Intellectual Property Office

BL O/210/17

02 May 2017

PATENTS ACT 1977

APPLICANT	Trillium Technology AB
ISSUE	Whether patent application number GB1400294.3 complies with sections 1(2)(c)
HEARING OFFICER	Phil Thorpe

DECISION

1 This decision concerns whether the invention set out in patent application GB1400294.3 relates to excluded matter. The examiner has maintained throughout the examination of this application that the claimed invention is excluded from patentability under section 1(2)(c) of the Patents Act 1977 as a program for a computer and a scheme, rule or method for doing business. The applicant has not been able to overcome the objections, despite amendments to the application.

2 The matter came before me at a hearing on the 28th February 2017, at which Ms Virginia Driver of Page White and Farrer appeared on behalf of the applicant.

The Patent Application

3 The application is entitled "Automated identification of events in data streams" and was filed on the 8th January 2014. It was published as GB 2518247 A on the 18th March 2015.

4 The invention relates to detecting and highlighting manipulative order patterns of financial securities or similar financial instruments. Market regulators have documented instances where marker traders have unlawfully manipulated market prices by placing and subsequently cancelling multiple market orders on one side of the market (offers to buy or offers to sell) with the intention of impacting the market price of the security in a manner that can be exploited depending on whether the trader actually wishes to sell or purchase the security. Offers to sell can lower the market price of a security if the rogue trader wishes to purchase the security and offers to buy can raise the market price if the trader actually wishes to sell the security. This practice has been labelled by regulators as "layering" or "spoofing".

5 To ensure compliance with the rules, regulators have required that market participants responsible for either originating orders or transmitting orders to trading venues monitor, detect and prevent potentially manipulative order patterns either at

the local level or at the market wide level. The large volume of orders created in the accounts of a market trader makes it difficult to undertake the required monitoring.

6 The invention allows the analysis of local orders that exceed certain concentration thresholds within the total or market-wide visible order book. The orders are offers to buy or sell securities that a securities market trader may place on a trading system. Traders may place high volumes of offers on the systems within millisecond or microsecond intervals. Offers may be made visible, where they can be seen by other market participants on public trading venues, or hidden where they are concealed from other market participants until a matching counterparty appears on the system and the order is executed. Offers may be extremely short-lived, in the order of milliseconds or microseconds, but these can still impact on the market price of the security. Offers to buy a security can exert upward pressure on the price of the security as an offer to buy creates the impression of demand. Conversely, offers to sell can exert downward pressure on the security's price as an offer to sell creates the impression of supply for the security.

7 The present invention allows for the automated analysis of both local and market-wide order book data to detect compliance-related events and allows the presentation of useful order book data related to the detected compliance-related event. This includes providing a user with the ability to move through a combined stream of local order and market-wide order states in graphical and table formats before, during and after the compliance related event. A graphical example as provided in Fig 8A of the specification is shown below.

