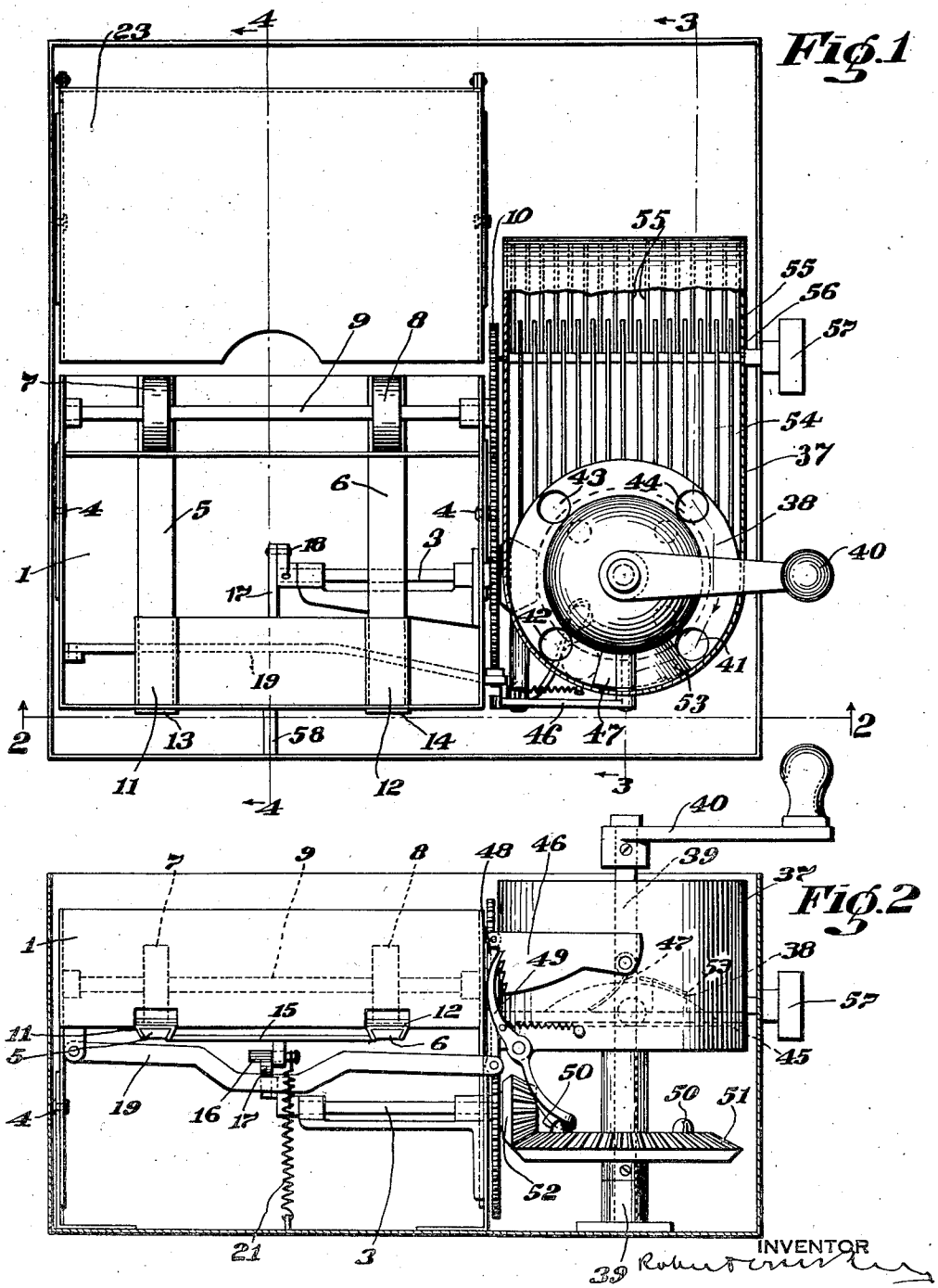
Feb. 19, 1935. R. C. McKAY 1,992,085

METHOD OF DEALING PLAYING CARDS

Filed Oct. 27, 1932 3 Sheets-Sheet 1



Feb. 19, 1935. R. C. McKAY 1,992,085

METHOD OF DEALING PLAYING CARDS

Filed Oct. 27, 1932 3 Sheets-Sheet 2.

