

A PLAYING CARD CARTRIDGE

Field of the Invention

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[01] The present invention generally relates to playing card cartridges adapted to be inserted in a card dealing device, and methods to deal cards from a card dealing device comprising such playing card cartridge.

10 **Background of the Invention**

[02] Card playing games are very popular in casinos and similar institutes. As the possible return on a placed bet is high, such card games are very vulnerable for potential fraud and cheating.

15 **[03]** A first source of potential fraud and cheating are arrangements made between dealer and players, e.g. signals being given in relation to the next cards being dealt. For this reason, it is made quite impossible for the dealer to see the next card when dealing. Sophisticated shoes and card dealing devices are made to prevent information on next card(s) to dealers and players.

20 **[04]** A further source of possible fraud and cheating can be the use of false cards which are entered in the set of cards, either during the game itself, or during production and transporting of the set of cards to the table where they are dealt.

[05] A next source of possible fraud and cheating is information of card rank and suit linked to minor defects visible on the cards itself. Such minor defects can be minor
25 colour deviations, deviations of printed pattern on the cards, minor deviation of the rectangular shape due to imperfect cutting of cards and alike. A high level of quality control is used to reduce or even take away any kind of card defects.

[06] Finally, a source of fraud or cheating is leaked information on the sequence
30 cards being present in the set of cards used during the game, which information is gained in the production process and during transport of the set of cards from card and set manufacturer, via locked area of casinos to the table where the set of cards is dealt.

To reduce the risk on leaking of information, the transport and production chain is kept as short as possible, both in time and distance.

Summary of the Invention

5 **[07]** It is amongst others an object of the present invention to further reduce the risk on leaking of information during transport of a set of cards from a card and/or set manufacturer, possibly via a locked area of casinos, to a table where the set of cards is dealt.

10 **[08]** According to a first general aspect of the invention, a playing card cartridge is provided, the cartridge comprising a container adapted to couple to a card dispensing shoe. The container defines a volume, and the container comprises a set of playing cards in the volume. The volume of the container, hence the cartridge, is sealed by one or more seals.

15 **[09]** The container comprises a top wall, a front wall and side walls, the top wall being slidably connected to the side walls and being adapted to slide towards the front wall, the top wall is prevented from sliding by at least a first seal, i.e. at least a first seal of said one or more seals. So the container comprises a top wall, a front wall and side walls, the top wall, after unsealing the cartridge, being slidably connected to the side walls and being adapted to slide towards the front wall, the top wall is prevented from
20 sliding by at least a first seal of said one or more seals.

25 **[10]** A seal is a closure that must be broken to be opened and that thus reveals tampering. The container being sealed hence means that the container cannot be opened without breaking at least one of the seals. When the container has been opened, this can always be noticed by the presence of at least one broken seal, traces of an opened seal, or by the fact the container itself is damaged, even broken.

30 **[11]** The cartridge is adapted to couple to a card dispensing shoe. The cartridge hence can be coupled to the card dispensing shoe without the need of any further device to link the cartridge and the card dispensing shoe, typically from a card dealing device.

[12] As the cartridge is adapted to couple to a card dispensing shoe, typically from a card dealing device, the dealer does not have to manipulate or have to be in contact with the set of cards in the container in the period between receiving the cartridge at the playing table and starting the game by dealing the cards from the cartridge. Even
5 more, the cartridge can be sealed at the manufacturing facility where the set of cards is made and inserted in the cartridge. Hence nobody is to contact the cards of the set of cards during the transportation of the set of cards between manufacturer and playing table, during which period the cartridge stays sealed. The cards, after the cartridge is sealed, never leave the cartridge, other than when actually pulled one by one by via
10 the card dispenser. As the cartridge is sealed, no one can have insight or can even touch or manipulate the cards during this transportation period. So no one can gather information on the sequence and identity of the cards in the set of cards during transportation from the manufacturer of the set until the game starts with dealing the first card from the set of cards at the playing table. Immediately before inserting the
15 cartridge in the card dispensing shoe, typically from a card dealing device, the cartridge can be unsealed by removing at least one of the seals. In the alternative, the cartridge is inserted in the card dispensing shoe, after which the cartridge is unsealed by removing at least one of the seals.

[13] The seals used can be any kind of seal, such as security seal tape, or the
20 cartridge can be sealed with lead and/or wax, or any combination of such seals.

[14] The container can be provided from polymeric material, such as thermoplastic polymer like polypropylene (PP), or thermoset polymer like polycarbonate (PC), acrylonitrile butadiene styrene (ABS) and mixtures thereof, such as PC/ABS mixtures. Preferably the cartridge is composed from one or more injection molded pieces.
25 Several walls or elements may be part of one injection molded piece. The volume of the container may be provided by the combination of several walls, such as a bottom wall, two side walls, a back wall, a front wall, and a top wall. One of the walls, preferably the front wall, is provided with an exit means to allow cards in the volume to be drawn out of the volume once the cartridge is unsealed. As an example, the container may
30 comprise a top wall, a bottom wall, two side walls, a back wall and a front wall, the bottom wall, two side walls and the back wall forming one integral piece, such as an injection molded piece. The container may partially be transparent, i.e. some walls may

be transparent, translucent, opaque or untransparent, either a part of this wall or the complete wall.

[15] According to a first particular facet of the first general aspect of the invention, a playing card cartridge is provided, wherein the container comprises a top wall, a front wall and side walls, the top wall being slidably connected to the side walls and being adapted to slide towards the front wall, the top wall being prevented from sliding by at least a first seal. Hence upon breaking this first seal, the top wall may slide in view of the side walls. According to some embodiments, the lower rim of the top wall being oriented towards the front wall and the upper rim of the front wall being oriented towards the top wall, the lower rim of the top wall may extend over the upper rim of the front wall.