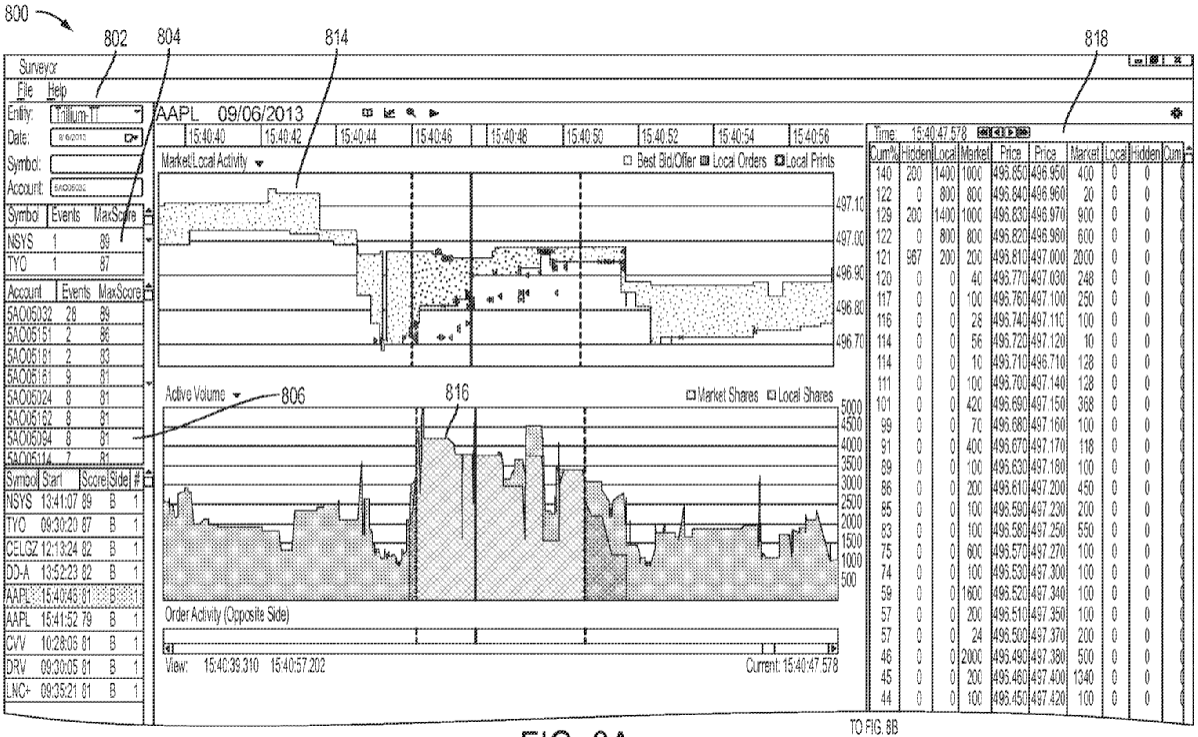

FIG. 8A

8 In the embodiment shown above a stream of price information for both market and local orders is shown at 814 and a corresponding stream of volume information

shown for local and market orders at 816. The display allows a user to view the trading activity and events for a particular account at a specific time. Ms Driver noted that the local and market wide updates would not necessarily be synchronised however the invention will base its analysis on the latest available local order update. Control box 802 allows the user to select a particular aspect to view including compliance events determined by for example the concentration of local orders on the market as a whole. A score can be determined for the significance of each event and the user can then view the stream of price and volume information around that event.

9 An order book can contain consolidated data regarding both offers to buy and offers to sell for either an individual account or an entity's aggregated visible local book (all accounts associated with an entity), as shown below. A local book can be presented side-by-side with a global or market-wide order book at a particular time for a particular account. This is shown further below.

[0076] Entity's Aggregated Visible Local Book:

Bid		Offer	
Shares	Price	Price	Shares
1000	20.63		
2000	20.62		
1000	20.60		
2000	20.59		
1000	20.58		

Local book side-by-side with the global (total) market book:

Bid			Offer		
Total Shares	Local Shares	Price	Price	Local Shares	Total Shares
1000	1000	20.63	21.09	0	300
2000	2000	20.62	21.15	0	600
500	0	20.61	21.18	0	1000
1500	1000	20.60	21.22	0	200
2000	2000	20.59	21.24	0	500
2000	1000	20.58	21.25	0	100
500	0	20.57	21.26	0	100
300	0	20.56	21.27	0	300
600	0	20.55	21.28	0	200
100	0	20.54	21.13	0	1100

10 The applicant filed amended claims on 21st February 2017 together with skeleton arguments. The amended claims include independent claims 1 and 14 directed respectively to a computer-implemented method and a computer system for detecting compliance events. These read as follows:

1. *A computer-implemented method for automated detection of events in data streams in a compliance computer system, comprising:*

in the compliance computer system, receiving market-wide order data from a plurality of different sources of marketplace data, wherein the market-wide data comprises a market-wide history of market-wide order book states in correspondence with an incrementing external timestamp;

consolidating the market-wide order data from the different sources into a consolidated stream of order book states;

storing the consolidated stream of market-wide order data in a first database;

in the compliance computer system, receiving local order data, wherein the local order data comprises data that identifies local order book states and a corresponding local timestamp, and wherein at least a portion of the local order book data comprises a history of local orders in correspondence with the local timestamp and including one or more hidden local orders, which are received from a source external to the different sources of marketplace data;

