inventive step was involved.

56 We noted that an application for a patent for the Invention was also filed in New Zealand on 1 September 1999. That application was accepted and published in the Intellectual Property Office of New Zealand

(“IPONZ”). Subsequently, a notice of opposition was filed on 24 October 2004 by Multi-Currency Management Services Limited (“MCMS”). However, the Assistant Commissioner of Patents of IPONZ, in a decision dated 13 March 2006, found that the grounds of opposition, one of which was obviousness, had not been made out by MCMS. He held (at 34 of his decision) that:

[T]he opponent [*ie*, MCMS] has shown systems, systems that have not been known in New Zealand at the priority date as far as I can see, where the cardholder is prompted to pay in the home currency of the card, but the opponent has not shown a system where the home currency is obtained automatically by way of an identifying number on a card, with the amount of the transaction in the currency of the card also being automatically calculated without any further input from the merchant or cardholder, and presented at the time of the transaction to the cardholder for payment in that currency.

57 The corresponding New Zealand provision on the test for obviousness is s 21(1)(e) of the Patents Act 1953 (NZ) (“the New Zealand Patents Act”), which states that a grant of a patent may be opposed on the ground that:

[T]he invention, so far as claimed in any claim of the complete specification, is obvious and clearly does not involve any inventive step having regard to the matter published as mentioned in paragraph (b) of this subsection, or having regard to what was used in New Zealand before the priority date of the applicant’s claim ...

The “matter published” is described in s 21(1)(b) of the New Zealand Patents Act as follows:

That the invention, so far as claimed in any claim of the complete specification, has been published in New Zealand before the priority date of the claim —

- (i) In any specification filed in pursuance of an application for a patent made in New Zealand and dated within 50 years next before the date of filing of the applicant’s complete specification[;]
- (ii) In any other document (not being a document of any class described in subsection (1) of section 59 of this Act) ...

In his further submissions, Mr Kang argued, in relation to the above decision by IPONZ, that the statutory provisions in that case were quite different as s 21(1) of the New Zealand Patents Act required prior use or publication in New Zealand.

58 The relevant Singapore provision which sets out the role of the state of the art in determining whether an invention is obvious is s 15 of the Act. The “state of the art” is itself defined in s 14(2) of the Act as:

[A]ll matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in Singapore or elsewhere) by written or oral description, by use or in any other way.

This definition of “state of the art” plainly extends to include prior use or publication. We also noted that IPONZ relied on the *Windsurfing* test (see [41] above) in arriving at its decision. While the statutory matrix in New Zealand is indeed not identical to that in Singapore, it cannot be gainsaid that there is some degree of consistency in the common-sense approach to this issue that is apparent in both regimes. The decision by IPONZ can be said to be, at the very least, of some penumbral assistance to us in this respect.

Was the Patent invalid on the grounds of insufficient disclosure of the Invention?

59 In the alternative, the appellants strenuously argued that the Patent was invalid as the Patent Specification was not sufficiently clear and complete for the Invention to be performed by a notional skilled person.

60 Section 80(1)(c) of the Act states that a patent may be revoked if its specification does not disclose the invention “clearly and completely” for it to be performed by a person skilled in the art. The phrase “clearly and completely” contemplates that the patent specification need not set out every detail necessary for the performance of the invention, but can leave the skilled man to use his skill to perform the invention (see *Mentor Corporation v Hollister Incorporated* [1993] RPC 7 (“*Mentor Corp*”). The English Court of Appeal in *Mentor Corp* held (at 10) that “whether the specification [of a patent] discloses the invention clearly enough and completely enough for it to be performed by a person skilled in the art” is a question of degree. It would not be desirable, and, indeed, probably quite impossible, to lay down any hard-and-fast rule. In each case, the question of the sufficiency of the disclosure would be a matter of fact, depending on the nature of the invention and the other circumstances of the case (see *Genelabs Diagnostics* ([19] *supra*) at [60]; *Mentor Corp* at 11; *Kirin-Amgen* ([25] *supra*) at [103]–[104]; William Cornish and David Llewelyn, *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights* (Sweet & Maxwell, 6th Ed, 2007) (“Cornish and Llewelyn”) at para 5-87). The breadth of the claims set out in the patent specification also has a role to play. If the invention discloses a principle capable of general application, the claims may be in correspondingly general terms (*Kirin-Amgen* at [111]; *Biogen Inc v Medeva plc* [1997] RPC 1 at 48).