Fig. 3

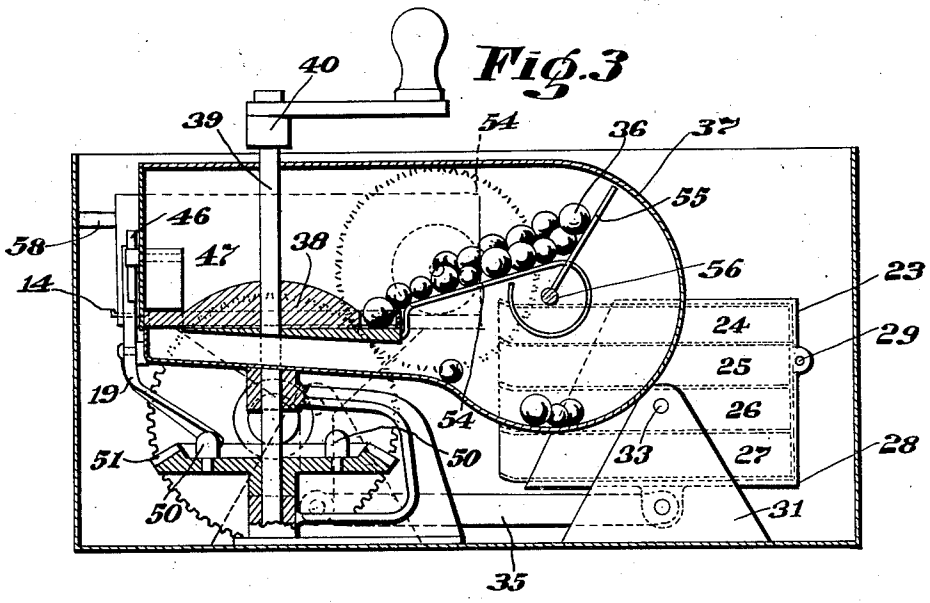
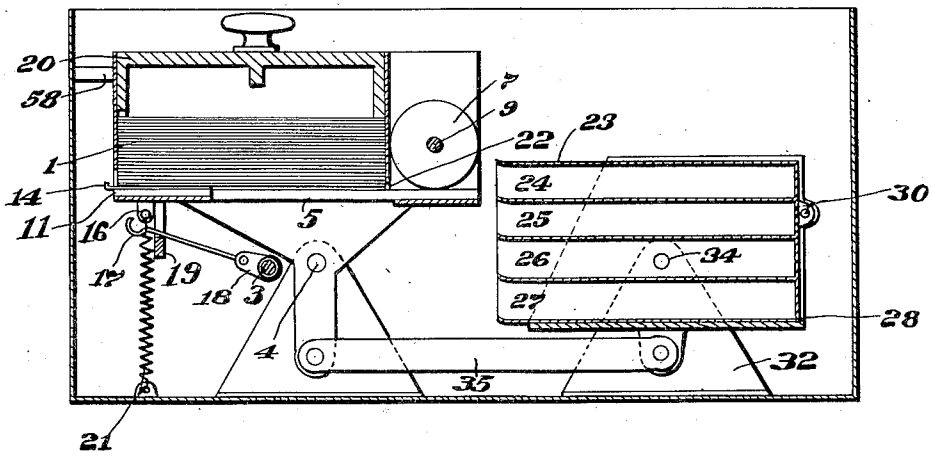


Fig. 4



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Feb. 19, 1935. R. C. McKAY 1,992,085