storing the local order data in a second database;

receiving a list of accounts corresponding to local order activity at the compliance system;

implementing a compliance event detection module in the compliance system;

in the compliance computer system, applying the compliance event detection module to the stored local order data and market-wide order data, comprising at the time of a market update:

retrieving based on the local timestamp at least one account's local order book data for a listed security at the market update time;

integrating a portion of the market-wide order data and a portion of the local order data for the listed security into a combined stream of local order and market-wide order states;

comparing, at the market update time, the state of the at least one account's local order book in a listed security to the state of the market-wide order book in that listed security;

in response to comparing, identifying a concentration of the local order book on one side of the order book;

identifying an individual compliance event, by applying a plurality of factors to the state of the account's local order book in the listed security and the state of the market-wide order book in the listed security, and in response, identifying a compliance-related event based on the identified concentration, one or more local orders by the account or a related account on the other side of the order book, and one or more compliance threshold requirements that are variable based on the particular listed security;

generating a score in association with the compliance-related event, wherein the score represents a corresponding level of significance of the event, and

providing a user-interactive interface that displays a view of the combined stream of local order and market-wide order states during the compliance-related event, marks the compliance related event, and provides a user with the ability to sequentially select to move through the stream and view the combined stream in graphical and table formats before, during, and after the compliance-related event.

14. *A computer compliance system for automatically detecting events in data streams, comprising:*
a market order component that is configured to:

receive market-wide order data from a plurality of different sources of marketplace data, wherein the market-wide data comprises a market-wide history of market-wide order book states in correspondence with an incrementing external timestamp;
consolidate the market-wide order data from the different sources into a consolidated stream of order book states;

a first database that is configured to store the consolidated stream of market-wide order data;

a local order server that is configured to:

receive local order data, wherein the local order data comprises data that identifies local order book states and a corresponding local timestamp, and wherein at least a portion of the local order book data comprises a history of local orders in correspondence with the local timestamp and including one or more hidden local orders, which are received from a source external to the different sources of marketplace data;
receive a list of accounts corresponding to local order activity at the compliance system;

a compliance event detection module that is configured to:

apply compliance event detection to the stored local order data and market-wide order data at the time of a market update, by:
retrieving, based on the local timestamp, at least one account's local order book data for a listed security at the market update time;
integrating a portion of the market-wide order data and a portion of the local order data for the listed security into a combined stream of local order and market-wide order states;
comparing, at the market update time, the state of the at least one account's local order book in a listed security to the state of the market-wide order book in that listed security;
in response to comparing, identifying a concentration of the local order book on one side of the order book;
identifying an individual compliance event, by applying a plurality of factors to the state of the account's local order book in the listed security and the state of the market-wide order book in the listed security, and in response,
identifying a compliance-related event based on the identified concentration, one or more local orders by the account on the other side of the order book, and one or more compliance threshold requirements that are variable based on the listed security;
generating a score in association with the compliance-related event, wherein the score represents a corresponding level of significance of the event;

a second database that is configured to store the local order data; and

a viewer component that is configured to provide a user-interactive interface that displays a view of the combined stream of local order and market-wide order states during the compliance-related event, marks the compliance-related event, and provides a user with the ability to sequentially select to move through the stream and view the combined stream in graphical and table formats during the compliance-related event.

11 The only difference between the claims, except that one is directed to a method and the other to apparatus, is that the end of claim 1 refers to viewing the combined stream "before, during and after the compliance-related event" whereas claim 14 refers merely to doing this "during the compliance-related event". Nothing I believe turns on this in relation to the matter before me.

The Law

12 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 with added emphasis below:

> *1(2) It is hereby declared that the following (amongst other things) are not inventions for the purpose of the 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 provisions shall prevent anything from being treated as an invention for the purposes of the Act only to the extent that a patent or application for a patent relates to that thing as such.*

13 As explained in the notice published by the UK Intellectual Property Office on the 8th December 2008[1], the starting point for determining whether an invention falls within the exclusions of section 1(2) is the judgment of the Court of Appeal in *Aerotel/Macrossan*[2].

