game by reducing the amount of time the dealer or house has to sp end in preparing to play the game.

However, working with many existing shuffler designs puts unnecessary strain on the muscles of the users (dealers). Using two complete sets of cards also increases the cost of offering the game.

Furthermore, the card output area or shoe used in conjunction with shufflers often places strain on dealers' hands and wrists by using card distribution interfaces to output cards that are oriented at a substantial acute angle relative to the table surface. To draw cards from these shoes, dealers often have to twist their wrists repeatedly at awkward and uncomfortable angles. Moreover, shoes often are not easily adjustable to meet a dealer's card drawing preference (*e.g.*, direction in which dealers prefer to draw a card relative to the table).

Card counting is a significant problem when using automatic card shufflers. Casinos often lose a house advantage when players are able to predict what cards remain to be dealt and the proximity of those cards being dealt. It is desirable for casinos to reduce or eliminate the ability for players to count cards. Continuous shuffling machines assist in reducing the ability to count cards, but additional ways to eliminate card counting and improve ergonomics of card delivery may be desirable.

Summary

In an aspect, there is a card handling device, comprising: a card shuffling apparatus configured to shuffle playing cards, the card shuffling apparatus defining at least a portion of a card path; and a card output portion including a card buffer area positioned at an interface of the card shuffling apparatus and the card output portion, the card buffer area configured to receive shuffled playing cards from the card shuffling apparatus via the card path and temporarily store a group of playing cards in a stacked configuration having a top and a bottom, the card output portion being configured to move to alter an orientation of the group of playing cards in the card buffer area relative to the card shuffling apparatus between a first orientation in which playing cards are inserted from the card shuffling apparatus at the top of the group of playing cards and a second orientation in which playing cards are inserted from the card shuffling apparatus at the bottom of the group of playing cards, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in both the first orientation and the second orientation.

In another aspect, there is a card handling device, comprising:
a card shuffling apparatus configured to shuffle playing cards, the card shuffling apparatus defining at least a portion of a card path;
a card output area in communication with the card shuffling apparatus to receive playing cards via the card path; and
a card output portion positioned between the card shuffling apparatus and the card output area on the card path and configured to receive playing cards from the card shuffling apparatus and deliver playing cards to the card output area, the card output portion comprising:

a card buffer area positioned within the card handling device at an interface of the card shuffling apparatus and the card output portion on the card path, wherein the card buffer area is configured to (i) receive playing cards from the card shuffling apparatus along the card path, (ii) temporarily hold a group of playing cards in a stacked configuration having a top and a bottom, and (iii) move to alter an orientation of the group of playing cards between a first orientation in which playing cards from the card shuffling apparatus are inserted at the bottom of the group of playing cards and a second orientation in which playing cards from the card shuffling apparatus are inserted at the top of the group of playing cards, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in both the first orientation and the second orientation; and

a card feed system configured to remove playing cards one-at-a-time from the group of cards in the card buffer area and to deliver the playing cards one-at-a-time to the card output area via the card path, wherein the card feed system is configured to not send a playing card to the substantially flat card output area until a previously sent playing card is drawn from the card output area.

In an aspect, there is provided a method of shuffling cards, comprising:

receiving, at a card input portion of a card handling device, playing cards;

transporting, by a card feed system of the card handling device, the playing cards from the card input portion into a card shuffling apparatus via a card path;

outputting, by the card shuffling apparatus, at least one playing card to a card buffer area positioned along the card path in a first orientation and configured to temporarily store a group of playing cards in a stacked configuration having a top and a bottom;

altering, by an actuation system of the card handling device, the orientation of the card buffer area and the group of playing cards relative to the card shuffling apparatus to a second orientation, the card path between the card shuffling apparatus and the card buffer area remaining fixed in the first orientation and the second orientation; and

outputting, by the card shuffling apparatus, at least another playing card to the card buffer area while the card buffer area is in the second orientation to alter a sequence of playing cards in the group of playing cards stored in the card buffer area.