[16] The seal prevents any sliding of the top wall towards the front wall in view of the side walls to which it is slidably engaged or connected. The provision of the lower rim of the top wall extending over the upper rim of the front wall prevents cards to be slipped at a slit which may possibly be present along the contact of both rims. If the top wall is adapted to slide towards the back wall as well, this seal may prevent any sliding of the top wall towards the back wall in view of the side walls to which it is slidably engaged or connected. In the alternative, if the top wall is adapted to slide towards the front wall as well, a first seal may prevent any sliding of the top wall towards the front wall, a second seal may prevent any sliding of the top wall towards the back wall. Sliding towards the back wall may be used to free the space in the front end of the container in order to load the container with the set of cards to be played during manufacturing of the cartridge. During transport and playing of the game, it is necessary to prevent this backwards sliding of the top wall, as this may provide possibilities to unauthorized handling of cards being present in the cartridge after being unsealed.

[17] The cartridge being sealed hence means that the top wall covers the opening defined by the side walls and the front and back wall of the container in sealed condition. After unsealing the cartridge, the top wall may slide under particular conditions. The top wall, after unsealing the cartridge, may still be prevented from sliding towards the front wall and/or back wall in case the relevant seal or seals preventing sliding of the top wall is not removed or broken, even though cards can be

removed from the cartridge. Or in the alternative, when the cartridge is coupled to a card dispensing shoe, the card dispensing shoe may hinder and prevent sliding of the top wall towards the front wall. In this case, optionally a second seal may prevent sliding of the top wall towards the back wall.

- 5 **[18]** According to some embodiments, the upper rim of the top wall being oriented away from the front wall, a pushing means to push the playing cards towards the front end of the container is provided in the volume of the container, the cartridge comprises a stopping means to prevent the upper rim of the top wall to slide beyond the pushing means.
- 10 **[19]** According to some embodiments, in case the upper rim of the top wall being oriented away from the front wall and a pushing means to push the playing cards towards the front end of the container being provided in the volume of the container, the pushing means may comprise a stopping means to prevent the upper rim of the top wall to slide beyond the pushing means
- 15 **[20]** The pushing means may have a protrusion at its side oriented towards the top wall, the protrusion sliding in a recess present in the top wall. this recess in the top wall is provided along the length of the top wall but ends before the upper rim of the top wall. As such, the top wall can be slid to the front end of the cartridge, but the absence of the recess near the upper rim of the top wall prevents the top wall to slide further.
- 20 The protrusion will hit the end of the recess and block further sliding of the top wall. Possibly the recess in the top wall is provided along at least part of the length of the top wall. Preferably, the recess in the top wall is provided all along the length of the top wall.
- 25 **[21]** Hence, according to some embodiments, the stopping means may comprise a protrusion on the pushing means at the pushing means side oriented towards the top wall, the stopping means further comprises a recess present in the top wall, the recess in the top wall being provided along the length of the top wall and ending before the upper rim of the top wall, said protrusion on the pushing means sliding in said recess present in the top wall.
- 30 **[22]** According to some embodiments, the upper rim of the top wall being oriented away from the front wall, a pushing means to push the playing cards towards the front

end of the container being provided in the volume of the container, the top wall may comprise a stopping means to prevent the upper rim of the top wall to slide beyond the pushing means. The top wall may comprise a protrusion protruding inwards of the cartridge, such it extends further than the upper side of the pushing means oriented to
5 the top wall. As such, the top wall can be slid to the front end of the cartridge, but the protrusion prevents the top wall to slide beyond the pushing means. The protrusion will hit the backside of the pushing means and block further sliding of the top wall.

[23] Hence, according to some embodiments, the stopping means may comprise a protrusion at the inner side, e.g. at the upper rim, of the top wall, said protrusion
10 protruding inwards the cartridge such that the protrusion extends beyond the upper side of the pushing means. This upper side is oriented to the top wall.

[24] During use of the cartridge, cards are pulled out of the cartridge and the remaining part of the set of cards is pushed forward by the pushing means. The pushing means proceeds also forward in the cartridge. During playing of a game,
15 between the backside of the pushing means and the back wall, a new volume is created. Once the game is ended and the cartridge is again removed from the dealing device, the top wall may slide towards the front wall, opening the newly created volume behind the pushing means. Dealt cards can be gathered and put in this newly created volume behind the pushing means. The stopping means, which may e.g. be an inwards
20 projection on the top wall or an upwards projection on the pushing means, sliding in a recess in the top wall, will prevent the top wall to slide beyond the stopping means. The inwards projection on the top wall may extend in the volume deeper than the upper side of the pushing means. The projection may be adjacent the upper rim of the top wall, i.e. the rim closest to the back wall. An upwards projection on the pushing means
25 may slide in a recess in the top wall. The recess may be all along the top wall in a direction from upper to lower rim of the top wall but ends before the upper rim of the top wall. As such the undealt cards which are still in front of the pushing means, still cannot be contacted and remain untouched. The undealt cards and its sequence remain secret and hence the cards may be recuperated without any fear of their identity
30 and sequence being known.

[25] Hence according to an aspect of the present invention, a method to gather playing cards in a cartridge is provided. The method comprises

- gathering playing cards, preferably dealt cards drawn from an unsealed cartridge according to the invention;
 - opening the volume behind the pushing means in the cartridge;
 - inserting the gathered playing cards in the volume behind the pushing means
- 5 in the cartridge;
- closing the volume behind the pushing means in the cartridge.

[26] According to some embodiments, the container may be provided with at least one storage place to store one or more spare seals. The spare seals on the inside of the sealed cartridge may be used to seal the cartridge once the cartridge was used.

10 The one or more storage places each may store one spare, unused seal, or may store a plurality of spare seals to be used for sealing the cartridge after its use. The spare seals, also referred to as return seals, hence can be used to seal the cartridge after its use. In order to avoid mistakes, the new cartridge can be sealed with seals having a given color, while the return seals are provided from another color, significantly

15 distinguishable from the color from the seals used to seal the new cartridge. Additionally or alternatively, the seals on a new cartridge and the return seals may be provided with a mutually different sign, e.g. a sign impressed in the seals, or a label or alike. Most preferably, the one or more storage places are provided at or in the back wall of the container. The storage place or places may as well be used to store the

20 broken seals of the new cartridge, when the resealed cartridge is returned to the back office of the casino.

