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(74) Representative:  
**Faggioni, Carlo Maria, Dr. Ing. et al**  
**Fumero**  
**Studio Consulenza Brevetti**  
**Pettenkoferstrasse 20-22**  
**80336 Munich (DE)**

(71) Applicant: **Eximia S.r.l.**  
**20154 Milano (IT)**

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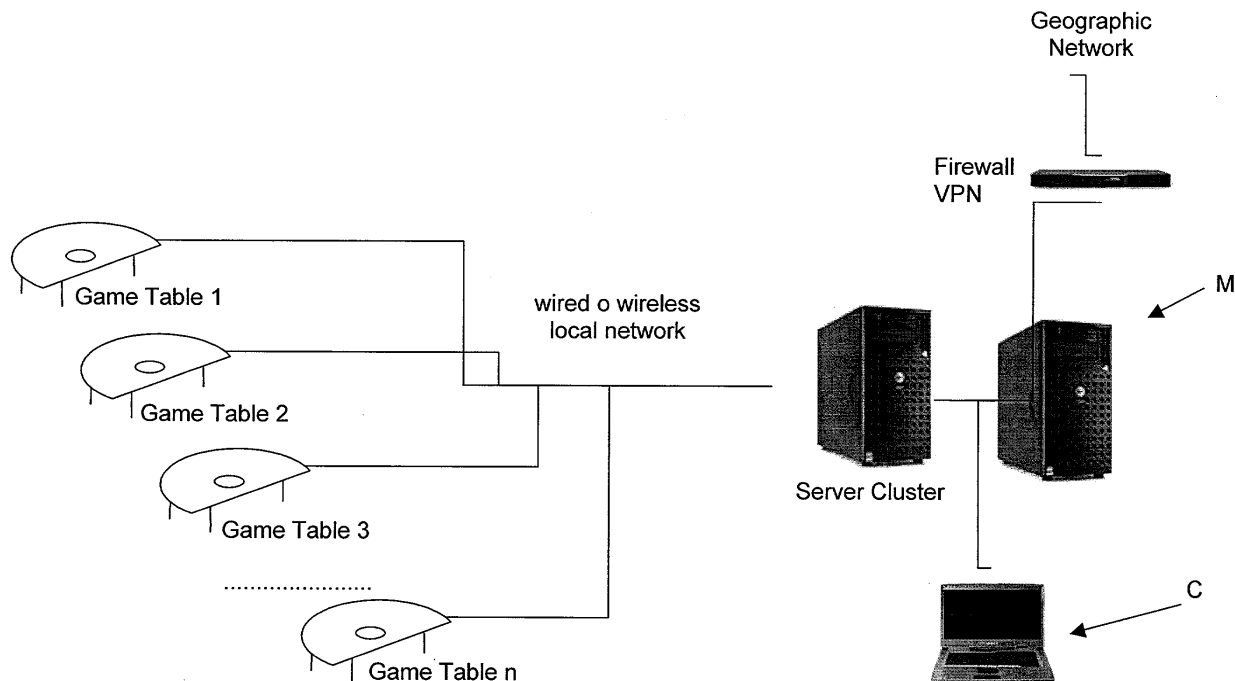
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(72) Inventor: **Di Floriano, Mario Dino**  
**20136 Milano (IT)**

(54) **Accounting system for gambling houses and method therefor and gambling chips and table for said system**

(57) A system and an accounting method for gambling houses is disclosed, wherein the gambling chips incorporate a remotely-readable passive-type transponder TAG, provided with an own unique identification

mark and with an exchange value mark, and the gambling tables have at least one reading antenna for said transponder TAGs, of a preset sensitivity level, capable of transmitting to an accounting computer the representative data of said marks detected in the chips.



**Fig. 2**

## Description

### Field of the invention

**[0001]** The present invention relates to an accounting system for gambling houses, in particular it relates to a system for the automatic and real-time accounting for one or more casinos belonging to the same operator.