14 The interpretation of section 1(2) has been considered by the Court of Appeal in *Symbian*[3]. *Symbian* arose under the computer program exclusion, but as with its previous decision in *Aerotel* the Court gave general guidance on section 1(2). Although the Court approached the question of excluded matter primarily on the basis of whether there was a technical contribution, it nevertheless (at paragraph 59) considered its conclusion in the light of the *Aerotel* approach. The Court was quite clear (see paragraphs 8-15) that the structured four-step approach to the question in *Aerotel* was never intended to be a new departure in domestic law; that it remained bound by its previous decisions, particularly *Merrill Lynch*[4] which rested on whether the contribution was technical; and that any differences in the two approaches should affect neither the applicable principles nor the outcome in any particular case.

15 Subject to the clarification provided by *Symbian*, it is therefore appropriate to proceed on the basis of the four-step approach explained at paragraphs 40-48 of *Aerotel* namely:

> *(1) Properly construe the claim.*

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[1] http://www.ipo.gov.uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer.htm

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

[3] *Symbian Ltd v Comptroller-General of Patents*, [2009] RPC 1

[4] *Merrill Lynch's Appn*. [1989] RPC 561

(2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution).

(3) Ask whether it falls solely within the excluded matter.

(4) If the third step has not covered it, check whether the actual or alleged contribution is actually technical.

Applying the Aerotel test

Step 1 - Properly construe the claim

16 For the purposes of this decision no real issues of construction arise. It should be noted however that the consolidation of market-wide order data is completed on an individual security basis.

Step 2 - Identify the actual contribution

17 Guidance on how to identify the contribution is given in paragraph 43 of the *Aerotel* judgment where the court accepted the proposition that identifying the contribution is an exercise in judgment probably involving consideration of the problem said to be solved, how the invention works and what its advantages are. Identifying what has the inventor really added to human knowledge perhaps best sums up the exercise.

18 Ms Driver highlighted three main contributions: These are:

- that the marketplace data is consolidated into a single stream of order book states per instrument;
- that the marketplace data and local data are integrated to compare them at a reference time; and
- that the compliance event can be viewed based on the time of detection by a user interacting with the data.

19 There was also a fourth, overriding, contribution which was that the invention allowed the accurate detection of compliance-related event in order book data.

20 With respect to the consolidation of the marketplace data into a single stream of order book states per instrument, Ms Driver explained that the market-wide order data was obtained from multiple sources, each with their own clock which is used to apply timestamps to the order data from that source. The market-wide order data comprises a market-wide history of market-wide order book states in correspondence with an incrementing time stamp. The market-wide order data from one external source is consolidated with the market-wide order data from other external sources. The consolidated stream of market-wide of order book states can then be stored.

21 Ms Driver noted that the market-wide order data could be high volume (perhaps a billion events a day) and high speed. However, I note that there is very little disclosure in the application as filed regarding the problems associated with handling this volume and speed of data and how these are overcome.

22 The integration of the marketplace data and local data is necessary to enable them to be compared so as to detect particular events within the data streams. Such comparison is undertaken at a “reference time” which according to the claims is at a market update time. The description notes that the market update includes market data for the instruments that were traded by any one of the listed accounts received previously by the system. At the hearing Ms Driver suggested that the update time was simply a time that the system “understood”.

23 The third aspect of the contribution suggested by Ms Driver relates to the user interactive interface which allows the presentation of the combined stream of local order market-wide order states during a compliance related event, marks the compliance-related event and provides the user with the ability to move through the stream, in relation to time. This relates to the fact that the invention provides order state data to the user in a particular format and allows the user to view the order state data at different times.

24 I noted at the hearing that this potentially may fall into the category of the presentation of information however no previous objection under this category has been raised by the examiner. I advised Ms Driver that I would ask for submissions if I thought that this aspect of the invention was important and if my decision was likely to turn on it. In the event that was not necessary.

