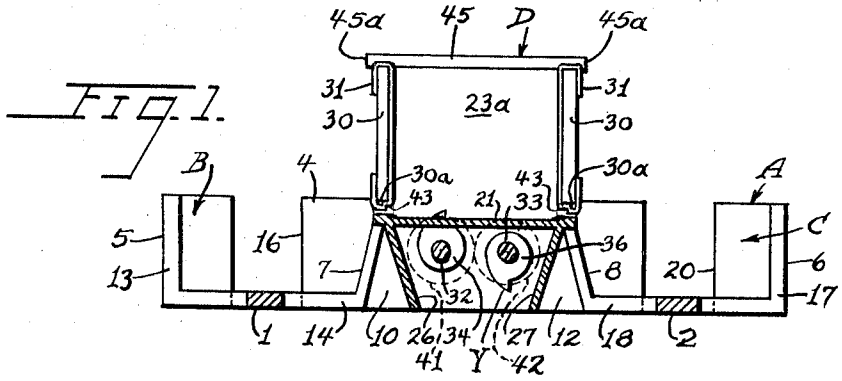
Feb. 21, 1967 E. J. GRANIUS 3,305,237

SHUFFLER WITH ADJUSTABLE GATES HAVING OFFSET PLAYING CARD HOLD DOWN MEANS

Filed March 2, 1964 2 Sheets-Sheet 1

FIG. 1.



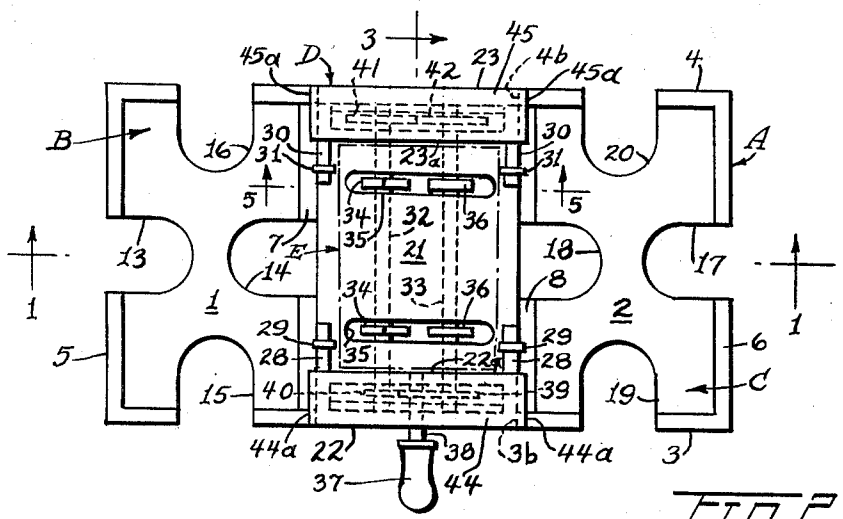


FIG. 2.

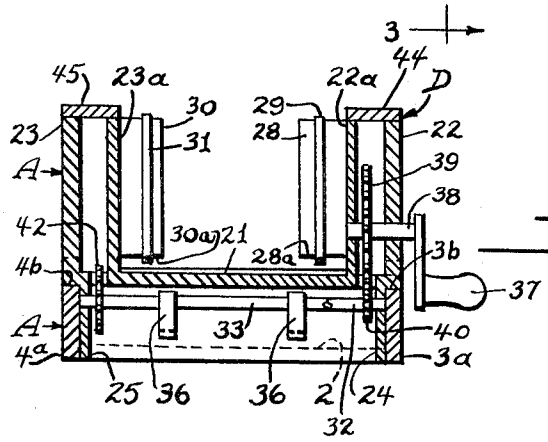


FIG. 3.

