



PATENTS ACT 1977

APPLICANT Mitsubishi Electric Corporation

ISSUE Whether patent application GB 2200512.8 is excluded under section 1(2)

HEARING OFFICER J Pullen

DECISION

Background

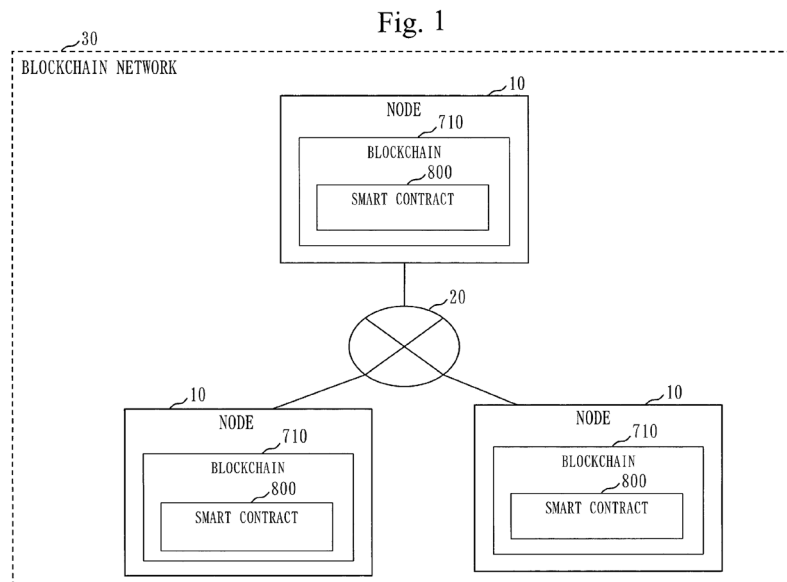
- 1 Patent application GB 2200512.8 ("the application") entitled "Exchange floor terminal device and method" was filed on 30 July 2019 in the name of Mitsubishi Electric Corporation. It was published as GB 2599332 A on 30 March 2022.
- 2 On 27 April 2022, the examiner issued an Examination Report under section 18(3), stating that the subject matter of the invention was excluded under section 1(2). In the Examination Report the examiner set out an objection that the invention relates to a method of doing business and a program for a computer as such and is excluded from patent protection under s.1(2).
- 3 The applicant responded by filing a set of amended claims with their agent's letter of 6 June 2022. The applicant also disagreed with the examiner's objection and argued that the invention was not excluded under s.1(2).
- 4 With the position unresolved the applicant asked to be heard and the matter came before me at a hearing on 26 September 2022. The issue of excluded matter before me was set out in the examiner's pre-hearing report of 13 July 2022. The applicant was represented at the hearing by attorney Dr Graeme Moore and Ms Charlotte Lynch of Mewburn Ellis LLP. I thank the attorney for filing skeleton arguments prior to the hearing. I was assisted by Mr Marc Collins.
- 5 Two sets of amended claims were filed alongside the skeleton arguments – a main request and an auxiliary request. The amended claims of the main request are the current working copy of the claims on file.

The invention

- 6 The application relates to a virtual-bond collecting device, which collects a virtual-bond, in a distributed ledger network. The invention is concerned with smart contracts for operation on a blockchain. A smart contract is a computer program

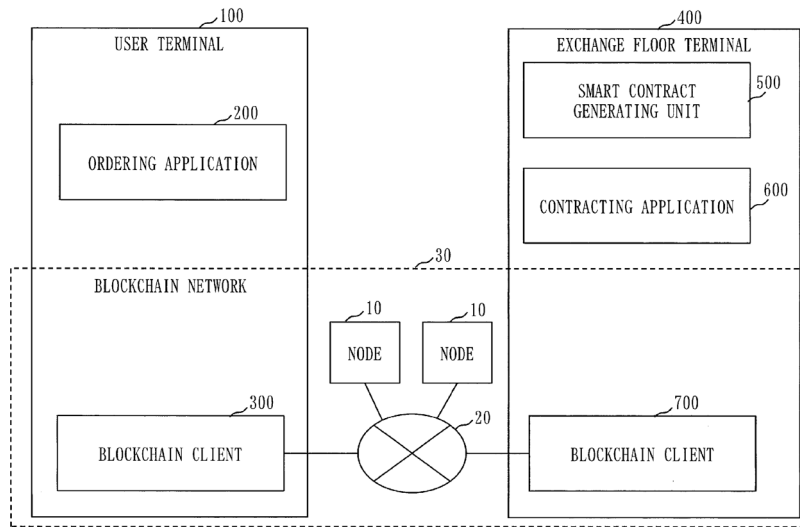
stored on a blockchain that is run when predetermined conditions are met. By using the smart contract, it is possible to perform an exchange safely even if the exchange is between two unreliable people since the exchange can be controlled by a program. For example, when a user sells a commodity to an exchange floor, the user gives the commodity to the exchange floor, and the exchange floor pays currency. At this time, if the exchange floor does not pay the currency, the user cannot receive a compensation for the commodity. In a case where the smart contract is used, the user can receive the compensation if the exchange floor deposits the currency in the smart contract in advance and payment from this deposit is automatically executed.