61 A two-step test was postulated by Lord Hoffmann in *Kirin-Amgen* ([25] *supra*) at [102]–[104] to determine whether the specification of a patent was sufficient:

[T]he disclosure must enable the invention to be performed to the full extent of the monopoly claimed: see *Biogen Inc v Medeva plc* [1997] RPC 1 [at] 48.

Whether the specification is sufficient or not is highly sensitive to the nature of the invention. The first step is to identify the invention and decide what it claims to enable the skilled man to do. Then, one can ask whether the specification enables him to do it. ...

It seems to me that a good deal of the argument in this case about sufficiency, like the argument about infringement, really turns on a dispute over exactly what the invention is ... But in order to decide whether the invention has been fully enabled, you first have to decide what the invention is.

62 The two-stage test as laid out above can be supplemented by two further considerations. First, the specification of the patent must embrace an embodiment of the invention asserted in each of the claims with sufficient particularity to enable the invention to be understood and carried into effect by those in the industry without making further inventions or prolonged study of the matter. The specification must be set out clearly and fairly so that any individual desirous of carrying out the invention may obtain full knowledge of its practical aspects. But, it is not necessary that the specification be so detailed that this notional individual can perform the invention without any trial or experiment at all. Second, the description of the invention should not be unnecessarily difficult to follow, and must not contain any traps or seriously misleading statements which the reader cannot correct (see *Halsbury's Laws of Singapore* vol 13(3) (LexisNexis, 2007) at para 160.367).

63 The appellants maintained that if the Invention involved an inventive step on the premise that the identifier code comprised a portion of the PAN and was not confined to the BIN, then the Patent Specification was insufficient as it did not disclose the portion of the PAN which was required and how it could be obtained. The appellants further contended that the notional skilled person would not read the identifier code as consisting of anything other than the BIN. The appellants described various permutations which were not contained in the description of the Invention, and argued that the Patent Specification did not adequately provide for such scenarios.

64 On the other hand, the respondent referred to the finding by the trial judge that practically all the appellants' witnesses had little difficulty in reading and understanding the Patent Specification and the claims therein, despite there being some ambiguity alleged by the appellants regarding the use of the terms "identifier code", "issuer code" and "issuer identifier code" in the specification (see [16] above). For example, it was readily apparent from the cross-examination of Mr Agnihotri that he understood with ease the intended workings of the Patent:

- Q: Right. Mr Agnihotri, can I just put my case to you. I would put to you that the [P]atent is clear on its face, there are no ambiguities, it covers a system for card currency identification; do you agree?
- A: Yes.
- Q: And the card currency identification is done by taking an identifier code which is a portion of the PAN, 16 numbers, and matching that against a country code, in your case, a currency code –
- A: Currency.
- Q: And the identifier code is matched against a corresponding currency code and the currency to be associated with the particular card for the transaction is then set; would you agree? You agree that, after having taken a portion of the PAN, and using that as an identifier code, the operating currency is determined by comparing this portion, this identifier code, the six numbers which you have, which FCC uses against a corresponding currency code?
- A: Yes.
- Q: The currency is then set and a multicurrency rate table is looked up; the foreign exchange equivalent for the transaction is then presented to the cardholder?
- A: Correct.

65 The appellants' assertions were largely predicated upon a parochial interpretation of certain parts of the claims in isolation. However, it is trite law that one must look at the claims in their totality. In this respect, it appeared to us, from a reading of the Patent Specification, that it described a "principle of general application" (*Biogen Inc v Medeva plc* ([60] *supra*) at 48). As stated in *Monsanto Co v Merck & Co Inc* [2000] RPC 709 at 738:

It has never been the law that the claim must be co-extensive with the embodiments specifically disclosed by the patentee in his specification. Protection limited in this way would in all probability be illusory.

In *Dyson v Hoover* ([28] *supra*), the defendant alleged that the patent specification was insufficient in not describing how to build a more complicated embodiment, which corresponded to the alleged infringing device. It was held (at [194]) that the patent specification was sufficient because the relevant claim had defined with sufficient precision a class of vacuum cleaning appliance sharing a common mode of operation, namely, that earlier defined as representing the "inventive concept" (*Dyson v Hoover* at [28]) of the claim. Thus, the patentee need not foresee every possible future way of implementing the invention. As Lord Hoffmann pointed out in *Kirin-Amgen* ([25] *supra*) at [112], "a claim is sufficiently enabled if one can reasonably expect the invention to work with anything which falls

within the general term” (see also *Kirin-Amgen* at [113]). It is unnecessary for the patentee to describe every possible embodiment of the invention.