METHOD OF DEALING PLAYING CARDS

Filed Oct. 27, 1932 3 Sheets-Sheet 3

Fig. 5

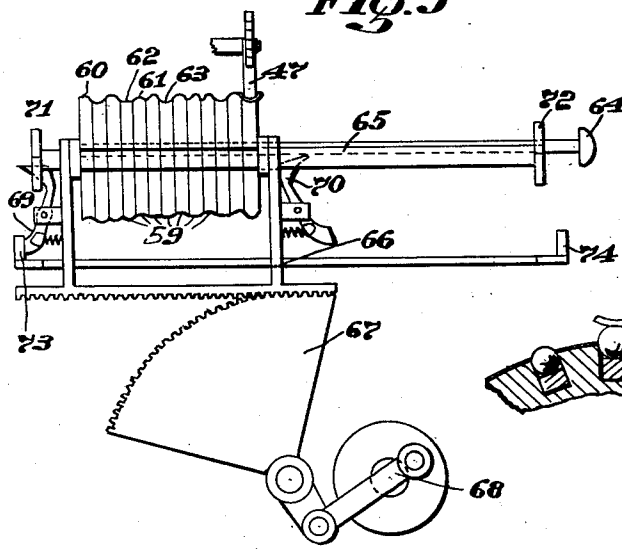


Fig. 6

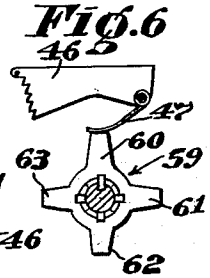


Fig. 11

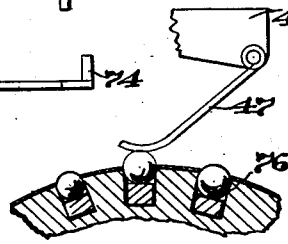


Fig. 7

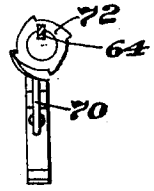


Fig. 8

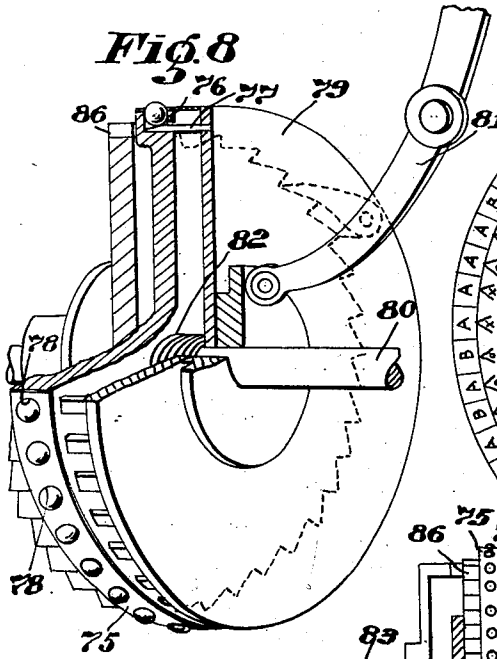
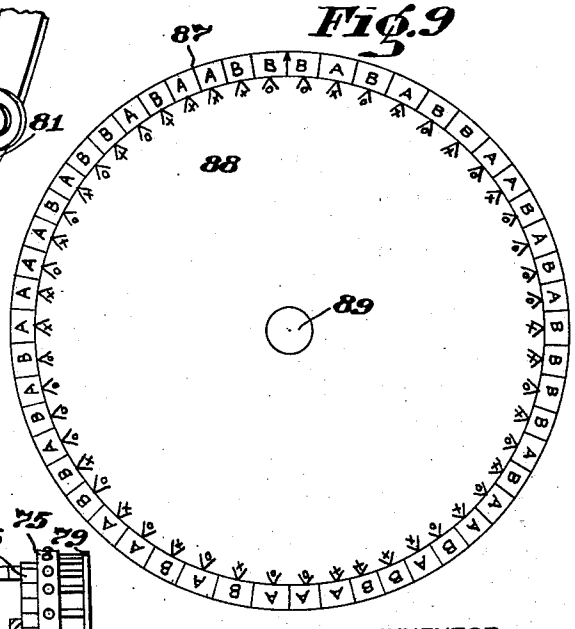


Fig. 9



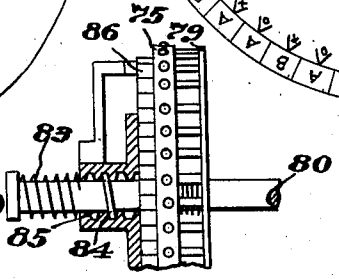


Fig. 10

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UNITED STATES PATENT OFFICE

1,992,085

METHOD OF DEALING PLAYING CARDS

Robert C. McKay, Swampscott, Mass.