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Filed March 2, 1964 2 Sheets-Sheet 2

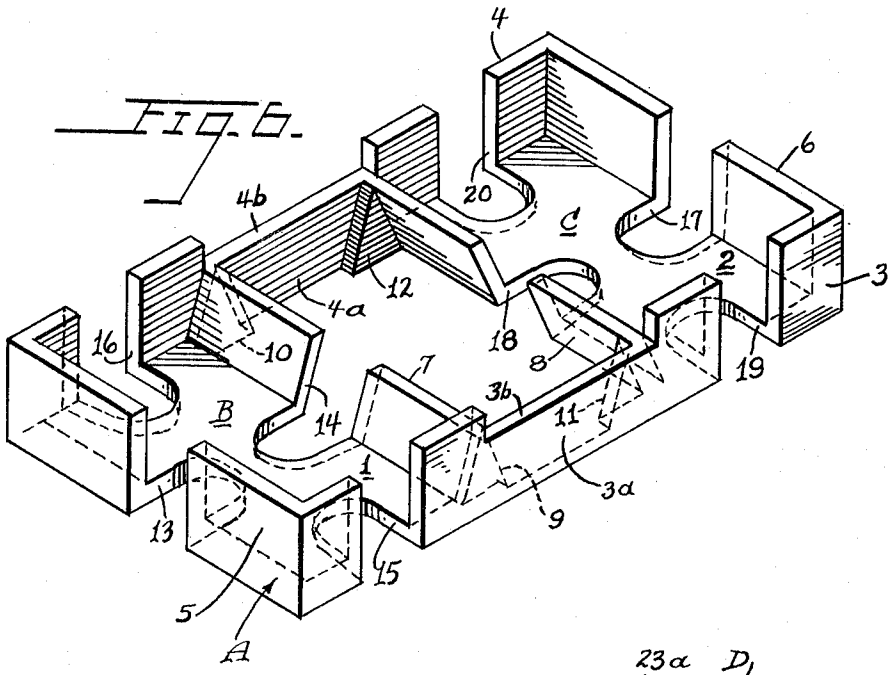

FIG. 6.

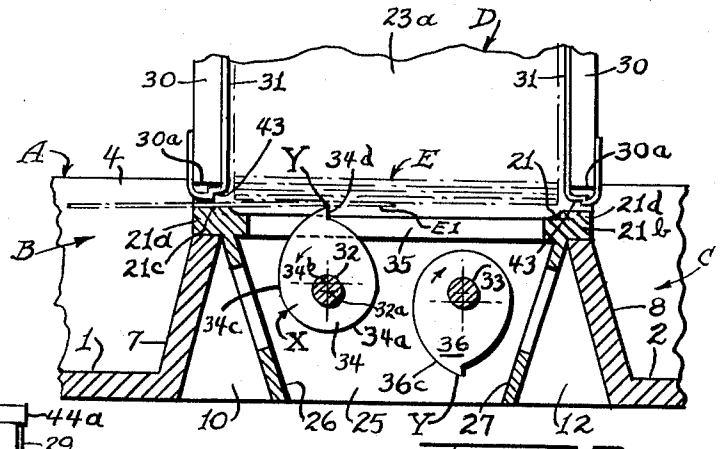

FIG. 5.

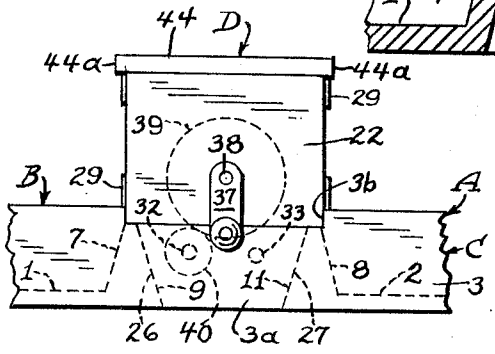

FIG. 4.

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3,305,237

SHUFFLER WITH ADJUSTABLE GATES HAVING OFFSET PLAYING CARD HOLD DOWN MEANS

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Filed Mar. 2, 1964, Ser. No. 348,681
2 Claims. (Cl. 273—149)

The present invention relates to improvements in a combined playing card shuffler and card receiving tray, and it consists in the combination, construction, and arrangement of parts as hereinafter described and claimed.

An object of my invention is to provide a multi-deck playing card shuffler and card receiving tray that serves a dual purpose of a device for shuffling cards and a tray for holding the shuffled cards. The card shuffler may be removed as a unit from the tray after completing the shuffling operation and the delivering of them to two compartments in the tray. The card shuffler has novel means for removing cards in succession from the bottom of a stack of cards in the shuffler and alternately delivering these removed cards to two card-receiving compartments in the tray. The cards in the tray compartments are accessible even though the card shuffler has not been removed from the tray and it is possible to cut the cards by removing any desired number of them from the compartments and placing them back in the card-receiving compartment of the card shuffler.

The tray can be used for holding playing cards when the card shuffler has been removed. The tray can be made of any desired material and could be molded when using plastic. The tray is of simple design.