### Background of the invention

**[0002]** As known, in casinos there is an intense flow of gambling chips (the equivalent of money) between the cashier's cage, where the gambling chips are issued against current money, and the individual gambling tables, and vice versa. Typically, upon entering a gambling house, the player changes his money into gambling chips, which he can then use at the various gambling tables; upon leaving the gambling house, the player redeems again the left-over chips against money in the legal currency.

**[0003]** Therefrom derives that a significant part of the work carried out in a gambling house consists in the counting of the gambling chips, in order to establish the net worth of the total inbound/outbound flow, i.e. the gain obtained. These accounting operations are obviously performed at the end of the day or at the end of each work shift, when the transactions at the gambling tables and at the cashier's cage are finished: for this purpose automatic chip-counting machines already exist, possibly interfaced with computers capable of supplying useful information.

**[0004]** However, this system is time-consuming as well as being rather complex (grouping of the chips according to their value is often carried out by hand). Besides, it does definitely not allow the continuous monitoring of the chip flow over time, i.e. the accounting result cannot be viewed moment by moment, nor - even less so - can the performance of the individual activities (black-jack, roulette, dice, etc.) or of the individual croupier inside the gambling house itself be assessed, if not at the cost of subsequent long and complex calculations.

**[0005]** Instead, the Applicant could notice that this would be extremely desirable, not only for statistical purposes, but also for a variety of other purposes, such as personnel assessment, security, and marketing. For example, to learn in real time the statement of account of each individual gambling table, but also to verify whether there are temporary abnormal circumstances (heavy losses or large winnings, or abnormal increases in the cash flow), or to alert the central cashier's cage in time when the cash desk of a gambling table is about to run out of chips. Again, by monitoring the accounting of an individual gambling position, it is possible to carry out marketing actions targeted at the individual player, too.

**[0006]** Furthermore, the above described chip/money flow is complicated by two further elements, which ex-

tend chip circulation also beyond the individual casino. A first element is the fact that the player occasionally takes some chips outside the gambling house, both to indulge a collecting urge, and to use them again at a later time. A second element is the possibility of using the same gambling chips in different gambling houses - possibly located miles away from each other - belonging to the same casino chain.

**[0007]** These two variables of the chip handling flow are not only considered perfectly legal, but are also commonly taken into account by the gambling house management during accounting calculations and in in-house statistics. However, as is understandable, it is extremely difficult to precisely gauge these phenomena, since they elude direct and univocal cash desk accounting; besides, it is unthinkable to have an instant reading thereof, and hence, for statistical purposes, only a long-term mediated assessment thereof can be reached.

**[0008]** In gambling houses, systems have already been introduced that are capable of automatically detecting and recognising gambling chips lying on gambling tables, which systems use remote-reading devices based on optical technology (photo-sensors) or radio frequency (RFID). Pertaining thereto, for example US-A-5941769, US-B1-6514140, and W096/14115 may be referred to.

**[0009]** However, these known systems deal with aspects relating to gambling and winning legality and teach to exploit remote-detection technology for such specific purposes. Furthermore, the systems known so far are of the stand-alone type, i.e. they are structured and "self-contained" on the individual gambling table.

**[0010]** The object of the present invention is instead to provide a system and an automatic accounting method for gambling houses which, through an original exploitation of RFID technology, simultaneously overcomes all the above described drawbacks. In particular, a system is intended to be supplied which allows real-time accounting of the flow of gambling chips inside a single casino, as well as in a plurality of casinos belonging to the same chain, accounting in the same manner the flow of gambling chips relating to an individual gambling activity (i.e. at the desk of the single gambling table) and, within this, relating to a single gambling position. Finally, gambling chips and tables are intended to be provided alongside the equipment necessary to implement a real-time automatic accounting system.

**[0011]** Such objects are achieved through a system, a method, and the components as described in their essential features in the attached main claims.