- 7 Figure 1 below depicts a network configuration diagram of a block chain network used in a first embodiment of the invention. Terminals, called nodes 10, which are connected to the Internet 20 perform P2P communication and share data with each other. Networks that share blockchain 710 by using the P2P communication via the Internet is called a blockchain network 30. The blockchain network is used for virtual currency. Each node has the blockchain and a smart contract 800 and data to be registered in the blockchain can be controlled by the smart contract.



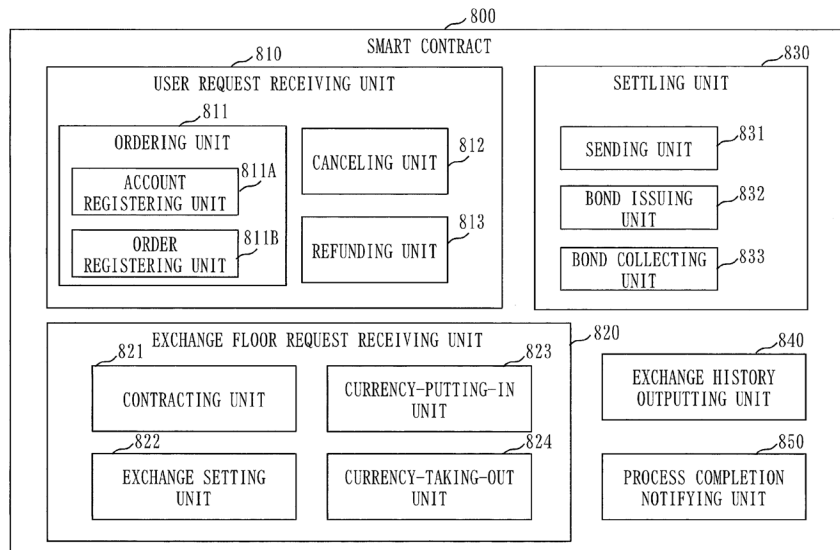
- 8 Figure 2 below is a software configuration diagram of a user terminal 100 and an exchange floor terminal 400 that perform a commodity exchange and are connected to the Internet. As with the node 10 in Fig. 1, the user terminal and the exchange floor terminal join the blockchain network. The user terminal has two pieces of software that are an ordering application 200 and a blockchain client 300. The exchange floor terminal has two pieces of software which are a contracting application 600 and a blockchain client 700. Further, the exchange floor terminal has a smart contract generating unit 500. The smart contract generating unit generates, compiles, and registers the smart contract in the blockchain 710 via the blockchain client 700.
- 9 The blockchain clients are pieces of software that constitute the blockchain network 30 which manage an account of the virtual currency and share the blockchain with another blockchain client. The ordering application 200 is an application that places a selling and buying order of the commodity. The contracting application 600 is an application by which the exchange floor contracts an order requested by the user.

Fig. 2



- 10 Figure 5 below is a functional configuration diagram of the smart contract 800 that controls the commodity exchange. The smart contract generated by the smart contract generating unit 500 is sent to the blockchain network 30, and all commodity exchanges are controlled by the smart contract. The smart contract includes a user request receiving unit 810, an exchange floor request receiving unit 820, a settling unit 830, an exchange history outputting unit 840, and a process completion notifying unit 850.

Fig. 5



- 11 The latest set of claims filed with attorney's letter dated 22 August 2022 has eight claims including two independent claims directed to a smart contract (claim 1) and a method (claim 8) which are set out below:

*[Claim 1] A smart contract for operation on a blockchain, wherein the smart contract comprises:
a settling unit to detect currency-putting-in of virtual currency of a buying contract process between a first user terminal device of a first user and the exchange*

floor terminal device wherein the first user has purchased a commodity from an exchange floor; and

a bond collecting unit to:

when the currency-putting-in of the virtual currency of the buying contract by the purchase of the commodity by the first user is detected,

refer to creditor information in which a second user is managed wherein the second user is a creditor that has a virtual bond which is electronic data that the smart contract has issued in a selling contract process between the exchange floor terminal device and a second user terminal device of the second user, and

pay back to the second user, at least a part of a currency amount indicated by the virtual bond by using the virtual currency of the first user.