Application October 27, 1932, Serial No. 639,817

13 Claims. (Cl. 273—149)

This invention relates to methods of shuffling and dealing playing cards.

It is the chief object of the invention to improve such methods with a view to producing a better shuffle and making a deal which will be uniformly fair. It is also an object of the invention to combine the shuffle and the deal into a single operation.

Stated more specifically, the invention aims to devise a method of shuffling and dealing cards which can be practiced with the aid of some relatively inexpensive type of machine. For this reason, and while the method of this invention can be practiced by hand, it will be herein disclosed in connection with the description of three different mechanisms designed to practice the method. The novel features of the invention will be more particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a plan view, with the cover broken away, of a machine which I prefer to use in practicing my novel method;

Fig. 2 is a sectional view on the line 2—2, Fig. 1;

Fig. 3 is a section on the line 3—3, Fig. 1;

Fig. 4 is a section on the line 4—4, Fig. 1;

Fig. 5 is a side elevation illustrating a mechanism of a very different type which can be used in place of certain of the parts of the machine shown in Figs. 1 to 4 for controlling the shuffling and dealing operations in accordance with this invention;

Figs. 6 and 7 are fragmentary elevations, partly in section, illustrating certain of the details of construction of the mechanism shown in Fig. 5;

Fig. 8 is a perspective view, with parts broken away, showing portions of another mechanism embodying features of this invention;

Fig. 9 is a diagrammatic view illustrating the principle on which the mechanism shown in Fig. 8 is based;

Fig. 10 is a side elevation, partly in section, showing certain of the details of the mechanism illustrated in Fig. 8; and

Figure 11 is a fragmentary elevation, partly in section, illustrating certain of the details of construction of the mechanism shown in Figures 5 and 8.

Briefly stated, the method provided by this invention consists in dealing successive cards at random, or indiscriminately, to the various hands. For example, the cards are dealt successively and the hand to which each card is delivered may be determined by chance, or the order in which the cards are delivered to the hands may be determined by selecting at random a sequence controlling such delivery. The same number of cards ultimately is delivered to each hand. The deal is made entirely without regard to the face value or playing value of the respective cards, just as it is in hand dealing in bridge, whist, and contract. In the machine shown in Figs. 1 to 4, inclusive, four groups of balls are used, the balls in each group differing in size from those in all the other groups. In connection with the dealing of each card a ball is selected at random and the ball so selected determines to which one of four hands the card will be delivered. The size of the ball selected in connection with the delivery of each card is made indiscriminately, or, in other words, is controlled entirely by chance. Consequently, a fair deal is ensured. In the mechanisms shown in Figs. 5 to 7, a similar control of the delivery of the cards is provided for, but the sequence in which the successive cards will be delivered to the hands, while determined indiscriminately, or by chance, is fixed in advance of each deal, and when once fixed the machine then goes through its complete series of operations. A similar arrangement also is provided in the mechanism illustrated in Figs. 8, 9 and 10, but the total number of combinations available with the latter mechanism is not nearly as great as in the other two machines.

Referring first to Figs. 1 to 4, inclusive, the machine there shown comprises a container or magazine 1 for holding a pack of cards. This container is pivoted on studs 4—4. The bottom of the container consists of two tracks or rails 5 and 6 on which the pack of cards rests, the rails extending forward beyond the front of the container and under two rubber tired transfer wheels 7 and 8, respectively. Both wheels are mounted on a shaft 9 which is geared to the shaft 3, the latter shaft being positively connected by mechanism later to be described with the crank 40.