**[0012]** Other inventive aspects of the system and method are described in the dependent claims.

### Brief description of the drawings

**[0013]** Further features and advantages of the system and method according to the invention will in any case become apparent from the following detailed description

of a preferred embodiment of the same, given by way of example and taken in conjunction with the following accompanying drawings, wherein:

- fig. 1 is a diagrammatic view of a gambling table according to the invention;
- fig. 2 is a diagrammatic view of an embodiment of the accounting system of the invention; and
- fig. 3 is a diagrammatic view of a preferred embodiment of the invention.

#### Description of some preferred embodiments

**[0014]** The system devised by the Applicant provides that, inside gambling chips, one or more transponder TAGs are embedded, in particular passive RFID (Radio Frequency Identification) components.

**[0015]** Such RFID components are known per se (please see, for example, those identified in standards ISO 14443 e ISO 15693) and basically consist of a standard microchip, operating at radio frequency (low frequency 100 - 150 kHz, medium frequency 13.5 MHz, or high frequency 2.5 - 5 GHz), provided with a pertaining spiral aerial, all of which may be supported by a carrier of various nature.

**[0016]** The prerogative of this technology lies in the fact that inside a very small chip (both in terms of width and thickness), advantageously of a passive type (i.e. not powered), it is possible to store a series of data - in particular a univocal identification number (ID) (for example a 128-bit code) as well as other data in a specific additional memory area (for example a 256-bit memory area) - which can then be remotely read (within a range of about 15-100 cm) energising the spiral aerial through the electro-magnetic field generated by specific reading antennas.

**[0017]** The unique identification number, also called RFID serial number, is preset by the manufacturer, whereas the end user can determine and customise (during the assembling phase or before use through writing/rewriting techniques) the contents of the additional memory area.

**[0018]** These RFIDs also have the advantage of being relatively impervious to environmental conditions and to radiofrequency noise, as well as being extremely inexpensive (of the order of a few tenths of a Euro).

**[0019]** RFIDs can also be divided into read-only types (type A) or read-and-write types (type B), but to the purpose of the present invention it is mainly important that the data contained in a passive-type microchip may be remotely read.

**[0020]** An exemplary RFID can have a plan extension of 1 mm<sup>2</sup> and a thickness of a few microns, hence it can easily be embedded in the thickness of a gambling chip, for example during the moulding stage of a plastic chip, or it can be inserted in a chip recess and sealed therein by applying resin or glue.

**[0021]** Each gambling chip is therefore uniquely iden-

tifiable through reading of its identification codes, which can be the RFID serial number and/or a code stored in the additional memory area.

**[0022]** The RFID additional memory area, according to the invention, contains at least a code or identification mark representing the chip exchange value. A series of further data may then be fed into such memory area, which may be of interest for the accounting of a gambling house: for example the type of chip, the casino to which it belongs, the year of manufacturing, and so on.

**[0023]** Besides, according to the invention, underneath or inside each gambling table T (fig. 1) are located one or more duly sensitive reading antennas A, i.e. sufficiently sensitive in order to detect the RFID TAGs of the individual chips F lying on the gambling surface. Typically, an exemplary sensitivity level may be of about 15 cm, so that all the chips lying within the space of the first 10 cm above the gambling surface may be detected.

**[0024]** Each antenna A is linked, through a wiring known per se, to a signal transducer L, which is in turn linked to a local computer PC. The local computer PC, placed underneath the table, is for example an industrial-type personal computer, equipped with an integrated operating system (Linux™, Windows® for Pocket PC or other) and with small memory-resident proprietary application software.

**[0025]** Each local computer PC is further linked to a local network (fig. 2) within the individual gambling house (for example a cable LAN or a wireless LAN). Within this local network is provided a master computer M (preferably in redundant cluster configuration) which collects, consolidates, processes, stores, and displays on a console C all the information that may be derived from the data coming from the antennas distributed in the gambling house.

**[0026]** In this way it is possible to read in real time the chip flow (at least in terms of their number and exchange value) of the chips travelling above the antenna A of each table, advantageously located, for example, in proximity with the table cash desk counting device.