[27] Hence the method to gather playing cards in a cartridge is provided may further comprise the steps of

- removing the spare seals from the cartridge before closing the volume

25 behind the pushing means in the cartridge; and

- sealing the cartridge using the spare seals.

[28] The seals, i.e. the seals on a new playing card cartridge and optionally the return seals, may be provided with an RFID label or RFID strip, which RFID label or strip is broken and stops functioning upon breaking of the seal.

[29] So according to some embodiments of the seals or playing card cartridges according to the invention, the at least one seal may comprise an RFID label, which RFID label breaks upon breaking of the seal.

[30] According to a second particular facet of the first general aspect of the invention,
5 a playing card cartridge is provided, wherein the container comprises a top wall and a front wall, the lower rim of the top wall being oriented towards the front wall, the front wall having a card exit means allowing cards to be taken out of the volume of the container when said cartridge being unsealed, at least the part of the inner surface of the top wall next to the lower rim is profiled for preventing a card different than the card
10 being closest to the card exit means to be taken out of the cartridge via the card exit means.

[31] In order to avoid that a card, different from the one in front of the exit means, is pulled out via the exit means, instead of the one in front of the exit means, it was found that the provision of a profiled surface, such as a serrated surface, adjacent to the
15 lower rim of the top wall prevents such incorrect cards to be drawn from the exit means. It is understood that the serration or profile is provided with its projections and indentations substantially parallel to the lower rim of the top wall, i.e. the rim closest to the front wall. The profiled, e.g. serrated surface also prevents playing cards to be pushed in the cartridge via the exit means.

[32] According to a third particular facet of the first general aspect of the invention, a
20 playing card cartridge is provided, wherein a pushing means to push the playing cards towards the front end of the container is provided in the volume of the container, the pushing means (or pusher) may be forced towards the front wall by means of a spring. The spring may be a constant torque spring. The constant torque spring may comprise
25 a coil. Possibly the coil may be housed in the pushing means. Alternatively, the constant torque spring, such as a coil, can be located at the front end near the front wall of the container in the cartridge.

[33] The use of a spring will cause a constant force to be applied on the set of cards from the pushing means towards the front wall and its exit means. A constant force
30 ensures a constant resistance being generated for each of the cards being drawn out

of the cartridge. The dealer will have to always exercise the same force to draw a card from the cartridge, which reduces the risk of errors and incorrect dealing of cards.

[34] According to some embodiments, a pushing means is provided in the volume of the container, the pushing means comprising at least one wheel to displace the pushing means in the volume under the gravitational force when the cartridge is inserted in a card dispensing shoe. The pushing means may be displaceable in the container by at least two wheels, one wheel at each side of pushing means, to displace the pushing means in this volume under the gravitational force when the cartridge is inserted in a card dispensing shoe. The one or more wheels may be located at the lower side of the pushing means and rotate on a bottom wall of the container.

[35] In other embodiments, the container may comprise two side walls, the wheels contacting and running over a ridge at the inner surface of each of these side walls, one wheel at each side. Alternatively, the wheels may be contacting and running in a recess at the inner surface of each of the side walls.

[36] Optionally, the container comprises two side walls, the pushing means may be displaceable in the container by at least two pairs of wheels, one pair of wheels at each side of pushing means, each of said wheels contacting and running over a ridge at the inner surface of each of the side walls. Alternatively, the pushing means is displaceable in the container by at least two pairs of wheels, one pair of wheels at each side of pushing means, each of the wheels be contacting and running in a recess at the inner surface of each of the side walls

[37] It is understood that the ridges or recesses may be slightly downwards inclined from the back wall to the front wall of the container. These ridges or recesses will guide the pushing means in its movement towards the front wall of the container when cards are drawn out of the cartridge.

[38] A combination of a spring, like a constant torque spring, such as a coil, and such wheels or pair of wheels may be used as well, providing an improved and smoothly guided movement of the pushing means in the container, hence in the cartridge.

[39] According to some embodiments, a pushing means is provided in the volume of the container, the container comprising a bottom wall, the pushing means comprising

at least one protrusion at its side contacting the bottom wall. The protrusion may slide in at least one recess of the bottom wall. This at least one recess may be present along the length of the bottom wall from the front end of the container to the back end of the container. Possibly the pushing means is provided with more than one protrusion, such as two or more protrusions, the bottom wall comprising a recess for each protrusion. Each protrusion slides in a recess. Each recess may be present along the length of the bottom wall from the front end of the container to the back end of the container. The protrusion or protrusions sliding in the recess or recesses, will guide the pushing means in its path downwards from the back end of the container to the front end of the container.

[40] Hence according to some embodiments, the pushing means may be provided in the volume of the container, the container comprising a bottom wall, the pushing means comprising at least one protrusion at its side contacting the bottom wall, the bottom wall comprising at least one recess along the length of the bottom wall from the front end of the container to the back end of the container, said protrusion of the pushing means at its side contacting the bottom wall sliding in said recess along the length of the bottom wall.

[41] According to a fourth particular facet of the first general aspect of the invention, a playing card cartridge is provided, wherein the container comprising a front wall, the front wall having a card exit means allowing cards to be taken out of the volume of the container when said cartridge being unsealed, the card of the set of playing cards being closest to the card exit means when the container is in sealed condition, may be sealed to the container by at least one seal. According to some embodiments, the cartridge may comprise a closing lid closing the card exit means and the closing lid may be sealed to the container by at least one seal. Closing the card exit means that drawing a playing card from the container is prevented. Preferably this closing lid is provided from polymeric material, most preferred from transparent or translucent polymeric material. This transparent or translucent polymeric material allows to see the color of the backside of the playing cards in the cartridge, even when the cartridge has not been unsealed. As such, a visual check on the correctness of the backsides of the playing cards can be made without unsealing the cartridge.

[42] Though the first card, i.e. the card of the set of playing cards being closest to the card exit means when the cartridge is in sealed condition, may be a fake or dummy card, the provision of a seal to this first card may provide a sealed cartridge at the exit means. The provision of a lid closing the exit means however is more preferred as this provides a higher guarantee to the set of cards not being unauthorizedly touched.