Slidably mounted on the rails 5 and 6 are sleeves 11 and 12, Figs. 1 and 2, each provided with a turned-up end or projection, as shown at 13 and 14. These projections or lips have a height approximately equal to, or slightly less, than the thickness of one card. Both sleeves are fastened securely together by a bar 15, from the under side of which a lug 16 projects. This lug lies in the path of travel of a link or pitman having a hook 17, Fig. 4, formed at its outer end and connected at its inner end to a crank 18 mounted on the shaft 3. As the shaft 3 is rotated the link 17 is moved backward and forward but it rests on the link 19 and consequently, it does

not engage the lug 16 unless the link has been raised sufficiently to effect this result. When so raised, however, the lips 13 and 14 will feed the bottommost card forward under the transfer rolls 7 and 8 which will complete the ejection of the card from the magazine. A cover 20 having sufficient weight to hold the cards down keeps the bottommost card pressed firmly against the rails 5 and 6 and the sleeves 11 and 12.

As successive cards are ejected in this manner from the magazine they are delivered into a receiver 23 having four compartments 24, 25, 26 and 27 corresponding, respectively, to the four hands to be dealt. This receiver is supported in a frame 28 which is pivoted on trunnions 31 and 32 at the points 33 and 34. A link 35 connects the bottom of the frame with an extension of the magazine support, as best shown in Fig. 4. Due to this arrangement a rocking movement of the magazine in a clockwise direction about the pivot 4 will produce a corresponding rocking movement of the receiver about the pivots 33 and 34 and these movements may be so controlled as to bring any one of the four compartments in the receiver into position for the delivery thereto of a card from the magazine.

The mechanism for determining at random, or by chance, the compartment to which any individual card will be delivered comprises 52 balls, indicated in general at 36, divided into four groups of 13 balls each. As above indicated, the balls in one group are all of substantially the same diameter, but those in each group are of a different size from those in any other group. Preferably, the diameter of the largest ball is somewhat less than twice the diameter of the smallest, but the particular diameters selected will depend upon the design of the machine. The balls are enclosed in a container 37. Mounted in this container is a horizontal disk 38 secured on the vertical shaft 39 to which the crank 40 is fastened. Several holes, in this instance four, are formed in the disk 38 and are made slightly larger in diameter than the largest ball, but are not large enough to receive two of the smallest balls simultaneously. Immediately below the disk 38 is a plate 45 on which the balls in the holes rest and which prevents them from falling through the disk until they have performed their selective functions. A lever 46 is secured on a rock shaft that is supported in the container, and an arm 47 also is secured to this rock shaft and projects downwardly at an angle immediately above the flattened margin of the disk 38, so that as the disk is revolved the balls located in the holes in the disk will be brought successively into contact with the arm and will lift it, and consequently the lever 46, to a height determined by the respective diameters of the balls. The lever 46 is provided with four notches each representing the height to which it is raised by the passage of the balls of the four sizes. Pivoted to the lever 46 is a link 48 that connects the lever with the link 19 previously referred to. A latch 49 also is provided to hold the lever 46 in any position to which it is raised by the passage of a ball under the arm 47. After being so adjusted by a ball, the lever 46 remains in its adjusted position until the latch is released by the action of a lug or projection 50 of which there are four carried by the gear 51 through which the shaft 3 is driven from the shaft 39, and the lugs are so spaced with reference to the holes 41 to 44, inclusive, in the disk 38 that the release of the latch occurs approximately simultaneously with the engagement of the arm 47 by a ball. A spring 53 which overlies the path of travel of the balls prevents more than one ball at a time from passing under the arm 47. At the beginning of a deal the entire supply of balls is supported on a platform consisting of a series of parallel wires 54, this platform being so inclined that the balls roll down it by gravity on to the reduced margin of the disk 38.