**[0027]** According to a preferred embodiment, in each gambling table is provided an antenna in proximity with the cash desk counting device, one in proximity with the cash desk containing the croupier's tips, and one opposite each gambling position.

**[0028]** In this way, by means of suitable software implemented in the master computer of each casino, the system allows to have an automatic and real-time accounting not only globally of the individual gambling tables, but also of the individual gambling positions.

**[0029]** According to a further embodiment, the system further comprises a series of personal badges, into which are encoded an equal number of passive RFID TAGs, which are handed out to the players as soon as they enter the casino. Furthermore, the reading antennas placed opposite the gambling positions on the tables are directional and more sensitive (for example, they have a range of up to about 100 cm): it is therefore

possible to detect all the chips lying on the table in front of the player, as well as the individual badge worn by each player. The paring of these two types of information - to which the software implemented in the central accounting computer is deputed - allows to follow the movements of the individual player from one table to the other and to detect the flow of chips spent or won by him, without intruding into his privacy (the badge, as a matter of fact, is not customised, but simply identifies a unique player inside a casino).

[0030] The automatic accounting, complete and in real time, which may be carried out in the individual gambling house with the system according to the invention, may easily be extended to a plurality of gambling houses, in particular to the ones belonging to the same operator. Fig. 3 shows a diagram of a typical system comprising a plurality of gambling houses, linked to each other by a geographical network (for example a VPN with a series of redundant firewalls) and with a central server (or a plurality of cluster servers) where the software is implemented which carries out the proper accounting processing of the data, both the detailed one of the individual gambling house, and the consolidated one of the whole casino chain.

[0031] According to a further embodiment of the invention, the system provides to place a reading antenna also in proximity with the gambling house central cashier's cage, to be able to detect the flow of chips coming into and going out from the cash desk of the individual casino. This piece of information can be useful to establish how much of the exchange value of the chips exchanged during a certain time frame remained inside the same casino or is circulating outside it or inside other casinos.

[0032] By implementing a database of all the identification codes (RFID serial numbers) of the chips owned by the casino in the system of the invention, it is possible to keep track of the movements of each chip and therefore to have an extremely high accounting potential.

[0033] With the accounting system of the invention, for example, one can advantageously have a tool for an effective and timely exchange of information on the accounting flows between casinos which may also belong to different operators. This allows to offer the players increased "compatibility": one need only think of the possibility to accept chips of other operators (whose identity is stored in the form of a suitable code in the additional memory area of each RFID TAG) who can be informed in real time of the exchange value of the pertaining chips cashed in, for a consequent offsetting of book values.

[0034] As can be guessed, the system according to the invention allows to fully achieve the objects detailed in the preamble. In particular a series of advantageous results can be obtained, such as

- real-time accounting of the cash flows, for administrative and statistical purposes, in particular to verify

the active/passive condition, the flow speed and accelerations, the level of tips, abnormal behaviour;

- control over the individual gambling positions, or over the movement of players, to discover possible abnormal situations, or to carry out marketing actions targeted at specific tables or players;
- real-time update of the status of the table cash desk counting device, to promptly alert authorised personnel to fill and/or unload it;
- control over the quantities and the exchange value of chips entering and leaving the gambling house;
- real-time exchange of pertaining book values between different gambling house operators;
- a strong deterrent to chip counterfeiting: counterfeit chips are univocally identifiable by means of the RFID ID stored in the casino's own database.

[0035] It is understood, however, that the invention is not limited to the specific embodiments illustrated above, which represent only non-limiting examples of the scope of the invention, but that a number of changes may be made, all within the reach of a skilled person in the field, without departing from the scope of the invention.

[0036] For example, it is not strictly necessary that each gambling table be equipped with its own local computer, but a system could also be conceived as incorporating a single master computer receiving the signals arriving from the various transducers L of the antennas A located in the gambling house.

[0037] Besides, the individual reading antennas can be placed, as well as within the gambling tables, in a number of other positions inside the casino, according to the operator's specific requirements.