66 In the present case, it was especially telling that the appellants were unable to suggest a solution when we queried how the Patent Specification could or should be improved on. The appellants argued that the specification did not provide for all possible situations and gave two examples. The first situation was when a principal bank kept a range of card numbers for itself to issue a card in one currency, and assigned another range of card numbers to an affiliate bank for the latter to issue a card in another currency. The second situation was when a bank used a range of numbers to issue a card in one currency, and another range of card numbers to issue another card in a different currency. In both situations, the PANs of the cards issued in the respective currencies would have the same BIN. The Patent Specification, so it was argued, did not show how one could differentiate between the two cards. However, the appellants were unable to go further and illustrate how the Patent Specification could be amended to encompass this consideration. In this regard, it is not necessary that all the possible ways in which an invention can be carried out be described in the specification, especially when the claim is of a functional nature, as is the case here (see *Halsbury’s Laws of Singapore* vol 13(3) ([62] *supra*) at para 160.369).

67 Furthermore, it appeared that the real thrust of the appellants’ grievance stemmed from their deliberately-adopted arid and narrow reading of the claims. As stated above at [25], a purposive construction of the claims should be applied. The failure to define certain terms like “issuer code” and “identifier code” did not mean that the Patent Specification was therefore insufficient. It must be emphasised that the inventor cannot be expected to relieve the competent workman from all obligation to take trouble in carrying into effect the description in the specification (see [62] above). A helpful illustration of this principle is set out in *Terrell* ([22] *supra*) at para 7-102 as follows:

[I]n modern engineering practice no one would think of treating the drawings of a machine in a specification as working drawings: a certain amount of designing and calculation has to be carried out before a machine can be built, and the degree of knowledge requisite to perform such operations must be presumed in the person to whom the specification is addressed. ...

Generally speaking, therefore, the inventor is not required to give directions of a more minute nature than a person of ordinary skill and knowledge of the art might fairly be expected to need.

Furthermore, as pointed out in *Cornish and Llewelyn* ([60] *supra*) at para 5-87, the purpose of the specification “is not to instruct the uninitiated in the whole art”.

68 At this juncture, it is perhaps appropriate to distinguish our decision in the present appeals from the recent decision by the Australian Patent Office dated 13 July 2007 (“the Australian decision”) on a patent application filed in Australia in respect of the Invention (“the Australian patent application”). The respondent filed that application on 1 September 1999 with the Australian Patent Office. The application was accepted on 10 July 2003. Notices of opposition were subsequently filed by, *inter alia*, First Currency Choice Pte Ltd (*ie*, FCC, the appellant in Civil Appeal No 4 of 2007). A hearing was held on 26 and 27 September 2006, and the Australian decision was released on 13 July 2007. The Australian Patent Office held that the claims in the patent specification for the Australian patent application were significantly flawed on several points due to a lack of clarity, but nevertheless allowed the respondent 60 days from the date of the decision to propose suitable amendments to overcome those defects. It was stated in the Australian decision (at [164] and [166]) that:

The operation of the invention as described by Mainline [*ie*, the respondent] at the hearing is not fully supported by the specification. All the claims of the specification, including the omnibus claims [*ie*, claims 34 and 35 of the Patent Specification], inadequately distinguish the various defined codes and their interrelationship, and inadequately define the content of the BRT in the context of the claimed invention. Further, several claims are flawed in respect to the conditional nature of the setting of the currency. The claims are quite distinct from the supposed invention described by Mainline at the hearing.

...

Given Mainline’s significantly enhanced description of the invention at the hearing over the material described in the specification, it may be difficult to extract suitable subject matter from the description and put it in the claims to overcome the above points against the claim. As mentioned above, all the claims fail in a couple of significant areas of clarity. On the other hand[,] I am unprepared to say with conviction at this stage that there is no patentable subject matter in the body of the specification that could not legitimately be brought into the claims by amendment.

Much of the hearing before the Australian Patent Office centred on the terminology used by the respondent in the patent specification for the Australian patent application. The terminology which the Australian Patent Office considered flawed included the definition of “identifier code” and “issuer code” and the relationship between these two codes. It was observed at [67] of the Australian decision that the respondent’s witnesses:

[S]eem[ed] to describe the interrelationships between the various codes and the data tables to enable more accurate identification of the preferred currency for any particular card and to differentiate any of the codes from being interpreted as BINs.