[43] According to a fifth particular facet of the first general aspect of the invention, a playing card cartridge is provided, wherein each of the cards may have a card identity code, the cartridge comprises a data storage means for storing information on the card identity codes of the cards of the set of playing cards held by the cartridge. The data storage means may store information on the sequence of the cards in the set of playing cards held by the cartridge.

[44] In order to increase the avoidance and detectability of fraudulent handlings with the set of cards present in the volume of the cartridge, the playing cards in the cartridge each may have a card identity code, which can be a unique identity code. The card identity code may comprise information on the rank and suit of the card, combined with a sequence of characters, optionally a random sequence of characters. It may be a binary code composed from 0 and 1, or it may be a string of characters. Characters are to be understood as characters chosen from the alphabet, the figures 0 to 9, punctuation marks and special characters like &, @, #, \$, £, €, any other ASCII character and alike. The card identity code may be a unique card identity code. A unique card identity does not refer to strict uniqueness but must be understood in the context of the invention, i.e. playing cards used in card games, such as in casinos. An identity is unique if it is infeasible to find a second playing card having an identical card identity. One could say that a card identity is unique if the possibility that a second playing card with the same card identity is found, is 1/100.000 or less, such as 1/1.000.000 or less, e.g. 1/10.000.000 or less. The card identity code may be printed one or more times on the front side of each of the cards. It may be printed as a string of characters or as a binary code, or this string of characters or binary code may first be converted into a barcode, QR code or alike. According to some embodiments the card identity string or code may be printed using micro-dot encryption. The use of micro-dots to identify the rank and suit of cards on the face side of a card is known from US9254435.

[45] The card identity string or code might not be visible by the naked eye. The card identity string or code may be visible, hence detectable, by UV illumination only, or by radiation with non-visible light of a given wavelength or wavelength range. UV illumination sources, such as LED UV illumination may be used to make the card
5 identity string or code readable using an appropriate camera system

[46] The data storage means, which may e.g. be a SIM card or a micro-SIM card or alike, may be integrated in the cartridge. The card dealing device may have a data reading means which may be coupled to the data storage means when the cartridge is inserted in the card dealing device. The data reading means of the card dealing
10 device may read out the stored data. The card dealing device when having a card reading means to read out the card identity code on the card, the read code can be compared with the card identity codes stored on the data storage means. If the read code does not match with one of the card identity codes stored on the data storage means, a fraudulent action may have taken place in view of the set of cards stored in
15 the cartridge. An alarm may be generated if and when this occurs. When the data storage means comprises information on the sequence of the cards in the cartridge, an alarm may be generated if and when a card identity code is read which is different from the one next stored in the sequence in the data storage means.

[47] The data storage means may as well be part of one of the seals used to seal
20 the cartridge. The broken seal may be adapted to be inserted into a reading device, which reading device will read the stored data.

[48] The cartridge may be provided with a cartridge identity code. The cartridge identity code may be a concatenation of defined groups of characters taken from each of the cards, in the sequence the cards are present in the set of cards in the volume of
25 the cartridge. As such, comparing a sequence of parts of the cartridge identity code with parts of the card identity code in the sequence they are drawn from the cartridge may reveal incorrect card order or incorrect cards being drawn from the cartridge. This again may be an indication of a fraudulent action having taken place in view of the set of cards stored in the cartridge.

[49] According to a sixth particular facet of the first general aspect of the invention,
30 a playing card cartridge is provided, wherein the cartridge may comprise a track and

trace means. This track and trace means may provide information on the place where the cartridge is present at any given moment in time. A cartridge identity code may be used to identify the cartridge in such track and trace means.

5 [50] According to a second general aspect of the invention, a method to provide a card dealing device is provided. Similarly a method to provide playing cards to a game table is provided, and a method to bring playing cards to and optionally remove from a game table is provided. The method comprises:

- 10 • providing a card dealing device comprising a card dealing shoe, said card dealing device is adapted to receive a playing card cartridge according to the first general aspect of the invention;
- providing a playing card cartridge according to the first general aspect of the invention;
- coupling the playing card cartridge to the card dealing shoe; and
- unseal the cartridge by removing at least one of the one or more seals.

15 [51] Possibly all the seals are removed before the cartridge is used in a card game, i.e. before the first card is drawn via the card dealing shoe from the cartridge. Possibly the seals are removed prior to coupling the playing card cartridge to the card dealing shoe. Alternatively, some seals are kept in place and are removed only after the cartridge is used and optionally recycled. Once the game is ended, the cartridge is
20 removed again from the card dealing shoe. As the used cartridge is typically send back to a restricted area of the casino, and the cartridge still may comprise a number of unused, i.e. undrawn cards, the used cartridge may be sealed again with new seals, in order to prevent unauthorised access to the unused cards.

25 [52] According to some embodiments of the invention, the playing card cartridge is a playing card cartridge according to the first particular facet of the first general aspect of the invention, the method further comprises

- collecting the dealt cards during a game played;
- at the end of the game played, slide the top wall towards the front wall, thereby opening a part of the container beyond the pushing means;
- 30 • placing the dealt cards in the open part of the container after the pushing means.

[53] During or after the game, dealt cards may be gathered and kept together. The used cards may be placed behind the pushing means by opening the volume of the cartridge behind the pushing means. As such, the used cards may be sent back in their entirety to the restricted area of the casino. The cartridge, once the used cards
5 are placed behind the pushing means, is closed again, and may be sealed with new seals. As such, used cards can be counted in the restricted area and missing dealt cards can be identified. Removing or holding back a dealt card may be a source of fraudulent activity as well.

[54] This is in particular the case when all cards have a card identity code. Used
10 cards can be counted in the restricted area and missing dealt cards can be identified by their card identity code. The missing cards, optionally by means of the card identity code, may be flagged. If a flagged card is identified during other games, using other cartridges, a link may be made between the occurrence of the flagged card and the cartridge from which the flagged card was removed. As such, during playing of the
15 game, a flagged card can be identified on the spot. The game can be interrupted once the flagged card is noticed, avoiding fraudulent actions having their effect.