25 I should add that Ms Driver also put forward the argument that the invention constituted a new arrangement of hardware. She highlighted that the invention has inputs from a number of different sources of marketplace data with each source having an individual clock. The feature of the external sources having their own clocks is not found in the independent claims, but rather is found in the dependent claims, claims 13 and 26 for the method and system respectively. At the hearing I put it to Ms Driver that, at least partially, the hardware was being characterised by the nature of the data being processed, rather than the hardware exclusively of itself. She accepted this but still maintained that the invention was a new arrangement hardware. I do not believe that having a computer (in the claimed invention: a compliance computer system) that receives inputs from a number of external computers can be said to be a new arrangement of hardware of itself as networks of computers are notorious. From the specification as a whole I cannot see any evidence that there is any new arrangement of hardware. For instance paragraphs 35 to 42 of the description make it clear that the invention can be implemented within a standard computer system. There is in my opinion no contribution in the arrangement of hardware used in the present invention.

26 Ms Driver was also keen to explain the commercial context of the invention in particular she considered this was helpful to understand the true contribution provided by the invention especially in terms of how it consolidates the market wide order data. She referred me to a number of articles and I was also provided with an affidavit by Mr Michael Friedman, one of the named inventors and also General Counsel and Chief Compliance Officer of the applicant. Mr Friedman highlights the advantages of the invention over the existing systems with particular emphasis on how the order books are consolidated.

27 I have carefully considered the specification as a whole and the various arguments advanced. As a result I believe that the alleged contribution made by the present invention is:

> a computer-implement method of processing both market-wide order data from a plurality of different sources and local order data including consolidating marketplace data into a single stream of order book states per instrument; applying a compliance event detection process to detect compliance-related events with respect to a local account's order book, which includes integrating the marketplace data and local data in order to compare them at a reference time and generating a score in relation to an identified compliance-related event; and presenting a user-interactive interface to a user that allows a user to view the order book data around the time of the identified compliance-related event.

Step 3 - Ask whether it falls solely within the excluded matter

A scheme, rule or method for doing business

28 Ms Driver suggested that the general manipulation and synchronisation of data was patentable and that the examiner had been mistaken in objecting to the invention as a scheme, rule or method for doing business, as such. She argued that this objection had been raised based on the nature of the data being processed in the invention. It was argued that support for this submission could be found in the Hearing Officer decision of *Apple Inc*.[5] In this decision the Hearing Officer found that claims directed to a method of synchronising data and a synchronisation server did not have a contribution that could be fairly characterised as solely a scheme, rule or method for doing business as such. Rather the Hearing Officer found that the contribution to data processing was broader than just a method of doing business, as such. It is however clear that the Hearing Officer in *Apple Inc* reached this conclusion because he was satisfied that the invention as claimed there was not characterised by the nature of the data being processed. He did however go on to find that the invention claimed in that application was excluded as a program for a computer, as such. In contrast it is apparent that the present invention relates only to the manipulation and synchronisation of financial data in terms of the local order book data and the market-wide order data. Hence the reasoning used in *Apple Inc* regarding the business method exclusion is not applicable here.

29 Further, Ms Driver submitted that the present invention related to a method of analysing data streams and that no business is being done in the claimed invention. Rather the invention relates instead to a method for the detection of a compliance event. I do not find that this is a convincing argument. The invention specifically concerns the detection of compliance events relating to orders of a financial security. This is in my view clearly a method of doing business within the meaning of the exclusion. I would add that it is well established that the exclusion is not limited to completed transactions. The example of double entry bookkeeping is often cited in this respect as is the idea of having "in", "out" and too difficult" trays[6].

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[5] *Apple Inc.*, BL O/244/13 (GB1016416.8)
[6] Aerotel paragraphs 64-71

30 Ms Driver also maintained that as the present invention involved the use of a user-interactive interface, a piece of technology around a user interface, the invention could not be excluded as solely relating to a scheme, rule or method for doing business, as such. I am not convinced by this line of argument. What matters is what the interface is being used for and how it is being used. In this case the user interface allows a user to analyse market related data including local market data at a particular time to determine if a compliance related breach has occurred. This is, as I have already noted, a method of doing business and the fact that the invention provides a user interface to facilitate this does not save the invention.

Program for a computer

31 Having reached the above conclusion relating to the business method exclusion, I do not have to consider whether the present invention falls foul of the computer program exclusion. However, because the matter was discussed in the examination reports and in the responses, skeleton argument and at the hearing, I will consider it briefly.