## Claims

1. An accounting system for gambling houses comprising at least a gambling table, a series of gambling chips usable at said gambling table, in each of said chips being embedded a remotely-readable passive-type transponder TAG, provided with a first unique identification mark and with at least a second exchange value mark, said gambling tables having at least a reading antenna for said transponder TAGs, of a predetermined sensitivity level, **characterised in that** the reading antennas of a plurality of gambling tables are linked to a central computer wherein the representative data of said first and second identification mark detected in each chip are transformed in accounting flows of the gambling house.

2. The system as claimed in claim 1), wherein said tables have at least one reading antenna located in proximity with the table cash desk counting device.

3. The system as claimed in claim 2), wherein said gambling tables further have a reading antenna in proximity with each gambling position.

4. The system as claimed in claim 2) or 3), wherein said gambling tables have a further reading antenna in correspondence with the position where bets are placed.

5. The system as claimed in any of the preceding claims, further comprising a reading antenna of said chip transponder TAGs in proximity of the gambling house central cashier's cage.

6. The system as claimed in any of the preceding claims, wherein a series of Badges equipped with respective, passive-type transponder TAGs is further provided, said further TAGs in turn being equipped with an own, remote-readable unique identification mark, the Badges being intended to be worn by the players.

7. The system as claimed in claim 6), wherein said tables have at least one directional antenna with a wider capacity range apt to detect the RFID TAGs embedded in said personal Badges worn by the players.

8. The system as claimed in any of the preceding claims, wherein each antenna is linked, through a transducer, to a local computer of the gambling table, all the local computers of a gambling house being linked to one another and with said central accounting computer by means of a local network.

9. The system as claimed in claim 8), wherein the local networks of a plurality of gambling houses are interlinked through a geographical network to which a general accounting computer can access capable of collecting the data of all the gambling houses and of carrying out an accounting process for each individual gambling house and/or a consolidated accounting operation for all the gambling houses.

10. A chip for an accounting system as claimed in any of the preceding claims, **characterised in that** it comprises a remotely-readable passive-type transponder TAG, provided with a first unique identification mark and with at least a second exchange value mark.

11. Chip as claimed in claim 10), wherein said transponder TAG is further equipped with an operator mark capable of identifying the chip owner.

12. Chip as claimed in claim 10 or 11), wherein said transponder TAG is embedded in the chip during moulding thereof with a plastic material.

13. A gambling table for an accounting system as claimed in any of the preceding claims, **characterised in that** it comprises at least one reading antenna for transponder TAGs, which is found below or inside it and is of a preset sensitivity level.

14. The table as claimed in claim 12), wherein said antenna is found in correspondence of a table cash desk counting device.

15. The table as claimed in claim 13) or 14), wherein said antenna is of such a sensitivity level that it is capable of reading within a range of 0-10 cm above the table gambling surface.

16. The table as claimed in claim 13), 14) or 15), wherein at least an antenna in correspondence of each gambling position is provided.

18. An accounting method for one or more gambling houses, **characterised in that** it comprises the steps of

- obtaining a reading of a first identification mark and of a second exchange value mark contained in RFID TAGs embedded in each chip in correspondence of at least the cash desk counting device of each of N gambling tables,
- transmitting said reading to an accounting computer for the N gambling tables,
- obtaining from said first identification mark the number of chips entering and leaving each of said counting devices,
- obtaining, at preset time intervals, an income value from the sum of said exchange value marks entering said counting devices,
- obtaining, at said preset time intervals also an outcome value from the sum of said exchange value marks leaving said counting devices,
- subtracting said outcome value from said income value to obtain a net value of the individual and global accounting flow of said counting devices for each of said preset time intervals.

19. The method as claimed in claim 18), further comprising the acquisition and processing of the same data with reference to each gambling position at the N gambling tables.

20. The method as claimed in claim 18) or 19), further comprising the simultaneous carrying out of the same steps in a plurality of gambling houses belonging to the same operator and interlinked by way of a network, to obtain a consolidated accounting flow.