[55] According to some embodiments of the invention, the playing card cartridge is a playing card cartridge according to the fifth particular facet of the first general aspect of the invention, wherein the method further comprises
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- obtain the data stored in the data storage means;
- reading the card identity code from a playing card dealt;
- comparing the read card identity code with the obtained data being stored in the data storage means.

[56] As such, during playing of the game, an inappropriate card or a defective card
25 sequence can be identified on the spot. The game can be interrupted once the defective card or sequence is noticed, avoiding casino losses due to fraudulent actions.

[57] According to a third general aspect of the invention, a kit of parts is provided which kit of parts comprises a cartridge according to the first aspect of the invention, and a card dealing device comprising a card dealing shoe adapted to receive the
30 cartridge. The card dealing device comprises a card dealing shoe which may have a holding means to receive and hold the cartridge when inserted in or placed upon the

card dealing shoe. The card dealing device may further comprise a mouthpiece which can be mount, such as anchored, on the card dealing shoe once the cartridge is inserted or placed upon the card dealing shoe. The mouthpiece may cover the front wall of the cartridge and may comprise an opening to allow cards to be drawn from the cartridge via the front wall and through the mouthpiece.

[58] The card dealing device, and in particular the card dealing shoe, may be provided with one or more of the following means:

- one or more sensors to sense the presence of a cartridge or to detect a card being drawn;
- 10 • a card reader reading the rank and suit of the card being drawn;
- a camera to detect and read the card identity code;
- a data reading means to read the data storage means of the cartridge;
- a reading means to read the cartridge identity code;
- 15 • a processor configured to compare the card identity code with the cartridge identity code;
- a signal providing means to provide a signal in case a discrepancy is found between the card identity code being read and the card identity code to be read according to the cartridge identity code. The signal provided may be a visual or an auditive signal, like a bel, siren, flashing light and alike.

20 **[59]** The card dealing shoe may have a top surface which is provided with a recess to receive the bottom wall of the cartridge. The circumference of the recess will encompass and may match the bottom wall of the cartridge. As such the cartridge may snugly fall in the recess and remain sunken along the depth of the recess during use. As such the cartridge cannot slide out of the card dealing shoe during use.

25 Alternatively, or additionally, the card dealing shoe may have a holding means to hold the cartridge in or on the card dealing shoe during use.

[60] According to a fourth general aspect of the invention, a seal is provided, the seal being adapted to be used in combination with a cartridge according to the first general aspect invention. The seal according to the fourth aspect of the invention may be used

30 to seal a cartridge according to the first general aspect of the invention.

[61] The seals have a body or stem and a head, which is wider than the body. To the body, at least one barb is provided having its opening oriented towards the head of the seal. The radial cross section of the seal (a cross section perpendicular to the axis of the body) may be polygonal such as triangular, rectangular, or square, or
5 circular or oval or alike. The width of the head of the seal extends beyond the outmost points of the at least one barb. Possibly the seal comprises at least two barbs, being positioned opposite one to the other versus the axis of the body of the T-shape.

[62] The head of the seal may be inclined in view of the axis of the body, forming an angle different from 90°. The outer point of the head may be more remote from the axis
10 of the body as compared to the outer point of the barb, when the barb is plied against the body of the seal.

[63] The seals cross section according to a plane parallel to the axis of the body, the barb being coplanar with said plane, may have a T-shaped cross section.

[64] As an example, the seals may have a T-shaped cross section in axial direction,
15 i.e. according to a plane parallel to the axis of the body, a barb being coplanar with said plane, may have a T-shaped cross section. This barb has its opening oriented towards the head of the T-shape. The T shape may be provided by a cylindrical body, to which one or more barbs are provided. The radial cross section of the seal, i.e. a cross section perpendicular to the axis of the body of the T-shape and substantially
20 parallel to the head of the T-shape, is circular or oval. Alternatively the axial cross section of the seal is polygonal such as triangular, rectangular, or square. The width of the head of the seal extends beyond the outmost points of the at least one barb, at least when the barb is in a position closest to the axis of the body. Preferably the seal comprises at least two barbs, being positioned opposite one to the other versus the
25 axis of the body of the T-shape.

[65] So according to some embodiments of the invention, the at least one seal has a T-shaped cross section in axial direction, along the body of the T-shaped cross section of the seal, at least one barb is provided having its opening oriented towards the head of the T-shaped cross section.

[66] The seals may be provided from polymeric material, preferably thermoplastic material, such as PVC (polyvinyl chloride), PP (Polypropylene), PC (Polycarbonate) or ABS (acrylonitrile-butadiene-styrene polymer).

[67] According to a fifth general aspect of the invention, a cartridge according to the first general aspect is provided with one or more slots for receiving seals according to the fourth general aspect of the invention. The slot or slots have an entrance opening whose perimeter is smaller than the circumference of the head of the T-shape of the seal in radial direction, larger than the circumference of the body of the T-shape of the seal in radial direction. In case the seal has only one barb, the maximum width of the entrance opening is less than the length provided by the distance between the outmost point of the barb and the body of the T-shape, increased with the smallest width of the body of the T-shape. In case the seal has two or more barbs, the maximum width of the entrance opening is less than the largest of the distances between two outmost points of two barbs. The depth of the slot or slots is more than the largest axial distance between the bottom of the body of the T-shape and the outmost points of the barbs.

[68] As such, when the seal is introduced in a slot, the barb or barbs will be compressed towards the body of the T-shape during passage through the slot, while once inserted sufficiently, the barbs will anchor under the slot and be prevented to be pulled back. Pulling back the seal out of the slot will break the barbs, hence will break the seal.