In an aspect, there is provided a method of shuffling cards, comprising:

removing, by a card transfer system of a card handling device, playing cards from a temporary storage area of the card handling device via a card path;

forming, in a card buffer area of the card handling device, a group of playing cards in a stacked configuration having a top and a bottom from the playing cards removed by the card transfer system;

adding, by the card transfer system, at least one playing card from the temporary storage area via the card path to the bottom of the group of playing cards by moving, using an actuation system of the card handling device, the card buffer area and the group of playing cards to a first orientation relative to the card path; and

adding, by the card transfer system, at least one playing card from the temporary storage area via the card path to the top of the group of playing cards by moving, using the actuation system, the card buffer area and the group of playing cards in a second orientation relative to the card path, the card path from the card transfer system to the card buffer area remaining fixed in both the first orientation and the second orientation.

In an aspect, there is provided a card handling device for a gaming table comprising:

a housing for mounting to a gaming table, the housing comprising a card intake area configured to receive cards to be shuffled and a card output area for a dealer to take cards

from the card handling device for dealing a game of cards at the table, the card intake area and card output area disposed to be arranged at the top of the gaming table when the housing is mounted to a table and define a card path therebetween for providing playing cards from the card intake area to the card output area;

a card shuffling apparatus configured to receive cards from the card intake area via the card path;

a card buffer area configured to receive and hold a group of cards from the card shuffling apparatus in a stacked configuration having a top and a bottom via the card path;

a card output portion configured to transport cards, one-at-a-time, from the card buffer area to the card output area via the card path;

an apparatus configured to alter an orientation of the card buffer area and the group of cards relative to the card shuffling apparatus between a first orientation in which cards from the card shuffling apparatus are inserted at the bottom of the group of cards and a second orientation in which cards are inserted at the top of the group of cards to alter the arrangement of cards in the group, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in the first orientation and the second orientation;

a sensor configured to provide a signal in response to removal of a card from the card output area by a dealer; and

a processor configured to receive the signal from the sensor and in response thereto control the card output portion to transport another card from the card buffer area to the card output area via the card path, the processor configured to control the card shuffling apparatus to re-supply cards to the card buffer area to maintain the group of cards therein for supply to the card output area,

wherein cards are continuously supplied to the card output area.

In an aspect, there is a card handling device for a gaming table comprising:

a housing for mounting to a gaming table, the housing comprising a card intake area configured to receive cards to be shuffled and a card output area for a dealer to take cards from the card handling device for dealing a game of cards at the table, the card intake area and card output area disposed to be arranged at the top of the gaming table when the housing is mounted to a table and define a card path therebetween for providing playing cards from the card intake area to the card output area;

a card shuffling apparatus configured to receive cards from the card intake area via the card path;

a card buffer area configured to receive and hold a group of cards from the card shuffling apparatus in a stacked configuration having a top and a bottom via the card path;

a card output portion configured to transport cards, one-at-a-time, from the card buffer area to the card output area via the card path;

an apparatus configured to alter an orientation of the card buffer area and the group of cards relative to the card shuffling apparatus between a first orientation in which cards from the card shuffling apparatus are inserted at the bottom of the group of cards and a second orientation in which cards are inserted at the top of the group of cards to alter the arrangement of cards in the group, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in the first orientation and the second orientation;

a sensor configured to provide a signal in response to removal of a card from the card output area by a dealer; and

a processor configured to receive the signal from the sensor and in response thereto control the card output portion to transport another card from the card buffer area to the card output area via the card path, the processor configured to control the card shuffling apparatus to re-supply cards to the card buffer area to maintain the group of cards therein for supply to the card output area,

wherein cards are continuously supplied to the card output area.

DISCLOSURE

Some embodiments of the present disclosure include a card handling device having a card shuffling apparatus for shuffling playing cards and a card output portion. The card output portion may include a card buffer area positioned at an interface of the card shuffling apparatus and the card output portion. The card output portion may further be configured to move relative to the card shuffling apparatus in order to alter an orientation of the card buffer area relative to the card shuffling apparatus.

Some embodiments of the present disclosure include a card handling device having a substantially flat card output area. The card handling device may include an interface portion having an at least substantially flat draw surface and a cover disposed over the interface portion. The interface portion and cover may define an outlet between the interface portion and cover. The substantially flat card output area may configured to permit playing cards to be drawn from the outlet of the substantially flat card output area on the draw surface of the interface portion in a plurality of different, at least substantially horizontal directions without

CLAIMS

What is claimed is:

1. A card handling device, comprising:
a card shuffling apparatus configured to shuffle playing cards, the card shuffling apparatus defining at least a portion of a card path; and
a card output portion including a card buffer area positioned at an interface of the card shuffling apparatus and the card output portion, the card buffer area configured to receive shuffled playing cards from the card shuffling apparatus via the card path and temporarily store a group of playing cards in a stacked configuration having a top and a bottom,
the card output portion being configured to move to alter an orientation of the group of playing cards in the card buffer area relative to the card shuffling apparatus between a first orientation in which playing cards are inserted from the card shuffling apparatus at the top of the group of playing cards and a second orientation in which playing cards are inserted from the card shuffling apparatus at the bottom of the group of playing cards, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in both the first orientation and the second orientation.