New playing cards have a glossy surface that makes them slide easily over each other. As the cards get older and more flexible, the glossy surface also wears off and adjacent cards that contact each other are more likely to stick together. Another object of my invention is to provide adjustable gates and they permit only one card at a time to pass. These gates are adjusted in the card shuffler to provide larger exit slots for the cards when the cards are new and less flexible and more slippery and the gates can be moved to decrease the size of the card exit slots when the cards become more flexible through use and the glossy surfaces of the cards has worn off and the cards are more likely to stick together.

A further object of my invention is to provide a device of the type described which is simple in construction and durable and efficient for the purpose intended.

Other objects and advantages will appear as the specification continues. The novel features of the invention will be set forth in the appended claims.

Drawings

For a better understanding of my invention, reference should be made to the accompanying drawings, forming part of this specification, in which:

FIGURE 1 is a longitudinal section through the combined card shuffler and tray shown about one-half size and is taken along the line 1—1 of FIGURE 2.

FIGURE 2 is a top plan view of the combined card shuffler and tray.

FIGURE 3 is a transverse section taken along the line 3—3 of FIGURE 2.

FIGURE 4 is a front elevation of the card shuffler and a portion of the tray.

FIGURE 5 is a transverse section taken along the line 5—5 of FIGURE 2 and is shown full scale.

FIGURE 6 is an isometric view of the card receiving tray at one-half scale.

While I have shown only the preferred form of my invention, it should be understood that various changes, or modifications, may be made within the scope of the annexed claims without departing from the spirit thereof.

Detailed description

In carrying out my invention, I provide a combined card shuffler and tray in which the card shuffling device is removable as a unit from the tray so that the tray can be used for holding the cards that have been shuffled or can be used for holding other playing cards. I will first describe the playing card receiving tray and then will describe the card shuffling device that can be removably mounted in the tray.

In FIGURE 6, I show an isometric view of my playing card receiving tray at half scale and the tray is indicated generally at A. The tray can be made of any material desired and it could be molded as a single piece from plastic. The tray has two end card-receiving compartments indicated generally at B and C and each compartment has a base portion 1, 2. The base portion 1 of the card receiving compartment B is adapted to support a plurality of playing cards that have been delivered to the compartment by the playing card shuffling device in a manner hereinafter described. The base portion 2 for the playing card receiving compartment C can likewise support a plurality of cards that are delivered from the card shuffling device. The tray A has parallel side walls 3 and 4 and parallel end walls 5 and 6. These walls form three sides for the card receiving compartments B and C. The compartment B has the base 1, the side walls 3 and 4 and the end wall 5 while the compartment C has the base 2, side walls 3 and 4 and the end wall 6.

The tray compartments B and C are spaced from each other and the tray A has a central rectangular portion bounded by central portions 3*a* and 4*a* of the side walls 3 and 4 and bounded by inclined partitions 7 and 8 that extend at right angles to the central portions. The central portion of the tray bounded by the midportions 3*a* and 4*a* of the side walls 3 and 4 and by the inclined partitions 7 and 8 need not have a base portion as is required by the card receiving compartments B and C. It will also be noted from FIGURE 6 that at the inside corners where the inclined partition 7 connects with the midportions 3*a* and 4*a* of the side walls 3 and 4, I provide triangularly shaped members 9 and 10. I also provide additional triangularly shaped members 11 and 12 and place these at the inner corners formed by the inclined partition 8 connecting with the midportions 3*a* and 4*a* of the side walls 3 and 4.

In order to make the playing cards readily removable from the compartments B and C, I provide the compartment B with finger receiving slots 13 and 14 that are formed in the end wall 5 and the inclined partition 7 and extend into the base 1. I also provide finger receiving slots 15 and 16 for the compartment B that are formed in the side walls 3 and 4 and extend into the base 1. In like manner I provide finger receiving slots 17 and 18 for the compartment C and these are formed in the end wall 6 and the inclined partition 8 and extend into the base 2. Additional finger slots 19 and 20 are provided for the compartment C and are formed in the side walls 3 and 4 and extend into the base 2. With this construction, it is possible for a player to remove one or more playing cards in either the compartment B or the compartment C.