32 Ms Driver sought under this head to rely on the judgment of *Raytheon*[7]. The invention there related to a system that provided an interactive graphical map of a layout of a facility. Kitchen J, as he was then, split the contribution into three parts. One of these parts related to the provision of a method of managing inventories and stock control that relied on visual rather than textual representations. This was found to have "a character that exists quite independently of whether it is implemented on a computer" and as such was not a computer program. It was however found to be both a business method and the presentation of information.

33 Ms Driver argued that notwithstanding that the invention would typically be carried out on a computer given the high volume and speed of the data, the method by which the data is consolidated could in principle, and similar to the method in *Raytheon,* be implemented without a computer. I am not convinced that the method here could in practice be implemented outside of a computer given the complexity and volume of data. Hence I believe the invention here does depend on computer implementation and hence therefore falls within the computer program exception. I would add that the invention in *Raytheon* also included a user interface and that this was found to be merely an element of the program design and hence excluded as a computer program.

34 I was also directed under this head to the signposts as set out in *AT&T Knowledge Ventures/Cvon Ltd*[8] as clarified in *HTC Europe Co Ltd v Apple Inc*[9]. 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;

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[7] *Raytheon Company v Comptroller General of Patents, Designs and Trade Marks* [2007] EWHC 1230 (Pat)
[8] *AT&T Knowledge Ventures/Cvon Ltd* [2009] EWHC 343 (Pat)
[9] *HTC Europe Co Ltd v Apple Inc* [2013] EWCA Civ 451

iii) whether the claimed technical effect results in the computer being made to operate in a new way;
iv) [whether] the program made 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.

35 I note that the signposts are mere guidelines to assist in the consideration of whether a computer related invention makes a technical contribution and that they should not be applied in a prescriptive manner.

36 Ms Driver's submissions were that the signposts were not particularly helpful for this type of invention, since the contribution is not a computer program. She added that the signposts were more useful where the contribution is a computer program and you are attempting to determine whether it is the kind of computer program that is patentable. However, Ms Driver submitted that the first and fifth signposts were satisfied. It was argued that the underlying method of manipulating messages and reformatting them, based around time, and presentation of the user-interactive interface and the ability to look on either side of a compliance event was an effect that was outside of the computer, because the user can interact with the display and that the invention solved the problem of monitoring traders. I do not agree. Processing data based around time stamps even where they are not synchronised, is in my opinion a routine data processing task and there is no technical effect based upon this. The use of a user-interactive interface is also not a relevant technical effect since virtually all computer programs with a user interface have some user-interactivity. Further whilst the perceived problem is addressed, the problem itself is a business problem. It does not lend itself to a technical contribution.

37 Hence I believe that the invention is also excluded from patentability by virtue of section 1(2) as a program for a computer, as such.

Step 4 - Check whether the actual or alleged contribution is actually technical

38 I have already considered this when considering step 3.

Possible saving amendment

39 Ms Driver sought to highlight the use of unsynchronised time-stamps which is found in claims 13 and 26 for the method and system respectively. Ms Driver stated that using time as a reference and having an interactive interface based on time provides a physical and real-world effect. She sought to draw a distinction with the invention found to be excluded in *Bloomberg*[10]. The invention in *Bloomberg* related to the downloading and distribution of streams of financial data from a financial data source to one or more networks or computer systems where the data could be subjected to further processing. The data sent by the data source could be modified by the data source into a format according to user specifications based on the applications they use. I am not convinced that this case helps Ms Driver as the facts are so different. Further I can see nothing in the inventions in claims 13 or 26 that would provide the necessary technical contribution nor in the additional claims 27-29 which relate to

[10] *Cappellini & Bloomberg, Re* [2007] EWHC 476 (Pat)

how the messages updating the data streams are handled and how the local and market data are displayed.

Decision

40 I have found that the contribution made by the invention defined by the claims falls solely in matter excluded from patentability by virtue of section 1(2)(c) of the Act, namely a program for a computer and a scheme, rule or method for doing business.

41 Having carefully considered the specification as a whole, I can see nothing that could be reasonably expected to form the basis of a valid claim. I therefore refuse this application under section 18(3).

Appeal

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

Phil Thorpe

Deputy Director, acting for the Comptroller