In operating the machine a deck of 52 cards is placed in the magazine 1 with the cover 20 resting on them. The crank 40 is then rotated to revolve the shaft 39. At each quarter of a revolution of the latter shaft a card is fed in the manner above described under the transfer rolls 7 and 8, and a ball is brought under the arm 47, thus adjusting the lever 46 to a position determined by the size of the ball. If the ball is one of the smallest size it will raise the lever 46 to the first notch, thus raising the lever 19 only far enough to lift the hook 17 to such a point that it can catch the lug 16 and produce the feeding movement above described. This will result in the delivery of the card to the upper compartment 24 of the receiver. When a larger ball comes under the arm 47 it will lift the link 19, still further, thus tipping the magazine in a clockwise direction to a degree depending upon the diameter of the ball and thus causing the card advanced simultaneously with the movement of that ball to be delivered to one of the lower compartments 25, 26 or 27 in the receiver. After each delivery the latch 49 is released, as above described, and the magazine is returned to its initial position, as shown in Fig. 4, by the spring 21, said position being determined by the stationary stop 58. It should be observed that no card will be fed out of the magazine unless a ball is under the arm 47, this relationship being required in order to lift the hook 17 far enough to engage the lug 16. Also, the particular compartment in the receiver to which the card will be delivered is determined by the size of the ball under the arm 47. Consequently, as the operation of the machine continues, the cards will be fed successively until the entire 52 cards have been delivered and 13 cards will be found in each compartment. The delivery of the cards to the respective compartments, however, is entirely a matter of chance and is effected indiscriminately since it is controlled solely by the order in which the balls are brought under the arm 47.

After a ball has passed under the arm 47 it drops through a slot in the plate 45 and rolls back into the lower part of the compartment 37. Before making another deal the entire group of balls is lifted on to the platform 54 by revolving a rake 55 consisting of a series of wire teeth staggered with reference to the wires which compose the platform 54. All of the teeth 55 are secured in a shaft 56 to which an arm 57 is fastened, so that by revolving this knob the rake may be swept through the lower part of the compartment 37 where it will pick up all the balls and transfer them to the platform.

From the foregoing it will be evident that in this machine while the cards are fed in order from one end of the pack, the delivery of the cards to the different hands is controlled solely by the selection of the balls and that this selection is made indiscriminately or by chance. Since there are four groups of balls with thirteen in each group, the number of combinations runs into extremely high figures.

Figs. 5, 6 and 7 illustrate a different selecting mechanism which may be substituted for that shown in the machine above described for con-

trolling, at random, the sequence in which the cards will be delivered to the compartments of the receiver. In this mechanism thirteen disks 59 are mounted to rotate loosely on a shaft 65. Each disk has four arms or projections 60, 61, 62 and 63, Fig. 6, radiating therefrom, the arms being of different lengths. Also, the ends of the arms are made of different transverse contours, the projections 60 and 61 being rounded or convex transversely, while the projection 62 is flat and 63 is concave. When the projections of the various disks are lined up together, therefore, they will form a horizontal cam, as illustrated in Fig. 5.

Slidable in the shaft 65 is a key 64. Also, each disk has four keyways formed in it and in line with the respective arms 60 and 63. When the key 64 is pulled out these disks are free to rotate individually around the shaft 65, and such rotation may be started either by hand or by mechanical means. Each disk also has a flange projecting axially therefrom and each flange is notched to provide a tapering guideway leading to each keyway. Consequently, if the key 64 is pushed forward while the disks are rotating, or after they have stopped revolving, it will slide with relatively little resistance through the entire series of disks and will lock them all to the shaft 65. This will produce a cam contour of a different form from the previous one and probably different from any which has been produced before.

The cam produced in this manner is used to operate the lever 46 of the machine shown in Figs. 1 to 4 in a manner generally similar to that in which the balls were so used in said machine. As shown in Fig. 5, the entire frame which carries the disks 59 and the shaft 65 is supported on a rack that meshes with a sector 67. The sector is arranged to be oscillated by connections with another shaft, which is either geared to the shaft 39 or is driven through a worm gear or pawl and ratchet connection with said shaft, so that the frame 66 and the cam carried thereby will be moved endwise the width of one disk with the delivery of each card. When the frame has reached the end of its traverse, the entire series of disks and the shaft 65 is revolved through an angle of 90° to present a new cam surface to the arm 47. For this purpose pawls 69 and 70 are provided at each end of the frame 66 and they are arranged to engage, respectively, with teeth on the ratchet wheel 71 and 72 carried by the shaft 65 so as to turn the shaft a quarter revolution at each end of the stroke of the frame 66. Lugs 73 and 74 are provided on a stationary part of the machine to engage, respectively, with said pawls in order to operate them in the manner just described.