69 Section 40 of the Australian Act ([40] *supra*) states that:

...

- (2) A complete specification must:
 - (a) *describe the invention fully*, including the best known method known to the applicant of performing the invention; and
 - (b) where it relates to an application for a standard patent – end with a claim or claims defining the invention; and
 - (c) where it relates to an application for an innovation patent – end with at least one and no more than 5 claims defining the invention.
- (3) The claim or claims *must be clear and succinct* and fairly based on the matter described in the specification.

[emphasis added]

A party may oppose the grant of a patent under s 59(c) of the Australian Act if “the specification filed in respect of the complete application does not comply with subsection 40(2) or (3)”.

70 In comparison, under our statutory regime, ss 25(4) and 25(5) of the Act state that in making an application for a patent:

- (4) The specification of an application shall disclose the invention in a manner which is clear and complete for the invention to be performed by a person skilled in the art.
- (5) The claim or claims shall —
 - (a) define the matter for which the applicant seeks protection;
 - (b) be clear and concise;
 - (c) be supported by the description; and
 - (d) relate to one invention or to a group of inventions which are so linked as to form a single inventive concept.

Section 80(1)(c) of the Act states that:

- (1) Subject to the provisions of this Act, the Registrar may, on the application of any person, by order revoke a patent for an invention on (but only on) any of the following grounds:

...

- (c) the specification of the patent does not disclose the invention *clearly and completely* for it to be performed by a person skilled in the art ...

[emphasis added]

It is important to note that sub-ss (4) and (5) of s 25 and s 80(1)(c) of the Act are taken from and mirror ss 14(3), 14(5) and 72(1)(c) of the 1977 English Act.

71 A clear divergence in the Australian approach and the Singapore/English approach is apparent from the relevant statutes. Under the Australian Act, revocation may be permitted if s 40(2) of the Australian Act (which is the sufficiency requirement) or s 40(3) of the Australian Act (which is the clarity requirement) is not complied with. In contrast, the Singapore/English approach only allows revocation in the circumstances delineated in, *inter alia*, s 80(1)(c) of the Act/s 72(1)(c) of the 1977 English Act, which corresponds to the sufficiency requirement under the Australian Act.

72 Previously, it was possible under s 32(1)(i) of the 1949 English Act to revoke a patent for failure to comply with the clarity requirement set out in the then statutory equivalent of s 14(5)(b) of the 1977 English Act (which, in turn, corresponds to s 25(5)(b) of the Act). However, there is no similar provision in the 1977 English Act. We agreed with the restrained approach adopted *vis-à-vis* s 72(1)(c) of the 1977 English Act by the English Court of Appeal in *Genentech Inc's Patent* [1989] RPC 147 ("*Genentech Inc's Patent*"), where it was held that the objection of ambiguity was no longer a ground for revocation under the 1977 English Act. Mustill LJ (as he then was) explained at 261 that this was because:

The opening words of section 72(1) are simply too strong to enable the court, as guardian of the public interest, to assert an inherent power to revoke a patent on grounds not expressly conferred by the statute.

Accordingly, where the specification of a patent is sufficient, any potential ambiguity or undue breadth of a claim is not in itself a ground of revocation. It has been quite correctly observed in *Cornish and Llewelyn* ([60] *supra*) at para 5-99 that it has become more challenging than in the past to advance and sustain an attack premised on the ambiguity of the claims in a patent specification. However, where there is insufficient disclosure of the invention in the specification as a result of an ambiguous or meaningless claim, the invention itself may not be properly enabled, and revocation under s 80(1)(c) of the Act may still be possible (see also *Terrell* ([22] *supra*) at para 7-106; *Kirin-Amgen* ([25] *supra*) at [124]-[129]).

73 In addition, the Singapore courts have held that it is clear from a reading of the Act, taken as a whole, that a patent specification suffices if it is clear enough and complete enough; absolute clarity and completeness are not uncompromisingly required (see *Ng Kok Cheng v Chua Say Tiong* ([28] *supra*) at [49]). Support for this proposition can also be found in an early decision by the House of Lords in *British Thomson-Houston Company Ltd v Corona Lamp Works Ltd* (1922) 39 RPC 49. In that case, a patent was granted for improvements in incandescent electric lamps. One of the claims

in the patent specification referred to the improved lamp “having a filament ... of large diameter or cross-section” (at 56). The defendants, in resisting an action for infringement, did not contend that the lamp-maker was unable to reproduce the invention based on the specification provided, but submitted that the words quoted did not sufficiently define the ambit of the monopoly claimed by the patentee. This argument was rejected by the House of Lords on the ground (at 77) that the adjective “large” must be read with reference to the dimensions of the filaments which were in use before the date of the patent, and that, so read, the above words provided an adequate definition of the scope of the monopoly. This case is also clear authority for the proposition that a patent is not necessarily invalid for want of definition merely because relative terms are used in its specification (see also *General Tire & Rubber Co* ([50] *supra*) at 514). One can also look to the explanation offered by Lord Hoffmann in *Kirin-Amgen* ([25] *supra*) at [128], where he said:

The skilled person is taken to be trying to make the invention work. If the skilled person would quickly realise that one method would work and another would fail, the specification is not insufficient because the claim is expressed in terms broad enough to include both methods.

74 Similarly, in the present appeals, the terms “identifier code”, “issuer code” and “identifier issuer code” (which, as mentioned in [68] above, were the definitions considered unclear by the Australian Patent Office) must be read with reference to the entire Patent Specification. When so read, a notional skilled person would, in our view, have a sufficient understanding of the Invention, especially since the nature of the Invention had been adequately described. As stated above (at [16]), the trial judge found that the appellants’ witnesses did not have any difficulty understanding the Patent Specification. This was certainly an important consideration.

Was there infringement?

75 The appellants contended that in the event that the Patent was valid, the FCC system did not infringe the Patent.

76 To determine whether there has been infringement of a patent, the scope of the monopoly claimed in the patent must first be determined (*Genelabs Diagnostics* ([19] *supra*) at [64]; *Bean Innovations* ([22] *supra*) at [16]). The claims in a patent specification are important because they fulfil a separate and distinct function from the patent specification (see [23] above), in that what is not claimed is deemed to be disclaimed (see *Lissen* ([22] *supra*) at [16]). If the alleged infringement falls within the words of one of the claims, the patent would have been infringed. In this regard, s 66 of the Act lists out acts of infringement as follows:

- (1) Subject to the provisions of this Act, a person infringes a patent for an invention if, but only if, while the patent is in force, he does any

of the following things in Singapore in relation to the invention without the consent of the proprietor of the patent:

- (a) where the invention is a product, he makes, disposes of, offers to dispose of, uses or imports the product or keeps it whether for disposal or otherwise;
- (b) where the invention is a process, he uses the process or he offers it for use in Singapore when he knows, or it is obvious to a reasonable person in the circumstances, that its use without the consent of the proprietor would be an infringement of the patent;
- (c) where the invention is a process, he disposes of, offers to dispose of, uses or imports any product obtained directly by means of that process or keeps any such product whether for disposal or otherwise.

77 General guidance can also be found in Lord Upjohn's masterful summary in *Rodi & Wienberger AG v Henry Showell Ltd* [1969] RPC 367 at 391, where he said:

[T]he essential integers having been ascertained, the infringing article must be considered. To constitute infringement the article must take each and every one of the essential integers of the claim. Non-essential integers may be omitted or replaced by mechanical equivalents; there will still be infringement. I believe that this states the whole substance of the "pith and marrow" theory of infringement. Furthermore, where the invention, as in this case, resides in a new combination of known integers but also merely in a new arrangement and interaction of ordinary working parts it is not sufficient to shew that the same result is reached; the working parts must act on one another in the way claimed in the claim of this patent. This is well illustrated by *Birmingham Sound Reproducers Ltd. v. Collaro Ltd.* [1956] R.P.C. 232 where Lord Evershed, M.R. delivering the judgment of the court said at page 245:

"Thus the essence of the invention resides wholly in the selection and arrangement of the parts and the manner in which they interact when arranged in accordance with the invention. It is therefore essential to the invention that it should consist of the particular parts described in the claim arranged and acting upon each other in the way described in the claim.

The question therefore appears to be whether the allegedly infringing apparatus consists of substantially the same parts acting upon each other in substantially the same way as the apparatus claimed as constituting the invention. It is not enough to find that the parts comprised in the respondents' apparatus individually or collectively perform substantially similar functions to those performed individually or collectively by the parts comprised in the apparatus claimed as the appellants' invention, or that the respondents' apparatus produces the same

result as the appellants' apparatus. It must be shown that the respondents' selection and arrangement of parts is substantially the same as the appellants' selection and arrangements of parts, for it is in such selection and arrangement that the appellants' invention resides."