2. The card handling device of claim 1, further comprising an actuation system attached to the card output portion and a frame structure of the card handling device, the actuation system configured to move the card output portion between the first orientation and the second orientation.

3. The card handling device of claim 2, wherein the actuation system comprises an electronic spindle.

4. The card handling device of claim 1, further comprising:
a card intake area configured to be positioned above a table surface of a table for receiving playing cards to be shuffled and delivering the playing cards to be shuffled to the card shuffling apparatus via the card path; and
a substantially flat card output area configured to be positioned above the table surface of the table for receiving cards from the card buffer area of the card output portion via the card path, wherein the card intake area and the substantially flat card output area are both positioned proximate one side of the card shuffling apparatus of the card handling device.

5. The card handling device of claim 1, wherein the card buffer area comprises:
a support plate having an upper surface for supporting a group of playing cards;
a pick-off roller oriented above the support plate; and
a bias attached to the support plate and configured to urge the support plate toward the pick-off roller, wherein the card buffer area is configured to hold the group of playing cards between the support plate and the pick-off roller.

6. The card handling device of claim 5, wherein the support plate of the card buffer area is translatable at least partially in a vertical direction relative to the pick-off roller of the card buffer area.

7. The card handling device of claim 1, further comprising a card input portion comprising:

a first card feed system for transporting playing cards via the card path from a card intake area to the card shuffling apparatus, the first card feed system defining a first card pathway of the card path; and
a first imaging system oriented along the first card pathway of the first card feed system and for reading playing cards being transported along the first card pathway of the first card feed system.

8. The card handling device of claim 1, wherein the card output portion further comprises:
a second card feed system for transporting playing cards via the card path from the card buffer area to a substantially flat card output area of the card handling device, the second card feed system defining a second card pathway of the card path; and
a second imaging system oriented along the second card pathway of the second card feed system and for reading playing cards being transported along the second card pathway of the second card feed system.

9. The card handling device of claim 1, wherein the card buffer area is configured to hold a minimum of nine playing cards and a maximum of twenty-two playing cards.

10. The card handling device of claim 1, wherein the card output portion includes a substantially flat card output area comprising:
an interface portion having an at least substantially flat draw surface; and
a cover disposed over the interface portion, the interface portion and cover defining an outlet between the interface portion and cover, wherein the substantially flat card output area is configured to permit playing cards to be drawn from the outlet of the substantially flat card output area on the draw surface of the interface portion in a plurality of different directions substantially within a plane defined by the draw surface without first being drawn from the outlet in a direction parallel to a center longitudinal axis of the substantially flat card output area.

11. A card handling device, comprising:
a card shuffling apparatus configured to shuffle playing cards, the card shuffling apparatus defining at least a portion of a card path;
a card output area in communication with the card shuffling apparatus to receive playing cards via the card path; and
a card output portion positioned between the card shuffling apparatus and the card output area on the card path and configured to receive playing cards from the card shuffling apparatus and deliver playing cards to the card output area, the card output portion comprising:
a card buffer area positioned within the card handling device at an interface of the card shuffling apparatus and the card output portion on the card path, wherein the card buffer area is configured to (i) receive playing cards from the card shuffling apparatus along the card path, (ii) temporarily hold a group of playing cards in a stacked configuration having a top and a bottom, and (iii) move to alter an orientation of the group of playing cards between a first orientation in which playing cards from the card shuffling apparatus are inserted at the bottom of the group of playing cards and a second orientation in which playing cards from the card shuffling apparatus are inserted at the top of the group of playing cards, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in both the first orientation and the second orientation; and
a card feed system configured to remove playing cards one-at-a-time from the group of cards in the card buffer area and to deliver the playing cards one-at-a-time to the card output area via the card path, wherein the card feed system is configured to not send a playing card to the

substantially flat card output area until a previously sent playing card is drawn from the card output area.