With this arrangement one of the cam surfaces on a disk 59 is brought into engagement with the arm 47 in connection with the feeding of each card, these surfaces of the disks performing the same function as do the balls 36 in the machine shown in Figs. 1 to 4. The ultimate result is the same, namely, that 52 cards are dealt to the four compartments according to the sequence in which the projections of different lengths are lined up when the key 64 is inserted through the keyways in the disks, and 13 cards finally will be deposited in each compartment of the receiver.

Due to the fact that the link 19 in the machine shown in Figs. 1 to 4 is provided chiefly for the purpose of so controlling the operation of the hook 17 as to prevent the delivery of a card except when one of the balls also is delivered, this link can be dispensed with in a machine equipped with the mechanism shown in Figs. 5, 6 and 7, and the link 48 can be attached directly to the magazine 1.

A third mechanism for determining a random sequence for controlling the delivery of the cards to the compartments in the receiver is illustrated in Figs. 8, 9, 10 and 11. It comprises a wheel 75 containing 52 balls, each ball being held in a small compartment provided in the periphery of the wheel. Each compartment has a lateral slot 76 to receive a wedge 77. The compartments are also open at the top, as shown at 78, to permit the balls to be pushed outwardly to approximately half of their respective diameters. In this construction the balls are divided into two groups of twenty-six each, one group consisting of balls of larger diameter than those in the other. The wedges 77 are carried by a disk 79 and are so arranged that each wedge can be inserted in a slot 76 and thus be entered under the ball in that slot to force it outwardly. Both wheels or disks 75 and 79 are mounted on the shaft 80 and are free to turn relatively to this shaft. Normally a lever 81 presses the disk 79 toward the wheel 75 and thus holds the wedges 77 under the balls carried by the wheel. When this lever is withdrawn, however, a spring 82 moves the disk 79 away from the wheel 75. At the same time a spring 83, Fig. 10, pushes a washer 54 and the wheel 75 along the shaft 80. The washer is pinned to the shaft and runs in the grooves of a stationary worm 85. Consequently, as the wheel and the washer are moved axially of the shaft 80, in the manner just described, a spinning motion will be imparted to the wheel. When the lever 81 which is operated by a cam on one of the shafts of the machine again slides the disk 79 and the wheel 75 toward the left, Fig. 8, it will again compress the springs 82 and 83 and will force the wedges 77 into the slots 76. This movement will also engage a pawl carried by the wheel 75 with the teeth of a ratchet wheel 76.

After the wedges have been inserted in the ball compartments and have forced the balls outwardly, the periphery of the wheel then will present the appearance of a cam because of the variation in the positions of the balls as shown, for example, in Fig. 11. This cam is utilized to operate the arm 47 of the lever 46 of the machine shown in Figs. 1 to 4. The ratchet wheel 86 will be revolved step by step by a pawl operated from the shafts 3 or 39 and, through the connections between this ratchet wheel and the wheel 75, will rotate the latter step by step and cause one ball to pass under the arm 45 each time a card is delivered.

The wedges are divided into two groups of different thicknesses, and their relation to the balls is such that whenever the two are brought into cooperative engagement the balls will be projected to four different heights or radial distances and the entire set will be divided into four groups with thirteen balls in each group. This relation is illustrated by the diagram in Fig. 9. The outer disk 87 shows fifty-two balls of sizes A and B. The inner disk 88 shows wedges of two sizes X and O. As both disks move around center 89 the size of the ball and the wedge minus the depth of the ball compartment will give the distance which the ball will project above the rim of the wheel. Thus, if ball A is six-thirty-seconds inches in diameter and ball B is eight-thirty-seconds inches in diameter, wedge X is two thirty-seconds inches thick and wedge O is three thirty-seconds inches thick, and the depth of the ball compartment is eight thirty-seconds inches, then A plus X will be eight thirty-seconds inches and

ball A will not project beyond the rim of the wheel. A plus B will be nine thirty-seconds and ball A will project one thirty-seconds of an inch above the rim of the wheel, B plus X will be ten thirty-seconds inches and ball B will project two thirty-seconds inches above the rim of the wheel. B plus O will be eleven thirty-seconds inches and ball B will project three thirty-seconds inches above the rim of the wheel. By following the arrangement of the balls and wedges shown on the diagram in Fig. 9, no matter in what position the inner disk may be in relation to the outer disk, there will always be thirteen projections of each different height, as will be seen from the arrangement of the balls and wedges. As a result a large variation in sequences for delivering the cards may be obtained.