I will now describe the card shuffling device which is removably mounted in the central portion of the card receiving tray A. In FIGURES 1 to 5 inclusive, I show the various views of the card shuffling device which is indicated generally at D. This mechanism is mounted in a removable frame that has a base 21 and end housings 22 and 23. The base 21 is supported by a rectangular lower support that has end walls 24 and 25 and inclined side walls 26 and 27, see FIGURES 1 and 3. The end walls 24 and 25 bear against the midportions 3*a* and 4*a*

of the side walls 3 and 4 of the card receiving tray A. The inclined side walls 26 and 27 bear against the wedge-shaped members 9, 10, 11 and 12 as shown in FIGURES 1 and 6. The two sides 21*a* and 21*b* of the base 21 rest on the upper edges of the inclined partitions 7 and 8, see FIGURE 5 and provide an additional support for the card shuffler device D. The ends of the base 21 rest on the midportions 3*a* and 4*a* of the tray side walls 3 and 4, see FIGURE 3. The height of the midportions 3*a* and 4*a* on the side walls 3 and 4 is less than the height of the remaining portions of the side walls. Recesses 3*a* and 4*b* are thus formed in the midportions of the upper edges of the sides 3 and 4 and these recesses receive the end housings 22 and 23 as clearly shown in FIGURES 4 and 6.

The base 21 of the card shuffler D is of an area that will receive a stack of playing cards indicated generally by the dot-dash lines at E and shown in FIGURES 2 and 5. The inner walls 22*a* and 23*a* of the hollow end housings 22 and 23, see FIGURE 3, extend upwardly from the base 21 and are spaced far enough apart from each other to receive the ends of the playing cards E. The inner wall 22*a* has a pair of parallel and spaced apart wings 28, see FIGURES 2 and 3 and these wings act as guides for the sides of the pack of playing cards E. FIGURE 3 shows the lower edge 28*a* of the wings 28 spaced above the top of the base 21 so as to provide a slot through which the playing cards can be ejected in a manner hereinafter described. Each wing 28 has an adjustable gate 29, see FIGURES 2 and 3 and this gate is in the form of a wire that encloses the wing 28 and frictionally engages with the wing. The wire 29 can be adjusted vertically with respect to the wing 28 so as to permit only one card at a time to be moved through the slot formed between the lower edge 28*a* of the wing and the top of the base 21.

In like manner the inner wall 23*a* of the end housing 23 has a pair of spaced apart wings 30 and these are designed to extend along the sides of the playing cards E, see FIGURE 5. The wings 30 have their lower edges 30*a* spaced above the top of the base 21 so as to permit cards to be ejected from the bottom of the stack of playing cards E supported by the base. Adjustable gates 31 formed of wire, see FIGURE 1, are frictionally mounted on the wings 30 and may be adjusted vertically. The gates 31 have U-shaped ends that receive the tops and the bottoms of the wings 30 and these ends frictionally engage with the sides of the wings. It is possible to adjust the gates 31 vertically in the same manner as the gates 29 are adjustable to position the lower ends of the gates the desired distance above the base 21 so as to permit only one card at a time to be moved past the lower edges of the wings.

The enlarged view of the gates 31 in FIGURE 5 shows how the lower ends of the gates are stepped at 43. These steps will hold the upper one of two cards from being simultaneously removed from the pack of cards E at one time. This will be explained more in detail when describing the operation of the device. The gates 29 also have their lower ends stepped in the same manner as the gates 31.

I will now describe the card shuffling device for alternately removing one playing card at a time from the bottom of the stack of cards shown at E in FIGURE 5. This card shuffling mechanism will remove successive playing cards from the pack of cards E and alternately move these cards laterally first in one direction and then in the other to cause them to pass through the spaces provided under the adjustable pairs of gates 29 and 31 and into the card receiving compartments B and C of the tray A. FIGURES 1, 2, 4 and 5 illustrate two parallel shafts 32 and 33 that are disposed under the base 21 of the card shuffler D, this base supporting the stack of playing cards E. The ends of the shafts 32 and 33 are rotatably mounted in the end walls 24 and 25, note how the shaft 33 in FIGURE 3 is supported by these end walls. The shaft 32 has

a pair of card moving cams 34 that are eccentrically mounted on the shaft as clearly shown in FIGURE 5. The cam 34 has a circular rim portion 34*a* whose center 34*b* is disposed eccentric to the longitudinal axis 32*a* of the shaft 32. The cam 34 then has an arcuate edge that has a length of approximately 120° and this arcuate edge from the point X to the high point Y of the cam gradually increases in its distance from the cam center 34*b* so that this arcuate edge 34*c* will project through a slot 35 provided in the base 21 and the latter portion of the arcuate edge 34*c* will project above the upper surface of the base 21 so as to frictionally engage with the lowermost card E1 of the pack of cards shown in FIGURE 5. The shaft 32 is rotated in a counterclockwise direction when looking at FIGURE 5 and the arcuate portions 34*c* of both cams 34 mounted on the shaft 32 will move the lowermost card E1 laterally to the left in FIGURE 5.