12. The card handling device of claim 11, wherein the card buffer area is positioned within the card handling device at a location proximal from the card output area.

13. The card handling device of claim 11, wherein the card buffer area comprises:
a support plate having an upper surface for supporting the group of playing cards;
a pick-off roller oriented above the support plate; and
a bias attached to the support plate and configured to urge the support plate toward the pick-off roller, wherein the card buffer area is configured to hold the group of playing cards between the support plate and the pick-off roller.

14. A method of shuffling cards, comprising:
receiving, at a card input portion of a card handling device, playing cards;
transporting, by a card feed system of the card handling device, the playing cards from the card input portion into a card shuffling apparatus via a card path;
outputting, by the card shuffling apparatus, at least one playing card to a card buffer area positioned along the card path in a first orientation and configured to temporarily store a group of playing cards in a stacked configuration having a top and a bottom;
altering, by an actuation system of the card handling device, the orientation of the card buffer area and the group of playing cards relative to the card shuffling apparatus to a second orientation, the card path between the card shuffling apparatus and the card buffer area remaining fixed in the first orientation and the second orientation; and
outputting, by the card shuffling apparatus, at least another playing card to the card buffer area while the card buffer area is in the second orientation to alter a sequence of playing cards in the group of playing cards stored in the card buffer area.

15. The method of claim 14, wherein the at least another playing card is output, with the card buffer area in the second orientation, to the card buffer area at a first position on top of the group of playing cards in the card buffer area.

16. The method of claim 14, wherein the at least one playing card is output, with the card buffer area in the first orientation, to the card buffer area at a second position beneath the group of playing cards in the card buffer area.

17. A method of shuffling cards, comprising:
removing, by a card transfer system of a card handling device, playing cards from a temporary storage area of the card handling device via a card path;
forming, in a card buffer area of the card handling device, a group of playing cards in a stacked configuration having a top and a bottom from the playing cards removed by the card transfer system;
adding, by the card transfer system, at least one playing card from the temporary storage area via the card path to the bottom of the group of playing cards by moving, using an actuation system of the card handling device, the card buffer area and the group of playing cards to a first orientation relative to the card path; and
adding, by the card transfer system, at least one playing card from the temporary storage area via the card path to the top of the group of playing cards by moving, using the actuation system, the card buffer area and the group of playing cards in a second orientation relative to

the card path, the card path from the card transfer system to the card buffer area remaining fixed in both the first orientation and the second orientation.

18. The method of shuffling cards of claim 17, wherein adding at least one playing card to the bottom of the group of playing cards and adding at least one playing card to the top of the group of playing cards comprises adding, by the card transfer system, the at least one playing card to the bottom of the group of playing cards and then adding, by the card transfer system, the at least one playing card to the top of the group of playing cards.

19. The method of shuffling cards of claim 18, further comprising changing, by the actuation system, an orientation of the group of playing cards and the card buffer area of the card handling device from the first orientation to the second orientation after adding the at least one playing card to the bottom of the group of playing cards and prior to adding the at least one playing card to the top of the group of playing cards.

20. The method of shuffling cards of claim 19, wherein changing an orientation of the card buffer area comprises rotating, by the actuation system, the card buffer area from the first orientation to the second orientation.

21. The method of shuffling cards of claim 20, further comprising delivering, by a card feed system of the card handling device, the at least one playing card that was added to the top of the group of playing cards to a card output area via the card path prior to removing any of the other playing cards in the group of playing cards from the card buffer area.

22. A card handling device for a gaming table comprising:
a housing for mounting to a gaming table, the housing comprising a card intake area configured to receive cards to be shuffled and a card output area for a dealer to take cards from the card handling device for dealing a game of cards at the table, the card intake area and card output area disposed to be arranged at the top of the gaming table when the housing is mounted to a table and define a card path therebetween for providing playing cards from the card intake area to the card output area;
a card shuffling apparatus configured to receive cards from the card intake area via the card path;
a card buffer area configured to receive and hold a group of cards from the card shuffling apparatus in a stacked configuration having a top and a bottom via the card path;
a card output portion configured to transport cards, one-at-a-time, from the card buffer area to the card output area via the card path;
an apparatus configured to alter an orientation of the card buffer area and the group of cards relative to the card shuffling apparatus between a first orientation in which cards from the card shuffling apparatus are inserted at the bottom of the group of cards and a second orientation in which cards are inserted at the top of the group of cards to alter the arrangement of cards in the group, wherein the card path between the card shuffling apparatus and the card buffer area remains fixed in the first orientation and the second orientation;
a sensor configured to provide a signal in response to removal of a card from the card output area by a dealer; and
a processor configured to receive the signal from the sensor and in response thereto control the card output portion to transport another card from the card buffer area to the card output area via the card path, the processor configured to control the card shuffling apparatus to re-

supply cards to the card buffer area to maintain the group of cards therein for supply to the card output area,
wherein cards are continuously supplied to the card output area.