21. The method as claimed in any of the claims 18) to 20), further comprising the steps of

- detecting an ownership mark of said RFID TAG for each chip;
- carrying out the steps of obtaining the accounting flow net value separately for different gambling house operators based on said chip ownership mark; 5
- transmitting to the operators said net book values which are of their competence.

**22.** A computer programme comprising computer programme code means suitable for performing all the steps of the claims 18)- 21) when run on a computer. 10

**23.** The computer programme as claimed in claim 22) embodied on a computer-readable medium. 15

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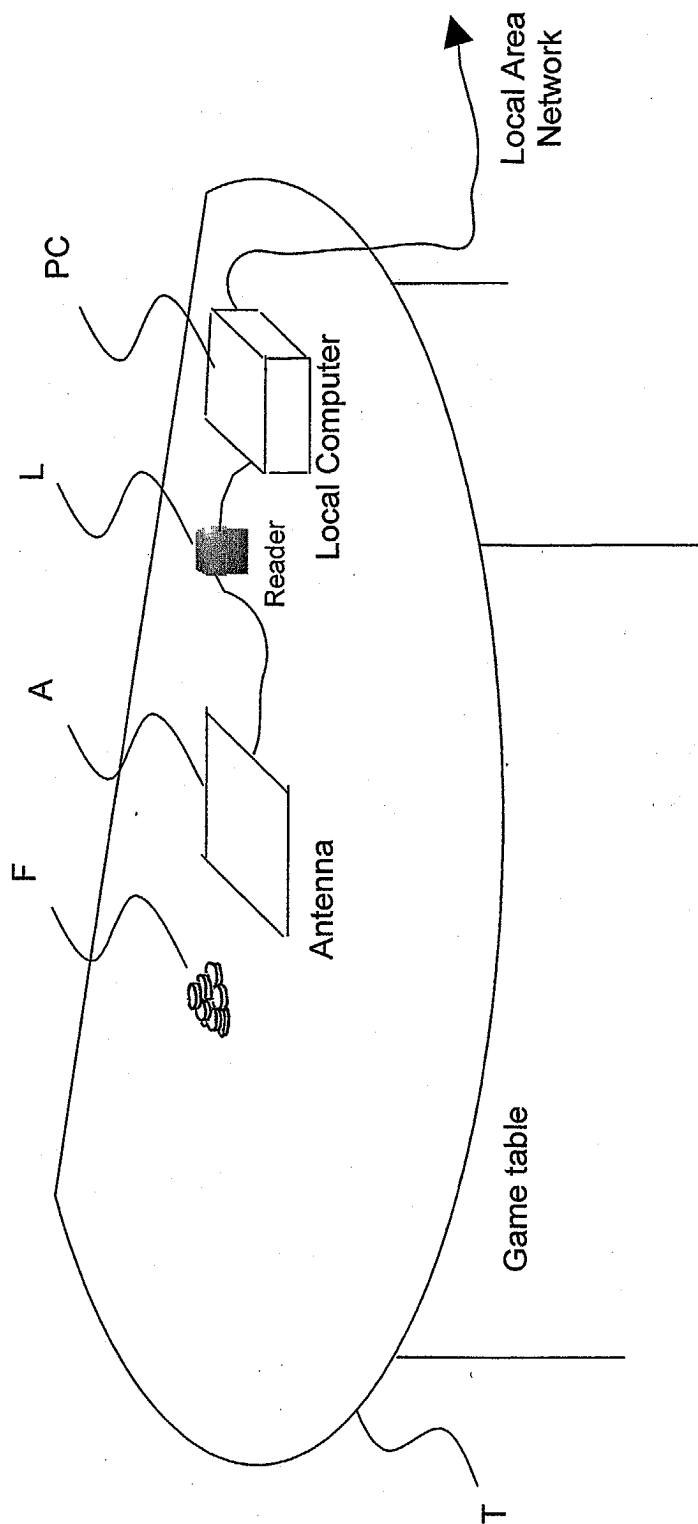
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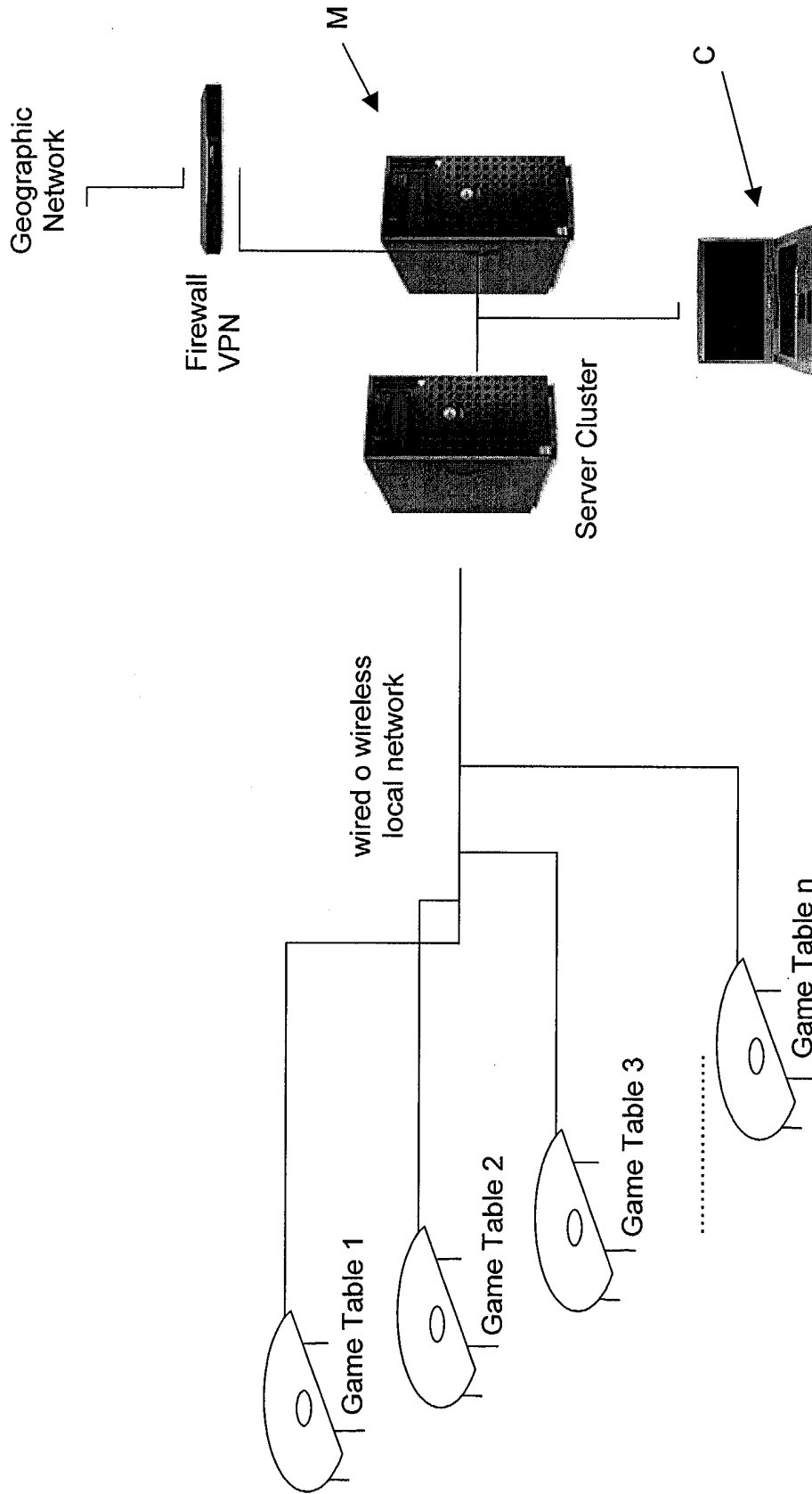