[69] As an example, the front wall of the cartridge may be provided with a volume enclosed by the material of the front wall, except one slot extending upwards from the front wall. The volume under the slot is wider than the slot. The top wall is provided with an opening having the same perimeter of the entrance opening of the slot. The entrance opening and the opening in the top wall coincide when the top wall is completely closing the cartridge. A seal according to the fifth aspect of the invention is inserted through the opening in the top wall into the slot of the front wall. The barbs will open and will block the seal in the volume under the slot. The cartridge can as such be sealed. Breaking the seal will result in leaving loose barbs in the volume under the slot. If the front wall is provided from transparent material, e.g. transparent polymeric material, the integrity of the inserted seal can be inspected at all times.

[70] As an alternative example, the cartridge comprises a closing lid, the closing lid of the cartridge may be provided with a volume enclosed by the material of the closing lid, except one slot extending upwards from the closing lid. The volume under the slot is wider than the slot. The top wall is provided with an opening having the same perimeter of the entrance opening of the slot. The entrance opening and the opening in the top wall coincide when the top wall is completely closing the cartridge. A seal according to the fifth aspect of the invention is inserted through the opening in the top wall into the slot of the closing lid. The barbs will open and will block the seal in the volume under the slot. Breaking the seal will result in leaving loose barbs in the volume under the slot. The cartridge can as such be sealed. If the closing lid is provided from transparent material, e.g. transparent polymeric material, the integrity of the inserted seal can be inspected at all times.

[71] According to a sixth general aspect of the invention, a cartridge according to the first and/or fifth general aspect is provided with a track and trace and/or real time tracking means. The track and trace/ real time tracking means may be an RFID chip which is provided to the cartridge, e.g. to the inner side of the volume of the container of the sealed cartridge. Scanners may be used to track and trace the sealed cartridge at all times, while the seal is not to be broken to identify the cartridge. The RFID may be linked to, or even carry the cartridge identity code.

[72] In alternative embodiments, Bluetooth low energy tags (BLE tags) may be used to track and trace, even real time tracking the position of the cartridges.

[73] In general, the track and trace and/or real time tracking means may use an integrated circuit, added to, or embedded in the cartridge. The integrated circuit (IC) may be the data storage means for storing information on the card identity codes of the cards of the set of playing cards held by the cartridge, or it may be a similar but separate integrated circuit, optionally storing the cartridge identity code. This integrated circuit may be a SIM card, a nano SIM card, a micro-SIM card or a micro-SIM card or alike. The integrated circuit storing the cartridge identity code, may be integrated in the cartridge, e.g. at the outer surface of one of the walls or the bottom side of the cartridge.

[74] The IC may as well function as data storage means storing the card identity codes and/or the cartridge identity code.

[75] The playing card dealing device may have a data reading means, adapted to read the card identity codes from the data storage means, and may read out the cartridge identity code as well. The data reading means, optionally the further the data reading means may be coupled to the integrated circuit when the cartridge is inserted
5 in the card dealing device. The read cartridge identity code may be used to verify to what extent this cartridge is allowed to be used during the game to be played.

[76] The independent and dependent claims set out particular and preferred features of the invention. Features from the dependent claims may be combined with features of the independent or other dependent claims, and/or with features set out in the
10 description above and/or hereinafter as appropriate.

[77] The above and other characteristics, features and advantages of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention. This description is given for the sake of example only,
15 without limiting the scope of the invention. The reference figures quoted below refer to the attached drawings.

Brief Description of the Drawings

[78] Figure 1 is a schematically view of a playing card cartridge according to the
20 invention. Figure 1B is the longitudinal section according to a plane AA, as shown in figure 1A.

[79] Figure 2 is a schematically view of a front view of the cartridge in unsealed condition.

[80] Figure 3 is a schematically view of a seal used in a playing card cartridge
25 according to the invention.

[81] Figure 4 is a schematically view of a card dealing device provided with a playing card cartridge.

[82] Figure 5 shows a schematically an embodiment of a seal which can be used in combination with the cartridges according to the invention.

[83] Figure 6 is a schematically view of a playing card cartridge according to the invention. Figure 7 is a cross section of the playing card cartridge of figure 6.

[84] The same reference signs refer to the same, similar or analogous elements in the different figures.

5 **Detailed Description of Embodiment(s)**

[85] The present invention will be described with respect to particular embodiments. It is to be noticed that the term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other
10 elements or steps. It is thus to be interpreted as specifying the presence of the stated features, steps or components as referred to, but does not preclude the presence or addition of one or more other features, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the
15 present invention, the only relevant components of the device are A and B.

[86] Throughout this specification, reference to "one embodiment" or "an embodiment" are made. Such references indicate that a particular feature, described in relation to the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment" or "in an
20 embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment, though they could.

[87] Furthermore, the particular features or characteristics may be combined in any suitable manner in one or more embodiments, as would be apparent to one of ordinary skill in the art.

25 [88] Figure 1A shows a front view of a playing card cartridge 100 according to the invention. Figure 1B is the longitudinal section of the playing card cartridge 100 according to a plane AA, as shown in figure 1A. Figure 2 shows a front view of the cartridge 100 in unsealed condition.

[89] The playing cartridge comprises a container 101 adapted to couple to a card dispensing shoe. The container 101 defines a volume 102 in which a set of playing cards 103 is provided. The volume 102 of the container 101 is sealed by a seal 104.

[90] The container 101 comprises a top wall 110, a front wall 111 and side walls 112 and 113. The top wall 110 is slidably connected to the side walls. The container further comprises a back wall 114 and a bottom wall 115. Behind the set of playing cards, a pushing means 120 is provided. The cartridge 100 comprises a stopping means 130 to prevent the upper rim 121 of the top wall 110 to slide beyond the pushing means 120. In the top wall 110, a recess 122 is provided, which ends near the upper rim 121. To the pushing means 120, a protrusion 123 is provided, which slides in the recess 122. In unsealed condition, if the top wall 110 is slid towards the front wall 111, the upper rim 121 will hit the protrusion and will be prevented to slide further towards the front wall 111. The top wall 110 cannot slide beyond the pushing means 120.

[91] The pushing means 120 is forced towards the front wall 111 by means of a constant torque spring 140, which coil is located in the pushing means itself. The tip of the coil is anchored to the front side of the cartridge, near the front wall 111. The unwound part of the coil is located in a recess in the bottom wall 115. The coil of the spring 140 causes the pushing means 120 to press with constant pressure to the backside of the set of playing cards 103 in a direction towards the front wall 111.