23. The device of claim 22, wherein the card output area comprises a flat draw surface and a cover defining a planar spacing therebetween for an outlet to permit cards to be pulled from the outlet in a plurality of different directions substantially within the plane of the outlet without first being drawn from the outlet.
24. The card handling device of claim 22, wherein the card buffer area comprises:
a support plate having an upper surface for supporting the group of cards;
a pick-off roller oriented above the support plate; and
a bias attached to the support plate and configured to urge the support plate toward the pick-off roller, wherein the card buffer area is configured to hold the group of cards between the support plate and the pick-off roller.

25. A card handling device, comprising:
a card intake area configured to receive playing cards to be shuffled;
a card output area configured to receive shuffled playing cards;
a card shuffling apparatus positioned between the card intake area and the card output area along a card path, the card shuffling apparatus configured to receive playing cards from the card input area via the card path and shuffle the playing cards; and
a card buffer area positioned within the card handling device between the card shuffling apparatus and the card output area along the card path, the card buffer area configured to receive playing cards from the card shuffling apparatus and store the playing cards in a stacked configuration having a top and a bottom, the card buffer area further configured to alter an orientation of the stored playing cards between a first orientation in which playing cards from the card shuffling apparatus are inserted at the bottom of the stored playing cards and a second orientation in which playing cards from the card shuffling apparatus are inserted at the top of the stored playing cards, wherein the card path between the card buffer area and the card shuffling apparatus remains fixed in both the first orientation and the second orientation.

26. The device of claim 25, further comprising at least one card imaging system oriented along the card path for reading playing cards being transported along the card path.

27. The device of claim 26, wherein the card handling device is configured to transport at least one card to the card output area of the card handling device after the at least one card has been read by the at least one card imaging device.

28. The device of claim 25, wherein the card buffer area is configured to move relative to the card shuffling apparatus.

29. The device of claim 25, further comprising a card feed system configured to remove playing cards one-at-a-time from the top of the group of cards stored in the card buffer area and to deliver the playing cards one-at-a-time to the card output area via the card path, wherein the card feed system is further configured to send a playing card to the card output area only when the card output area is free of any other playing cards.

30. The card handling device of claim 25, wherein the card buffer area comprises:
a support plate having an upper surface for supporting the stored playing cards;

a pick-off roller oriented above the support plate; and
a bias attached to the support plate and configured to urge the support plate toward the pick-off roller, wherein the card buffer area is configured to hold the stored playing cards between the support plate and the pick-off roller.

31. A card handling device, comprising:
a card shuffling apparatus configured to shuffle playing cards, the card shuffling apparatus defining at least a portion of a card path; and
a card output portion including a card buffer area positioned at an interface of the card shuffling apparatus and the card output portion, the card buffer area configured to receive shuffled playing cards from the card shuffling apparatus via the card path, and temporarily store the received playing cards in a stacked configuration, the card output portion being configured to move to alter an orientation of the card buffer area and the stacked playing cards relative to the card shuffling apparatus and the card path between the card shuffling apparatus and the card buffer area, wherein the playing cards from the card shuffling apparatus are received at a first card position of the stacked playing cards in response to the card buffer area being positioned in a first orientation and are received at a second card position of the stacked playing cards in response to the card buffer area being positioned in a second orientation, the card buffer area comprising:
a support plate having an upper surface for supporting the stacked playing cards stored in the card buffer area;
a pick-off roller oriented above the support plate; and
a bias attached to the support plate and configured to urge the support plate toward the pick-off roller, wherein the card buffer area is configured to hold the stacked playing cards between the support plate and the pick-off roller.

32. The card handling device of claim 31, wherein the support plate of the card buffer area is translatable at least partially in a vertical direction relative to the pick-off roller of the card buffer area