[Claim 8] A method by a computer, comprising:

detecting currency-putting-in of virtual currency of a buying contract process between a first user terminal device of a first user and an exchange floor terminal device of an exchange floor wherein the first user has purchased a commodity from the exchange floor; and

when the currency-putting-in of the virtual currency of the buying contract by the purchase of the commodity by the first user is detected,

referring to creditor information in which a second user is managed wherein the second user is a creditor that has a virtual bond which is electronic data that the smart contract has issued in a selling contract process between the exchange floor terminal device and a second user terminal device of the second user, and

paying back to the second user, at least a part of a currency amount indicated by the virtual bond by using the virtual currency of the first user.

The issues to be decided

- 12 The issue to be decided is whether the claimed invention relates to excluded subject matter, and in particular whether the invention falls into one of the categories set out in section 1(2)(c) of the Patents Act 1977 as a method of doing business and/or a program for a computer as such.
- 13 At the outset of the hearing Dr Moore explained that the amended claim sets of the main request and the auxiliary request superseded those claims previously on file. I had reviewed these claim sets and noted that the claim sets do not appear to be different in substance. On this basis I suggested that the contribution of both the main and auxiliary requests would most likely be the same. Dr Moore agreed and explained that there was a subtle difference in the wording of the independent claims which he submitted altered the focus of the claims. I will consider the allowability of the claims of the main request and review the auxiliary request based on my findings.
- 14 As the claims under consideration were filed after the examiner issued his pre-hearing report, he has not had the opportunity to consider their allowability. Nevertheless, I will consider examiner's arguments relating to the previous claims on file as they are of relevance as discussed below as the claim sets under consideration here are very similar.

The law

- 15 The examiner has raised an objection under section 1(2) of the Patents Act 1977 that the invention is not patentable because it relates inter-alia to one or more

categories of excluded matter. The relevant provisions of this section of the Act are shown in bold below:

1(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of

—

(a) a discovery, scientific theory or mathematical method;

(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;

(c) a scheme, rule or **method for performing a mental act, playing a game or doing business, or a program for a computer;**

(d) the presentation of information;

but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.

- 16 The examiner and the applicant agree that the assessment of patentability under section 1(2) is governed by the judgment of the Court of Appeal in *Aerotel*¹, as further interpreted by the Court of Appeal in *Symbian*².
- 17 In *Aerotel*, the court reviewed the case law on the interpretation of section 1(2) and approved a four-step test for the assessment of what is often called "excluded matter", as follows:
- Step one: properly construe the claim*
- Step two: identify the actual contribution (although at the application stage this might have to be the alleged contribution)*
- Step three: ask whether it falls solely within the excluded matter*
- Step four: check whether the actual or alleged contribution is actually technical in nature.*
- 18 Subsequently, the Court of Appeal in *Symbian* made clear that the *Aerotel* test is not intended to provide a departure from the previous requirement set out in case law, namely that the invention must provide a "technical contribution" if it is not to fall within excluded matter. The *Aerotel* test has subsequently been endorsed by the Court of Appeal in its decisions in both *HTC*³ and *Lantana*⁴.
- 19 Lewison J (as he then was) in *AT&T/CVON*⁵ set out five signposts that he considered to be helpful when considering whether a computer program makes a

¹ *Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application* [2006] EWCA Civ 1371, [2007] RPC 7

² *Symbian Ltd's Application* [2008] EWCA Civ 1066, [2009] RPC 1

³ *HTC Europe Co Ltd v Apple Inc* [2013] RPC 30

⁴ *Lantana v Comptroller-General of Patents, Designs and Trade Marks* [2014] EWCA Civ 1463

⁵ *AT&T Knowledge Venture/CVON Innovations v Comptroller General of Patents* [2009] EWHC 343 (Pat)

technical contribution. In *HTC* the signposts were reformulated slightly in light of the decision in *Gemstar*⁶. The signposts are:

i) Whether the claimed technical effect has a technical effect on a process which is carried on outside the computer.

ii) Whether the claimed technical effect operates at the level of the architecture of the computer; that is to say whether the effect is produced irrespective of the data being processed or the applications being run.

iii) Whether the claimed technical effect results in the computer being made to operate in a new way.

iv) Whether the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer.

v) Whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented.