[92] To seal the cartridge 100, one or two seals 104 are provided, the seals being rectangular plates with at both long sides, near the outer end of the sides, having a barb 144. The front wall 111 of the cartridge 100 is covered with a closing lid 150 which edges having protrusions which clip into recesses in the side walls 112 and 113. The closing lid is provided from transparent polymeric material. At the bottom of the lid 150, two fingers 171 and 172 will close the opening 170 in the front wall 111 which is present to allow cards to be drawn out of the volume 101. The fingers will prevent cards to be able to be drawn out of the volume. The closing lid also extends beyond the lower rim 122 of the top wall 110 and hooks into small openings at the lower rim of the top wall. As such the top wall cannot be slid towards the front wall 111 nor towards the back wall 114.

[93] In figure 3, a seal 104 is shown. The seal has a body 141 and a head (not shown). Symmetrically to the axis 142 of the seal's body 141, two barbs 144 are provided. In the lid 150, there are two slits 151 and 152. As shown in figure 3, the closing lid 150 being provided over the front wall 111, is sealed to the front wall 111 of the cartridge 100 by introducing one or two seals 104 into one or both the slits 151 and 152 in the closing lid 150. The barbs also protrude through two slits 161 and 162 at the upper rim of the front wall 111, and the barbs clip behind the front wall 111. The seal is made from rigid polymeric material and the barbs 144 will break when the seal is pulled out from the openings. In this sealed condition, the complete inner volume 102 cannot be reached. The volume 101 is sealed, and nothing can enter or taken out of the volume without breaking the seal. To unseal the volume 101 of the cartridge 100, the one or two seals 104 are pulled out of the slits 151 and 161, and/or 152 and 162. The barbs 144 will break during pulling out, so the seals when introduced back in the slits after having been pulled out, will no longer function, and will sit loosely inserted in the slits. The fact the seal has been taken out therefore is detectable.

[94] An alternative seal 104 is shown in figure 5. Also here the seal has a body 141 or stem and a head 145, which is wider than the body 141. To the body 141, one barb 144 is provided having its opening oriented towards the head 145 of the seal 104. The radial cross section of the seal (a cross section perpendicular to the axis of the body) is polygonal. The width of the head 145 of the seal extends beyond the outmost points of the at least one barb.

[95] The head 145 of the seal 104 may be inclined in view of the axis 142 of the body 141, forming an angle different from 90°. The outer point 146 of the head 145 may be more remote from the axis 142 of the body 141 as compared to the outer point 147 of the barb 144, when the barb is plied against the body of the seal. The seals cross section according to a plane parallel to the axis of the body, the barb being coplanar with said plane, has a T-shaped cross section.

[96] Once the cartridge 100 is inserted in a card dealing shoe and used, behind the pushing means 120, a new empty volume is created because gradually the pushing means 120 slides towards the front wall 111. The small volume 180, present behind the pushing means 120 when the cartridge is in sealed condition, increases in volume. When the game is finished, the cartridge 100 is taken from the card dealing shoe, and

the top wall 110 can be slid towards the front wall 111. As such, the volume 180, is opened. The top wall 110 will not slide beyond the pushing means 120 due to the presence of the stopping means 130. The dealt cards can be inserted in the volume 180, and the top wall 110 can be slid backwards towards the back wall 114. Optionally, the closing lid 150 can be placed again over the front wall 111 and a new seal can be inserted in the slits 151 and 161, and/or 152 and 162. As such a used, resealed cartridge can be provided.

[97] At the backside of the cartridge, a memory card is present in the volume 180 (not shown in figure 1B). This memory card can be read by the card dealing device once the cartridge is inserted in the card dealing device.

[98] To be able to distinguish the fresh sealed cartridges and the used and resealed cartridges, the seals used can have a different colour in order to make the distinction.

[99] In figure 4, a card dealing device 1000 is provided, comprising a card dealing shoe 1001 which may have a holding means 1010 to receive and hold the cartridge 100 when inserted in the card dealing shoe 1001. The card dealing device 1000 further comprises a mouthpiece 1002 which can be mounted on the card dealing shoe 1001 once the cartridge 100 is inserted in the card dealing shoe 1001. The mouthpiece 1002 will cover the front wall 111 of the cartridge and comprise an opening 1011 to allow cards to be drawn from the cartridge 100 via the front wall 111 and through the mouthpiece 1002. The mouthpiece will prevent the top wall to slide to the front wall. The holding means will prevent the top wall to slide towards the back wall.

[100] The card dealing shoe 1001 has a top surface 1020 which is provided with a recess 1021 to receive the bottom wall 115 of the cartridge 100. In this embodiment, the recess 1022 has two different zones with different depths, the deepest is to receive the part of the bottom wall 115 in which the uncoiled end of the coil of the spring is located. The circumference of the recess 1021 matches the bottom wall 115 of the cartridge 100. As such the cartridge 100 snugly falls in the recess 1021 and remains sunken along the depth of the recess during use. The cartridge 100 cannot slide out of the card dealing shoe 1001 during use.

[101] The card dealing shoe 1001 is provided with sensors, cameras and alike, which are located at two ridges 1030 adjacent the front end of the cartridge when placed in the card reading shoe 1001 and covered by the mouthpiece 1002 during use.

[102] A second embodiment of a cartridge 2000 is shown in figure 6 and figure 7. The same references refer to the same features as applicable for the cartridge 100 in the figures 1A and 1B. the cartridge 2000 has a pushing means 120 has two protrusions 2001 which slides in two recesses 2002 in the bottom wall 115. The top wall 110 has a protrusion which protrudes in the volume of the container 101. The protrusion prevents the upper rim 121 of the top wall 115 to pass beyond the pushing means 120.