78 The appellants argued that the FCC system relied on BINs to derive the issuer code and the identifier code, and that such usage of BINs was public knowledge at the priority date. Since the trial judge had found that the issuer code and the identifier code, which were the essential integers of the claims in the Patent Specification, relied on a portion of the PAN and were not limited to the BIN, and since these distinguishing features were absent from the FCC system, the FCC system, so the appellants contended, did not infringe the Patent. The respondent, however, argued that the issue was not whether the BRT was similar to the BIN table, but whether there was an automatic "look up-and-associate" process embodied in the FCC system.

79 In the affidavit of evidence-in-chief of Denis Cleary, one of FCC's witnesses and the technical manager of Fexco (a company that developed a system called the "FDCC system", which operates on the same basis as the FCC system), the FDCC system was described (at para 17) as follows:

[T]he FDCC System *performs a look up* on the "local" BIN table ... to find the BIN of the credit, debit or charge card (the BIN of the credit, debit or charge card is usually the first six (6) digits of the card number). If the BIN of the credit, debit or charge card corresponds to an entry in the "local" BIN table, then the transaction is processed in the merchant's local currency;

... If the BIN of the credit, debit or charge card does not correspond to an entry in the "local" BIN table, the FDCC System then *performs a lookup* on the "currency" BIN table to find the BIN of the credit, debit or charge card. If the BIN of the credit, debit or charge card corresponds to an entry in the "currency" BIN table, then the system operator is *automatically* presented with a choice of the currency identified ... or the merchant's local currency, for processing. This device is needed to prompt the system to ask for the cardholder's consent to conversion of the transaction to his home currency and maximise the use of the service.

[emphasis added]

Since the FDCC system and the FCC system operate in the same manner, there is, therefore, likewise a look up of the BIN against the "local" BIN table in the FCC system for the purposes of identifying a payment card's operating currency, which process is automatic. This would plainly be an infringement of the automatic "look up-and-associate" feature of the Invention.

80 A connected issue was whether the definition of “identifier code” and “issuer code” in the Patent Specification included the BIN. The appellants stoutly maintained that the FCC system relied on the BIN as the identifier code, and that the issuer code constituted the foundation of their system. The appellants relied on this point to support their contention that the FCC system did not infringe the Patent as it did not contain the essential integers of the claims in the Patent Specification.

81 However, the appellants’ case was fundamentally flawed because the identifier code and the issuer code in the claims can and, indeed, must be construed to include the BIN. While it is accepted that, on occasion, the issuer code and/or identifier code may include less than six digits or more than six digits (*ie*, either code is not equivalent to the BIN), there would also be situations where the BIN itself is used to operate the Invention (see also the passage from the Judgment quoted at [15] above).

82 The issue of infringement is a question of fact (see *Genelabs Diagnostics* ([19] *supra*) at [71]). We were not persuaded that the trial judge had been mistaken. There was clear evidence from the respondent’s expert witness, Mr Robert Wastyn (“Mr Wastyn”), that the FCC system infringed the Patent. During cross-examination, Mr Wastyn testified that although the BRT was different from the BIN table in so far as the two tables contained different information, the scope of the BRT extended to an inclusion of BINs. Any system which performed currency recognition for the purposes of automatic currency conversion would be an infringement of the Patent. Furthermore, it was evident from the cross-examination of Mr Agnihotri that all the essential integers of claim 1 of the Patent Specification were practised by the FCC system, albeit at different stages:

Q: The point is that what has been set up in the [P]atent in claim 1 has been practised by the FCC system; do you agree?

A: Some portions, yes.

Q: Everything that has been set out in claim 1 has been practised by the FCC system; do you agree?

A: I agree, but they are at different places. For example there is [a] local BIN look-up, there is a BIN table look-up, and then there is a currency setting which is done right at the time when the customer makes the choice, so, yes, those things are taken care of but at different stages.

Q: *But the point is that the various steps which I will call the integers of claim 1 [have] been practised in the FCC method as per claim 1, isn't that correct?*

A: Yes.

...

Q: [T]he point I am putting to you, sir, is, leaving aside all those other points, would you agree or would you not, sir, that if the

[P]atent is found [to be] valid, i.e. those challenges fail, the FCC system would infringe claims 1 to 35 of the [P]atent; do you not agree?

A: I am not sure whether I would agree with that because, as I said, there are similarities and there are differences, so it really remains to be judged as to whether those differences are material or not.