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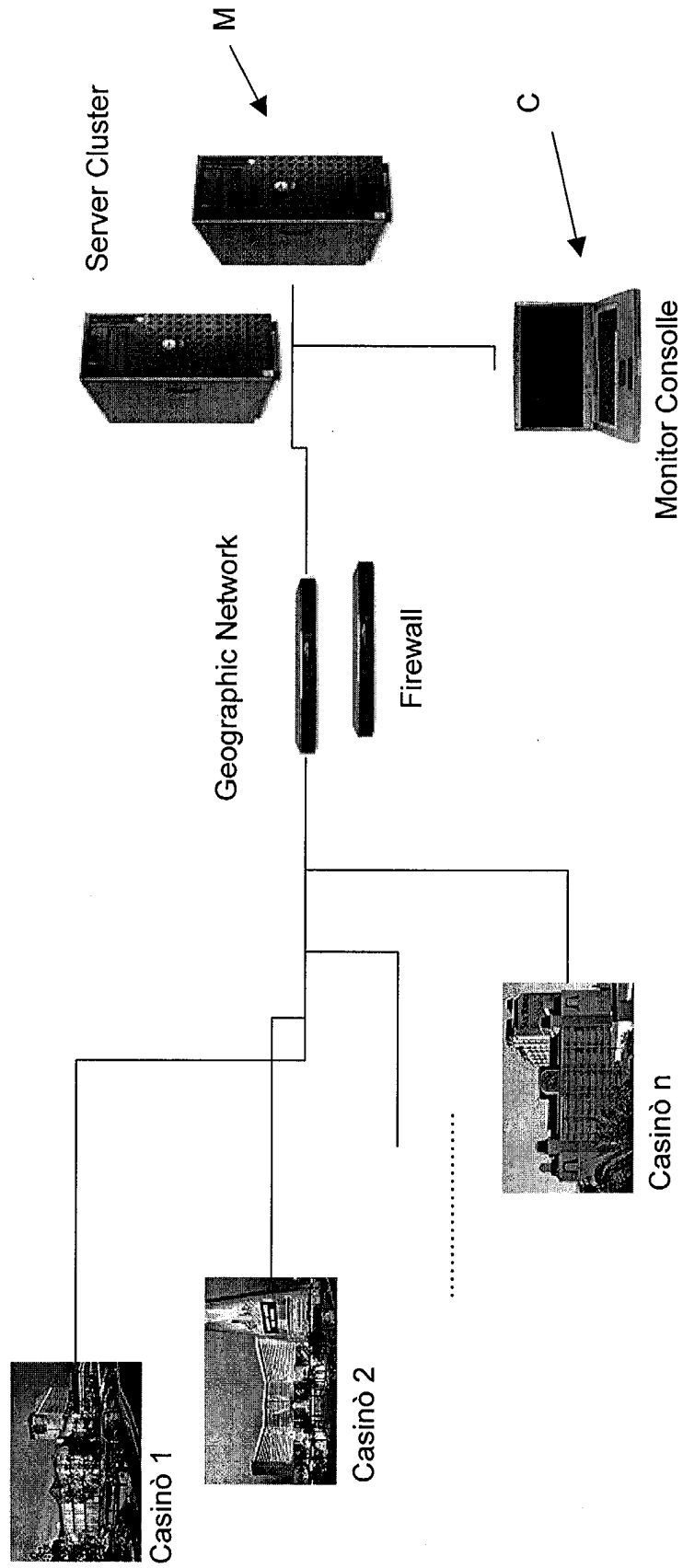


**Fig. 1**



**Fig. 2**





**Fig. 3**



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                              |                                                          |                                                             |
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| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Citation of document with indication, where appropriate, of relevant passages                                                                                                | Relevant to claim                                        | CLASSIFICATION OF THE APPLICATION (Int.Cl.7)                |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                              |                                                          |                                                             |
| Place of search<br><b>MUNICH</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                              | Date of completion of the search<br><b>16 March 2004</b> | Examiner<br><b>Breidenich, M</b>                            |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>.....<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                              |                                                          |                                                             |

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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