The position of the two gates 29 and 31 on the left hand wings 28 and 30 when looking at FIGURE 2, will permit only one card at a time to be moved under these gates and thus be removed from the bottom of the pack of cards E and delivered to the tray compartment B. FIGURE 5 shows the left hand edge of the base 21 as having a longitudinally extending rib 21*c* and this rib will cause the lowermost card E1 that is being removed from the bottom of the pack of cards E, to remain in substantially a horizontal plane during its movement. The length of the arcuate portions 34*c* on the cams 34 is sufficient to entirely remove the lowermost card E1 from the pack. The shaft 32 is rotated rapidly during the card shuffling operation and the momentum imparted by the arcuate surface 34*c* in frictionally engaging with the underside of the lowermost card will cause this card to be moved clear of the pack of cards E and delivered to the card receiving compartment B in the tray A. There is a step 34*d* provided between the high point of the cam 34 and the low point.

Another pair of cams 36 are mounted on the shaft 33, see FIGURES 2, 3 and 5. The cams 36 are identical to the cams 34 and they are merely reversed in their positions to the cams 34 because the shaft 33 rotates clockwise in FIGURE 5 while the shaft 32 rotates counter-clockwise. The high point on each cam 36 which is shown at Y is placed 180° away from the high points Y on the cams 34. Reference to FIGURE 5, for example, shows the high points Y on the cams 36 extending downwardly when the high points Y on the cams 34 extend upwardly. The purpose for this is to permit the cams 34 to entirely remove a lowermost card E1 from the pack of cards E and deliver this card to the tray compartment B before the cams 36 will frictionally engage with the next lowermost card in the pack. No further descriptions of the shapes of the cams 36 is necessary since as already stated, they are of the same shape as the cams 34 but are merely reversed in their positions and the high points Y are spaced 180° away from the high points Y of the cams 34.

The cams 36 will extend through the same slots 35 in the base 21 when the enlarged peripheries of the cams move into the slots. The arcuate portions 36*c* are so shaped that for 120° of travel of the cams 36 prior to the high points Y being at their uppermost positions, this 120° of arcuate surface will be disposed above the upper surface of the base 21 and will frictionally engage with the lowermost card in the pack of cards E and will move this card to the right in FIGURE 5 and cause it to move under the bottom portions of the gates 29 and 31 on the right hand wings 28 and 30 in FIGURE 5. The upper surface of the base 21 may be provided with a raised rib 21*d* along its right hand edge, see FIGURE 5. The purpose of this is to cause the card that is being ejected from the pack to remain in substantially a horizontal position during its removal. The cams 36 will be rotated rapidly enough to move the card into the tray compartment C.

The means for rotating the shafts 32 and 33 in opposite directions comprises a crank 37, see FIGURES 2, 3 and 4, that is mounted on a shaft 38 and this shaft is rotatably carried by the end housing 22. FIGURES 3 and 4 show the shaft 38 as having a gear 39 keyed thereto and this gear meshes with a pinion 40 that in turn is mounted on the shaft 32. FIGURE 2 shows the opposite end of the shaft 32 provided with a gear 41, see FIGURES 1 and 2 and this gear meshes with a second gear 42 that is mounted on the shaft 33. This gear train will cause the shaft 32 in FIGURE 5 to rotate counter-clockwise and the shaft 33 to rotate clockwise when the crank 37 in FIGURE 4 is rotated clockwise. The gear ratio between the gear 39 and the pinion 40 in FIGURE 4 is such as to cause the shafts 32 and 33 to rotate at a faster speed than the shaft 38 which is manually rotated by the crank 37.

Operation

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. When the device is used for shuffling cards one or more decks of cards may be placed in the card receiving compartment in the card shuffling device D. The card shuffling device is placed in the center of the tray A and is removably supported by the wedge-shaped members 9, 10, 11 and 12 of the tray and shown in FIGURE 6. The recesses 3*b* and 4*b* in the side walls 3 and 4 of the tray have vertical side walls that act as positioning means for mounting the card shuffling device D in the right place at the center of the tray.