[103] In the cartridge, a SIM card 2100 is provided comprising data on the card identity codes and the sequence of the cards in the cartridge 2000. This SIM card also comprises the cartridge identity code. At the inner side of the container a storage place, like a pocket, is provided to carry a spare seal, which can be used to seal the cartridge when it is used and is to return to the back office of the casino, once the dealt cards were inserted in the volume between the pushing means 120 and the back wall 114 of the cartridge, while the top wall was slide away from the back wall 114. A snap click system 153 is provided in the closing lid 150 to click the closing lid 150 on the front wall 111.

[104] It is to be understood that although preferred embodiments and/or materials have been discussed for providing embodiments according to the present invention, various modifications or changes may be made without departing from the scope and spirit of this invention.

CLAIMS

- 5 1. A playing card cartridge comprising a container adapted to couple to a card dispensing shoe, the container defining a volume, said container comprising a set of playing cards in said volume, said volume of said container is sealed by one or more seals, wherein said container comprises a top wall, a front wall and side walls, the top wall being slidably connected to the side walls and being adapted to slide towards the front wall, the top wall is prevented from sliding by at least a first seal.
- 10 2. A playing card cartridge according to claim 1, wherein the lower rim of the top wall is oriented towards the front wall, the upper rim of the front wall is oriented towards the top wall, the lower rim of the top wall extends over the upper rim of the front wall.
- 15 3. A playing card cartridge according to any one of the preceding claims, wherein the upper rim of the top wall is oriented away from the front wall, a pushing means to push the playing cards towards the front end of the container is provided in the volume of the container, the cartridge comprises a stopping means to prevent the upper rim of the top wall to slide beyond the pushing means.
- 20 4. A playing card cartridge according to claim 3, wherein the stopping means comprises a protrusion on the pushing means at the pushing means side oriented towards the top wall, the stopping means further comprises a recess present in the top wall, the recess in the top wall being provided along the length of the top wall and ending before the upper rim of the top wall, said
25 protrusion on the pushing means sliding in said recess present in the top wall.
5. A playing card cartridge according to claim 3, wherein the stopping means comprises a protrusion at the inner side of the top wall, said protrusion protruding inwards the cartridge such that the protrusion extends beyond the upper side of the pushing means.
- 30 6. A playing card cartridge according to any one of the preceding claims, wherein said container comprises a top wall and a front wall, the lower rim of the top

- 5 wall being oriented towards the front wall, the front wall having a card exit means allowing cards to be taken out of the volume of the container when said cartridge being unsealed, at least the part of the inner surface of the top wall next to the lower rim is profiled, preventing a card different than the card being closest to the card exit means to be taken out of the cartridge via the card exit means.
- 10 7. A playing card cartridge according to any one of the preceding claims, wherein a pushing means to push the playing cards towards the front end of the container is provided in the volume of the container, the pushing means is forced towards the front wall by means of a spring.
8. A playing card cartridge according to claim 7, wherein said spring is a constant torque spring.
9. A playing card cartridge according to claim 8, wherein the constant torque spring comprises a coil, the coil is housed in the pushing means.
- 15 10. A playing card cartridge according to any one of the preceding claims, wherein a pushing means is provided in the volume of the container, the container comprising a bottom wall, the pushing means comprising at least one protrusion at its side contacting the bottom wall, the bottom wall comprising at least one recess along the length of the bottom wall from the front end of the container to the back end of the container, said protrusion of the pushing means at its side contacting the bottom wall sliding in said recess along the length of the bottom wall.
- 20 11. A playing card cartridge according to any one of the preceding claims, wherein said container comprises a front wall, the front wall having a card exit means allowing cards to be taken out of the volume of the container when said cartridge being unsealed, the card of the set of playing cards being closest to the card exit means is sealed to the container by at least one seal.
- 25 12. A playing card cartridge according to any one of the preceding claims, wherein said container comprises a front wall, the front wall having a card exit means allowing cards to be taken out of the volume of the container, the cartridge
- 30

comprising a closing lid closing said card exit means, said closing lid being sealed to the container by at least one seal.

13. A playing card cartridge according claim 12, wherein said closing lid is provided from transparent or translucent polymeric material.

5 14. A playing card cartridge according to any one of the preceding claims, wherein each of the cards have a card identity code, the cartridge comprises a data storage means for storing information on the card identity codes of the cards of the set of playing cards held by the cartridge.

10 15. A playing card cartridge according to claim 14, wherein said data storage means stores information on the sequence of the cards in the set of playing cards held by the cartridge.

16. A playing card cartridge according any one of the preceding claims, wherein said cartridge comprises a track and trace means.

15 17. A playing card cartridge according any one of the preceding claims, wherein said container comprises at least one storage place to store one or more spare seals.

18. A playing card cartridge according any one of the preceding claims, wherein said at least one seal comprises an RFID label, which RFID label breaks upon breaking of the seal.

20 19. A playing card cartridge according any one of the preceding claims, wherein said at least one seal has a T-shaped cross section in axial direction, along the body of the T-shaped cross section of the seal, at least one barb is provided having its opening oriented towards the head of the T-shaped cross section.

25 20. A playing card cartridge according any one of the preceding claims, wherein said container is provided from polymeric material.

21. A method to provide a card dealing device, comprising

- 5
- providing a card dealing device comprising a card dealing shoe, said card dealing device is adapted to receive a playing card cartridge according to any one of the claims 1 to 20;
 - providing a playing card cartridge according to any one of the claims 1 to 20;
 - coupling the playing card cartridge to the shoe; and
 - unsealing the cartridge by removing at least one of the one or more seals.

10 22. A method according to claim 21, wherein the playing card cartridge is a playing card cartridge according to claim 14 or 15, wherein the method further comprises

- obtaining the data stored in the data storage means;
- reading the card identity code from a playing card dealt;
- comparing the read card identity code with the obtained data being stored in the data storage means.

15 23. A method according to claim 21 or 22, wherein the playing card cartridge is a playing card cartridge according to any one of the claims 3 to 5, the method further comprises;

- 20
- collecting the dealt cards during a game played;
 - at the end of the game played, slide the top wall towards the front wall, thereby opening a part of the container beyond the pushing means;
 - placing the dealt cards in the open part of the container after the pushing means.