- 20 Paragraph 41 of AT&T/CVON emphasises that consideration of the signposts should properly reflect both stages 3 and 4 of the Aerotel approach:

If there is a technical effect in this sense, it is still necessary to consider whether the claimed technical effect lies solely in excluded matter.

- 21 The signposts are guidelines; although they provide a useful aid in assessing the technical character of a claimed invention, they were not intended to provide a definitive test (as Lewison LJ's obiter remarks in paragraph 149 of *HTC* make clear). Several judgments have emphasised this point - John Baldwin QC (sitting as a Deputy Judge) in *Really Virtual*⁷ noted that the signposts, although useful, are no more than signposts and that there will be some cases in which they are more helpful than in others. Kitchin LJ made similar remarks in paragraph 51 of *HTC* that their usefulness does not mean they will be determinative in every case.

Arguments and analysis

- 22 Whilst independent claims 1 and 8 relate to different categories of protection, they do not differ in substance, so they will stand or fall together.
- 23 The examiner maintains that the claims, filed on 6 June 2022, define an invention which consists of a business method and/or a program for a computer. His position is set out most recently in his pre-hearing report of 13 July 2022. Detailed arguments against the examiner's position are contained in the applicant's responses and their skeleton arguments filed through their attorney. These arguments were elaborated clearly and helpfully at the hearing by Dr Moore and Ms Lynch. I will take all written and oral submissions into account in coming to my decision.

Step 1: Properly construe the claims

⁶ *Gemstar-TV Guide International Inc v Virgin Media Ltd* [2010] RPC 10

⁷ *Really Virtual Co Ltd v UK Intellectual Property Office* [2012] EWHC 1086 (Ch)

- 24 The first step of the test is to construe the claims. Following the resolutions of some clarity objections in previous claim sets, I do not think understanding the meaning of the claims presents any real problem and I consider them to be clear.

Step 2: Identifying the actual or alleged contribution

- 25 Jacob LJ outlined the considerations to be applied when identifying the contribution made by the claims in paragraph 43 of Aerotel – the critical factors for the examiner to consider are emphasised:

“The second step – identify the contribution - is said to be more problematical. How do you assess the contribution? Mr Birss submits the test is workable – it is an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are. What has the inventor really added to human knowledge perhaps best sums up the exercise. The formulation involves looking at substance not form – which is surely what the legislator intended.”

- 26 The attorney explained that a problem to be solved in prior art systems which implement exchange floor exchanges using terminal devices and a smart contract on a blockchain is that an exchange floor terminal device within the system is vulnerable to denial-of-service (DOS) attacks if the system is one which ensures that exchange interactions between the exchange floor terminal device and a user terminal device will be perfected (appropriately completed). In other words, there is no way to both be resilient against DOS attacks and ensure that each exchange interaction will be perfected. The attorney explained that the effect of the present invention is best characterised as restricting the vulnerability of the system to DOS attacks.
- 27 In his analysis of the contribution, the examiner has noted that it is not entirely clear how the present invention *necessarily prevents* DOS attacks (and the description does not provide any details on this feature), nor is it clear to what extent the present invention “restricts” or is “more secure” against DOS attacks. However, the examiner has proceeded on the basis that the alleged contribution restricts the effect of DOS attacks in the sense that the exchange floor terminal is not required to input virtual currency into the smart contract, with a bond being issued instead.
- 28 The examiner has identified the contribution made by the previous claims to be:

“a program which provides reliable commodity exchanges and which restricts denial-of-service attacks on an exchange floor terminal device by detecting a virtual currency being put into a buying contract process between a first user terminal device and the exchange terminal device, and paying a second user using the detected virtual currency – wherein the second user has previously been issued a bond by the exchange floor terminal device”

- 29 The applicant partially agrees with the examiner’s formulation of the contribution but, in light of the examiner considering it unclear as to what extent the present invention restricts DOS attacks, clarifies that the present invention reduces the vulnerability of the system to DOS attacks. Further, the applicant considers it important to emphasise that it is the smart contract which is carrying out the various steps of the present invention. Therefore, the applicant has identified the actual contribution made by the present invention to be:

“a program which ensures that each exchange interaction between two devices (the exchange floor terminal device and the second user terminal device) will be perfected in a system with reduced vulnerability to DOS attacks

by the smart contract issuing a virtual bond to the second user, and the smart contract paying back a currency amount indicated by the virtual bond to the second user when the smart contract detects currency putting in of virtual currency in an exchange between the exchange floor terminal device and the first user terminal device.”