My card shuffler is especially designed to shuffle a plurality of decks of cards such as three decks at one time. The cards E are placed in the card shuffler and then the operator rotates the crank 37 in a clockwise direction when looking at FIGURE 4. This operation will rotate the shaft 32 and the cams 34 in a counter-clockwise direction and will simultaneously rotate the shaft 33 and the cams 36 in a clockwise direction. The pair of cams 34 on the shaft 32 when contacting with the lowermost card E1 in the pack will remove this card from under the pack and deliver it to the tray compartment B. When this movement has been completed the pair of cams 36 on the shaft 33 will then frictionally engage with the next lowermost card and will deliver this card to the compartment C in the tray. Successive cards in the pack E will therefore be alternately delivered to the compartments B and C. FIGURE 5 shows the inclined walls 26 and 27 as having slots therein for permitting the high points Y of the cams 34 and 36 to pass therethrough during the rotation of the cams.

The operator can cut the cards in the compartments B and C at any time he so desires and the finger slots 15 and 16 in the compartment B and the finger slots 19 and 20 in the compartment C can be used for this purpose. It is possible to shuffle all of the cards in the card shuffler before any cutting is done and the tray compartments B and C are made deep enough to receive these cards.

When the pack of cards E in the card shuffler are reduced to a point where only a few cards are left, then the weight of the pack is greatly reduced and the rotating cams 34 and 36 will have a tendency to vibrate these cards in a vertical direction as the high points Y of the cams alternately engage with the lowermost cards. In order to overcome this tendency to vibrate the cards, I provide the bottoms of the gates 29 and 31 with the stepped portions 43, see FIGURE 5. The lowermost card when being ejected from the pack will have a tendency to move the card above it because of the frictional contact between the adjacent cards. The card above the lowermost card might be moved as far as the step portion 43 of the gates 29 and 31 on the left hand side of the base 21 and will engage with the step and be held against further lateral movement.

The step portions 43 in the lower ends of the gates have the additional advantage of acting as a stop for the next to the lowermost card and holding this card against vertical upward movement even though there are only a few cards left in the pack. The height of the step 43 is equal to the thickness of one card. If the next to the lowermost card is prevented from vertical upward movement because of engaging with the step 43, then all of the remaining cards in the pack will be prevented from moving upwardly. In this simple way, I guard against the vertical vibrational movement of the remaining cards in the pack when most of the cards have been removed from the pack. The steps 43 on the other two gates 29 and 31 on the opposite side of the compartment in the card shuffler D will function in the same manner and will prevent all movement of the remaining few cards in the pack when the lowermost card is being removed from the pack.

After the shuffling of the cards has been completed, the card shuffling device D can be lifted from the tray A and the tray can be used in an ordinary manner for holding two packs of cards in the compartments B and C. The end housing 22 has a top member 44, see FIGURES 2, 3 and 4, whose two ends 44*a* extend beyond the side walls of the housing. In like manner the other end housing 23 has a top member 45, see FIGURES 1 and 2, whose two ends 45*a* extend beyond the side walls of this housing. These projecting ends 44*a* and 45*a* may be grasped by the person who wants to remove the card shuffler D from the tray A or when placing the card shuffler in proper position on the tray. It is easier to move the card shuffler D when grasping these projecting ends of the top members 44 and 45.

One or more cards in either pack may be removed from the tray A and the finger slots 13 and 14 may be used when the card shuffler D is removed or the slots 15 and 16 in the compartment B may be used by the operator to readily grasp the cards in this compartment for removal. In like manner the finger slots 17 and 18 or 19 and 20 may be used by the operator when removing cards from the compartment C.

The gates 29 and 31 are illustrated as being made of wire in the drawings. It may be advisable to make these gates out of strap material that would have a width equal to the length of the wings 28 and 30. This change in width for the gates will not alter the operation of the card shuffling device. However, gates of a wider width than the wires shown in the drawings will have less tendency to wear grooves in the sides of the cards.