In all of these arrangements, therefore, the delivery of the cards to the various compartments in the receiver is determined indiscriminately, or by chance, so that a fair deal always is made.

While the method of this invention has been herein described in connection with certain specific forms of mechanism, it will be evident that the method can also be practiced by hand or with the aid of a great variety of other mechanisms.

Having thus described my invention, what I desire to claim as new is:

1. That improvement in methods of dealing a deck of playing cards which consists in dealing the cards successively, and selecting at random the hand to which each card will be delivered.

2. That improvement in methods of dealing a deck of playing cards which consists in dealing the cards successively, selecting at random a sequence for delivering the cards to the various hands, and dealing the cards according to the sequence so selected.

3. That improvement in methods of dealing a deck of playing cards which consists in dealing the cards in order from one face of the pack, and delivering the cards in random sequence to the various hands while ultimately delivering the same number of cards to each hand.

4. That improvement in methods of dealing a deck of playing cards which consists in dealing the cards successively and determining at random the hand to which each card will be delivered but ultimately delivering the same number of cards to each hand.

5. That improvement in methods of dealing a deck of playing cards which consists in providing elements differing from each other but corresponding in the number of kinds to the number of hands to be dealt, dealing the cards successively, selecting one of said elements at random in connection with the dealing of each card, and determining the hand to which each card will be dealt by the characteristics of the element so selected for that individual card.

6. That improvement in methods of dealing a deck of playing cards which consists in providing a number of groups of elements corresponding to the number of hands to be dealt, the members of each group being different from those of each other group, dealing the cards successively, selecting one of said elements at random in connection with the dealing of each card, and controlling the distribution of the cards to the various hands in accordance with the classification of the elements so selected for the respective cards, whereby the cards ultimately will be divided into hands corresponding to said groups of elements.

7. That improvement in methods of dealing a deck of playing cards which consists in dealing successive cards to the various hands in irregular sequence containing irregularities other than those involving a reversal of the deal, but ultimately dealing the same number of cards to each hand, and without regard to the playing value of the respective cards so dealt.

8. That improvement in methods of dealing a deck of playing cards which consists in dealing the cards successively, selecting any one of a variety of irregular sequences for delivering the cards to the various hands and dealing the cards according to the sequence so selected and without regard to the playing value of the respective cards so dealt.

9. That improvement in methods of dealing a deck of playing cards, which consists in delivering the cards to the various hands promiscuously and without regard either to the order in which the hands are located or to the playing value of the respective cards, but ultimately delivering the same number of cards to each hand.

10. That improvement in methods of dealing a deck of playing cards, which consists in dealing the cards successively, and utilizing variable factors beyond the control of the dealer and which bear no relationship to the playing value of the respective cards to determine the sequence in which the cards so dealt shall be delivered to the various hands.

11. That improvement in methods of dealing a deck of playing cards which consists in delivering the cards successively to the various hands in irregular sequence, containing irregularities other than those involving a reversal of the deal, but ultimately dealing the same number of cards to each hand, and utilizing mechanical factors to determine the sequence in which the cards so dealt shall be delivered and to maintain the order of delivery to the respective hands beyond the control of the dealer.

12. That improvement in methods of dealing articles which consists in providing elements differing from each other, dealing the articles successively, selecting one of said elements at random in connection with the dealing of each article, and controlling the distribution of said articles by the characteristics of the elements so selected for the respective articles.

13. That improvement in methods of shuffling a deck of playing cards, which consists in dealing successive cards to a series of card receptacles in an irregular sequence containing irregularities other than those involving a reversal of the deal, and without regard to the playing value of the cards so dealt.

ROBERT C. McKAY.