- 30 The attorney explained that reduction in DOS vulnerability is achieved by the smart contract allowing an exchange floor terminal device to issue a bond to a user terminal device if the exchange floor terminal device does not have enough currency deposited in the smart contract to carry out the selling contract.
- 31 He further explained that the present invention ensures that each exchange interaction (between the exchange floor terminal device and the first user terminal device) is completed. In prior art systems, when a bond is issued by an exchange floor terminal device to a user terminal device, there is no way of ensuring that the bond will be returned as virtual currency to the user. The present invention ensures the bond is returned as virtual currency to the user by the “bond collecting unit” of the smart contract computer program. This unit detects when virtual currency is input into the smart contract by an additional terminal device (the first user terminal device) in a buying contract process between the additional terminal device and the exchange floor terminal device and this triggers the smart contract to pay back the virtual currency of the bond to the second user terminal device.
- 32 I am not persuaded by the significance of an additional device. An ‘additional physical device’ (i.e. the first terminal device) is first mentioned in the attorney’s letter of 6 April 2022 in an attempt to align the facts of this specification with that of BLO/701/21. Prior art systems could be entirely expected to have three parties i.e. a buyer, an exchange and a seller involved in a commodity exchange transaction, and also for them to each have an associated physical device, such as a user terminal. It is the functionality or the method performed on each of these devices which forms the substance of the contribution over any prior art rather than the arrangement of the hardware.
- 33 I find myself in agreement with the examiner that the specification as filed does not clearly set out how the present invention necessarily prevents DOS attacks or to what extent the present invention “restricts” or is “more secure” against DOS attacks. For this reason, I am happy to accept the contribution put forward by the applicant which clarifies the contribution as reducing the vulnerability of the system to DOS attacks and emphasises the role of the smart contract which more closely reflects the amended claims now under consideration.

Steps 3 and 4: Does the contribution fall solely within excluded matter/is it technical in nature?

- 34 What I must now decide is whether the contribution identified above relates solely to a program for a computer as such and/or a method of doing business as such. This corresponds to step three of the *Aerotel* test.

- 35 The fourth step of the test is to check whether the contribution is technical in nature. In paragraph 46 of *Aerotel* it is stated that applying this fourth step may not be necessary because the third step should have covered the question. This is because a contribution which consists solely of excluded matter will not count as being a "technical contribution" and will not, as the fourth step puts it, be "technical in nature". Similarly, a contribution which consists of more than excluded matter will be a "technical contribution" and so will be "technical in nature".
- 36 In this case, the arguments concerning whether the invention is excluded are very much wrapped up with the question of whether the contribution is technical in nature. Given that, I have considered the third and fourth steps together.

Computer program

- 37 At this point it is useful to consider the *AT&T/CVON* signposts as they are a helpful aid when considering whether a computer program makes a technical contribution. The examiner has made reference to the signposts in his examination reports. In his assessment of the five signposts the examiner determined that the contribution failed to satisfy any of the signposts.

Signpost (i)

- 38 The first signpost asks whether the claimed technical effect has a technical effect on a process which is carried on outside the computer. The attorney argues that the provision of an additional physical device (the first user's terminal device) is used to achieve the technical effect of the present invention, of ensuring that an exchange interaction between two devices (the exchange floor terminal device and the second user terminal device) will be perfected in a system with reduced vulnerability to DOS attacks.
- 39 The attorney considers that this effect is technical as it is a functionality which technical systems of the prior art are unable to technically achieve. It is argued that the use of the additional physical device in an interaction which was previously (i.e., in the prior art) carried out between only two physical devices necessarily gives rise to an effect outside the computer system of the two physical devices, namely the exchange floor terminal device and the first user terminal device. In particular, the above-mentioned technical effect occurs outside of the computer arrangement of the exchange floor terminal device and the first user terminal device because the smart contract detects an interaction of the first user terminal device and the exchange floor terminal device which triggers the smart contract to pay back virtual currency to the second user terminal device.
- 40 I disagree with the attorney's assessment with regard to the first signpost. The computer of the contribution is not the arrangement of two physical devices as argued by the attorney. The computer of the contribution, as set out above, is a system of terminals comprising the first user terminal device, the second user terminal device and the exchange floor terminal device. The program of the contribution is then run on this system and as there is no process outside of this system there can be no technical effect outside of it. Therefore, in my view the first signpost is not met.