The ribs 21*c* and 21*d* which are integral with the base 21 of the card shuffler are provided with a wide enough top surface so that the inner edge of the rib 21*c* will be in vertical alignment with the inner vertical surfaces of the left hand gates 29 and 31. In like manner the inner left hand edge of the rib 21*d* will be in vertical alignment with the inner surface of the right hand gates 29 and 31 shown in FIGURE 5. When the base ribs are formed in this manner, the playing cards will not become jammed against the shoulders 43 on the gates. The shoulders will permit ony one card at a time to pass under either the left hand pair of gates or the right hand pair of gates.

During the operation of the card shuffler, the two pairs of cams 34 and 36 will rotate in opposite directions and will alternately contact with the lowermost pack of cards E. The rotation of the cams will have a tendency to move the pack of cards laterally in one direction when the cams 34 contact with the lowermost card and then to move the pack in the opposite direction when the cams 36 contact with the cards. This transverse reciprocation of the pack of cards will have a tendency to keep the cards in a loosened condition. The result will be a continued removing of the cards from the bottom of the pack and in alternating feeding of the removed cards to the left and to the right from the card shuffler D when looking at FIGURE 5.

I claim:

1. In a card shuffler:

(a) a card receiving compartment including a base and side walls, the lower edges of said side walls being spaced above the top of said base to permit the lateral passage of cards from said compartment;

(b) card shuffling means including rotatable cams for alternately engaging with the lowermost card in the stack of cards in said compartment for removing the card laterally from the stack and moving the card through the space between the lower edge of one compartment side wall and the top of said base and then for moving the next lowermost card laterally and in the opposite direction for ejecting the card through the space between the lower edge of the other compartment side wall and the top of said base; and

(c) a plurality of adjustable gates carried by each of said side walls and projecting below the lower edges of said side walls for altering the extent of the unobstructed opening between the top of said base and the lowest portions of said gates for permitting only one card at a time to be removed from the bottom of the card stack in said compartment;

(d) said gates having offset means for receiving the edge of the next to the lowest card in the stack for preventing this card edge from being moved upwardly when the lowermost card is engaged by the cams for removing it from the card stack;

(e) the offset means of said gates having shoulders associated therewith acting as stops to the adjacent edge of the next to the bottom card for preventing this card from being ejected laterally from the card stack with the lowermost card that is being ejected.

2. In a card shuffler:

(a) a card receiving compartment including a base and side walls, the lower edges of said side walls being spaced above the top of said base to permit the lateral passage of cards from said compartment;

(b) a pair of parallel and spaced apart shafts positioned under said base and extending in the direction of the length of the cards supported by the base;

(c) card moving cams carried by said shafts, said base having slots through which said cams can move to contact with the lowermost card of the stack of cards in said compartment;

(d) the cams mounted on one of the shafts having cam-shaped edges that during a portion of each complete rotation of said shaft, the cam-shaped edges will have portions move gradually upwardly through the base slots associated therewith to frictionally engage with the lowermost card in the pack of cards and move this card laterally out from under the pack and through the space provided between the lower edge of the side wall disposed nearest to said cams and the top of said base for ejecting the card;

(e) the cams mounted on the other shaft having cam-shaped edges that during a portion of each complete rotation of said shaft, the cam-shaped edges will have portions move gradually upwardly through the base slots associated therewith to frictionally engage with the next lowermost card in the pack and move this card laterally out from under the pack and in an opposite direction from the lateral movement of the former lowermost card so that this card will be moved through the space provided between the lower edge of the side wall nearest to the last-mentioned cams and the top of said base and be ejected from the pack;

(f) means for rotating said shafts in opposite directions, the cams on one shaft being angularly disposed with respect to the cams on the other shaft so that they will alternately and gradually engage with the lowermost cards in the pack for ejecting the cards therefrom one at a time and in opposite directions;

(g) adjustable gates carried by the side walls of said card receiving compartment in substantial alignment with the cams mounted on each of said shafts, said gates projecting below the lower edges of said compartment for altering the extent of the unobstructed opening between the top of said base and the lowest portions of said gates for permitting only one card at a time to be removed from the bottom of the card stack in the compartment;

(h) said gates having offset means for receiving the edge of the next to the lowest card in the card stack and for preventing this card edge from being moved upwardly when the lowermost card is frictionally engaged in a gradual manner by the rotating cams for removing it from the stack; and

(i) the offset means of said gates having shoulders associated therewith acting as stops to the adjacent edge of the next to the bottom card for preventing this card from being ejected laterally from the card stack with the lowermost card that is being ejected.

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