Q: But you would agree, would you not, Mr Agnihotri, insofar as claims 1 and 14 are concerned, *the FCC system falls squarely within those words, the words in those claims?*

A: *It does.*

[emphasis added]

Plea of innocent infringement

83 At the trial, UOB relied on the “plea” of innocent infringement under s 69(1) of the Act at the trial stage. Section 69(1) of the Act states that:

In proceedings for infringement of a patent, damages shall not be awarded and no order shall be made for an account of profits against a defendant who proves that at the date of the infringement he was not aware, and had no reasonable grounds for supposing, that the patent existed.

The area of controversy lay in whether UOB’s knowledge of the European Patent (see [6] above) fell within the scope of s 69(1) of the Act. It was disclosed during the trial that the respondent had informed UOB in an e-mail dated 10 May 2002 that the European Patent Office had granted the respondent the European Patent on 5 December 2001, and that a corresponding patent application in Singapore (“the Singapore patent application”) was pending (see [77] of the Judgment). The Singapore patent application was eventually granted on 30 June 2003. The trial judge found that in view of the above e-mail, any protection accorded by innocent infringement had ceased to apply by 10 May 2002. He held at [83] of the Judgment that:

An infringer who believes that a patent can be challenged is certainly not the same as one who does not know about the patent. To succeed in this defence, an infringer must plead and prove absence of knowledge *and* absence of reasonable grounds. I find that by 10 May 2002, UOB had the requisite knowledge of the [P]atent or at least reasonable grounds for supposing that it existed and that any innocent infringement therefore ended by that date. [emphasis in original]

84 While UOB did not initially challenge the trial judge’s finding on this matter, it would be appropriate to address some concerns which have arisen in this regard. It was suggested that UOB’s liability should only have started from 30 June 2003, the date on which the Patent was granted in Singapore,

because (*per* Tan Tee Jim SC, “Intellectual Property Law” (2006) 7 SAL Ann Rev 325 at para 17.58):

It is trite an invention does not receive protection in Singapore until and unless it is patented in Singapore. In the meantime, the use of the invention in Singapore does not constitute an infringement even though the invention is already patented in a foreign country. This accords with basic international norm. [Under] the terms of s 69(1) of the [Act], the knowledge that the invention has already received patent protection in a foreign territory is irrelevant and should not be held against a claim of innocent infringement. It is actual and constructive knowledge of the existence of a patent in Singapore that is material.

85 There has been some disinclination on the part of the courts to award damages for acts of infringement committed during a period of “innocence” (see Cornish and Llewelyn ([60] *supra*) at para 2-42). In this respect, the courts in England and Singapore have generally relied on the statutory relief granted by s 62(1) of the 1977 English Act and s 69(1) of the Act (see [83] above) respectively. The statutory test for determining whether an infringer was aware or should have had reasonable grounds for supposing that the patent in dispute existed is an objective one (*Lancer Boss Ltd v Henley Forklift Co Ltd* [1975] RPC 307 (“*Lancer Boss*”). As stated by Graham J in *Lancer Boss* at 317:

[I]f the infringer had no actual knowledge, the existence of reasonable grounds must be judged in the light of all the circumstances at the time of the infringement.

86 The prevailing disposition of the English courts has been to look at whether the infringing party made “the necessary investigation which a prudent man of business in the same circumstances would have made” (*John Khalil Khawam and Company v K Chellaram & Sons (Nig) Limited* [1964] 1 WLR 711 at 716.) In *Benmax v Austin Motor Coy Ld* (1953) 70 RPC 143, Graham J commented at 156 that:

In my judgment, a defendant who seeks to avail himself of the protection afforded by Sec. 59(1) [of the Act, the then English equivalent of s 69(1) of the Act] must plead and prove a complete ignorance of the existence of the patent monopoly during the period in which the wrongful acts were being done ...

87 The burden of proving the absence of the requisite degree of knowledge rests on the alleged infringer. Section 69(1) of the Act provides for two types of knowledge – actual and constructive. Bainbridge illustrates this in *Intellectual Property* ([43] *supra*) in the following way at p 460:

The application of the word ‘patent’ or ‘patented’ or words expressing or implying that a patent has been obtained for the product does not necessarily fix the defendant with notice unless accompanied by the number of the patent or *application*. It would, however, be difficult for a defendant to prove to the court that he did not know of the existence

of the patent if he copied a product to which the word 'Patented' was applied. [emphasis added]

88 In this respect, the publication of a patent application is significant because it can serve as a form of notice (either actual or constructive) to the infringer, thereby modifying the protection afforded by the plea of innocent infringement. Knowledge may, in appropriate cases, be imputed to the infringer upon publication of the patent application in question.