Signposts (ii)-(iv)

41 I note that the applicant has not relied on signposts (ii)-(iv) during prosecution. I do not consider them to assist the applicant and I have not considered them in detail here.

Signpost (V)

42 The fifth and final signpost asks whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented. The fifth signpost looks at the technical character of an alleged invention by means of the problem addressed. When the problem is a technical one, the alleged invention can be considered to have a technical nature leading to it falling outside the exclusion.

43 The examiner has argued that whilst he does not consider the alleged problem of 'denial of service attacks cannot be prevented for reliable commodity exchanges on the blockchain' is technical in nature (as the problem relates to processes involved in exchanging commodities), I would note that any DOS attack problems have been circumvented by not inputting virtual currency in the contract and using a bond instead – rather than solving anything to do with a DOS attack itself.

44 The attorney contends that the technical problem to be solved is that there is no known way to both be resilient against DOS attacks and ensure that each exchange interaction will be perfected, submitting that the present invention solves this technical problem in a technical way. The attorney argues that the particular functioning of the smart contract computer program of the present invention which involves an additional terminal device in an interaction previously carried out between two terminal devices involves technical implementation choices, as they lie within the competence of a technically skilled person such as a software engineer rather than a business person, for example. Thus, the technical problem has been overcome (i.e., solved in a technical way), and not merely circumvented.

45 I do not find the attorney's position that the problem lies outside the realm of a business method because of the technical implementation choices which lie within the competence of a technically skilled person, to be convincing. In this case I am minded to agree with the examiner that the problem to be solved is not technical in nature, as the problem of completing financial transactions is in itself a business problem. I also agree with the examiner that the problem of DOS attacks on the system have not been overcome, but rather circumvented through the program of the contribution implemented via the smart contract. Therefore, signpost (v) is not satisfied.

46 Looking at the fourth step, as discussed above I do not consider the contribution to be technical in nature.

47 Therefore, I consider the contribution identified above to relate to a program for a computer as such.

Business method

- 48 The examiner has argued that the contribution does not prevent a DOS attack in a general or technical sense on a computer and/or network – rather the effect is to (allegedly) restrict or lessen a DOS attack on an exchange device when conducting exchanges by the exchange device not being required to enter virtual currency into a smart contract and issue a bond instead. Therefore, such a contribution merely indicates a better way of conducting the business of financial exchanges. This does not assist in providing a technical contribution, as noted by Fox LJ in Merrill Lynch’s Application [1989] RPC 561:

“The fact that the method of doing business may be an improvement on previous methods of doing business does not seem to me to be material. The prohibition in section 1(2)(c) is generic; qualitative considerations do not enter into the matter.”

- 49 The applicant has argued that seemingly, the examiner is of this view because they deem the smart contract of the present invention to be directly equivalent to a legal contract, and thus to relate solely to a way of conducting business. However, it is important to note, as mentioned above, that smart contracts are not directly equivalent to standard legal contracts; rather, as described by IBM, smart contracts are computer programs stored on a blockchain that run when predetermined conditions are met.
- 50 I am not persuaded that the examiner deems the smart contract of the present invention to be directly equivalent to a legal contract, and thus to relate solely to a way of conducting business. The examiner has outlined how he considers the contribution to indicate a better way of conducting the business of financial exchanges by using a smart contract. The terminals and/or network are not more secure in any technical sense – rather any improvement resides in when/how payment is effected in the system.
- 51 The invention clearly has a commercial context, as set out in the application, in that commodities are exchanged in a system with reduced vulnerability to DOS attacks. This is achieved through the use of conventional hardware programmed to implement the program and method through the smart contract. In *Merrill Lynch*⁸ it was discussed at page 569 that the fact that the method may be an improvement on previous methods is immaterial. The prohibition in section 1(2)(c) is generic and draws no distinction between the method by which the mode of business is achieved. The independent claims are directed to a program and method for exchanging commodities. This application fails as a method of doing business.

Conclusion

- 52 I am content that consideration of the auxiliary claim set would not result in a different outcome.

⁸ *Merrill Lynch’s Application [1989] RPC 561*

53 For the reasons set out above, I find that the claimed invention is excluded under section 1(2)(c) as a method of doing business and a program for a computer as such. I refuse this application under section 18(3).

Appeal

54 Any appeal must be lodged within 28 days after the date of this decision.

J Pullen

Deputy Director, acting for the Comptroller