89 It is convenient at this point to examine the statutory protection afforded by s76(1) of the Act to applicants with pending patent applications. Section 76(1) states that:

Where an application for a patent for an invention is published, then, subject to this section, the applicant shall have, as from the publication and until the grant of the patent, the same right as he would have had, if the patent had been granted on the date of the publication of the application, to bring proceedings in the court or before the Registrar for damages in respect of any act which would have infringed the patent.

However, the right to bring proceedings under s 76(1) of the Act arises only if the conditions stated in s 76(3) are fulfilled. The conditions are as follows:

The applicant shall be entitled to bring proceedings by virtue of this section in respect of any act only —

- (a) after the patent has been granted; and
- (b) if the act would, if the patent had been granted on the date of the publication of the application, have infringed not only the patent, but also the claims (as interpreted by the description and any drawings referred to in the description or claims) in the form in which they were contained in the application immediately before the preparations for its publication were completed by the Registry.

Furthermore, in an infringement action under s 76 (*ie*, an action founded on a pending patent application), s 76(4) requires:

[T]he court or the Registrar ... [to] consider whether or not it would have been reasonable to expect, from a consideration of the application as published under section 27, that a patent would be granted conferring on the proprietor of the patent protection from an act of the same description as that found to infringe those rights ...

As emphasised in *Terrell* ([22] *supra*) at para 13-31, the test under s 76(4) of the Act is “an objective one and does not depend on the knowledge of a particular defendant” (see also [85] above).

90 In the present appeals, it was pertinent to note that prior to the Patent being granted on 30 June 2003, the Singapore patent application had already been published in *The Patents Journal (Singapore)* on 19 February

2002. In addition, the application for an “international” patent under the Patent Cooperation Treaty had been published on 18 January 2001. Under s 85(1) of the Act:

An international application for a patent (Singapore) for which a date of filing has been accorded under the Patent Co-operation Treaty shall, subject to sections 86 and 87, be treated for the purposes of this Act as an application for a patent under this Act.

91 We also noted, however, that no evidence was adduced at the trial as to whether UOB should reasonably have known that the Singapore patent application was pending. Furthermore, we were of the view that, UOB not being in this particular line of software business, it would be somewhat unreasonable to hold that the mere publication of the Singapore patent application should be deemed to have put UOB on notice of potential patent infringement.

92 It should, nevertheless, be emphasised that the plea of innocent infringement is not available to an infringer who *has been informed* of the existence of a patent application in respect of the article in question (see the use of the word “aware” in s 69(1) of the Act; see also *Wilbec Plastics Limited v Wilson Dawes (Sales and Contracts) Limited* [1966] RPC 513 (“*Wilbec Plastics*”). In *Wilbec Plastics*, the defendants knew that the patent application had been lodged at the Patent Office almost two years *before* the alleged date of infringement. Thus, the court held that the defendants could not rely on innocent infringement because, on the facts, they must necessarily have been aware of the patent application.

93 In the present case, UOB was, in point of fact, only informed of the European Patent and the pending Singapore patent application on 10 May 2002, after it had implemented the FCC system. (UOB implemented the FCC system on 11 October 2001: see [5] above.) Thus, the current situation could be distinguished from that in *Wilbec Plastics* ([92] *supra*), in so far as UOB only had actual notice of the Singapore patent application after the alleged infringement occurred.

94 On the facts, UOB was only entitled to invoke the protection conferred by innocent infringement until 10 May 2002, the date when it first received notice from the respondent of the Singapore patent application (see [83] above). We therefore agreed with the trial judge’s finding that UOB’s liability for damages commenced from 10 May 2002 onwards.

95 There is one further point which we would like to briefly address. The trial judge had, in [75] of the Judgment, characterised the protection conferred by s 69(1) of the Act as a “defence”. It should be noted that the statutory protection is not a “defence” in the strict sense of the word, but is, rather, an extenuating consideration that ameliorates unknowing and,

therefore, innocent transgressions in terms of the remedy (either in the form of damages or an order for an account of profits) that can be granted.

Conclusion

96 The appellants were unable to persuade us to depart from the trial judge's findings. We thus upheld the finding that the Patent was valid, and that it was in fact infringed by the appellants' actions. Both appeals were, accordingly, dismissed with costs and with the usual consequential orders.

Reported by Loh Tann Ling.
