

Oct. 6, 1936.

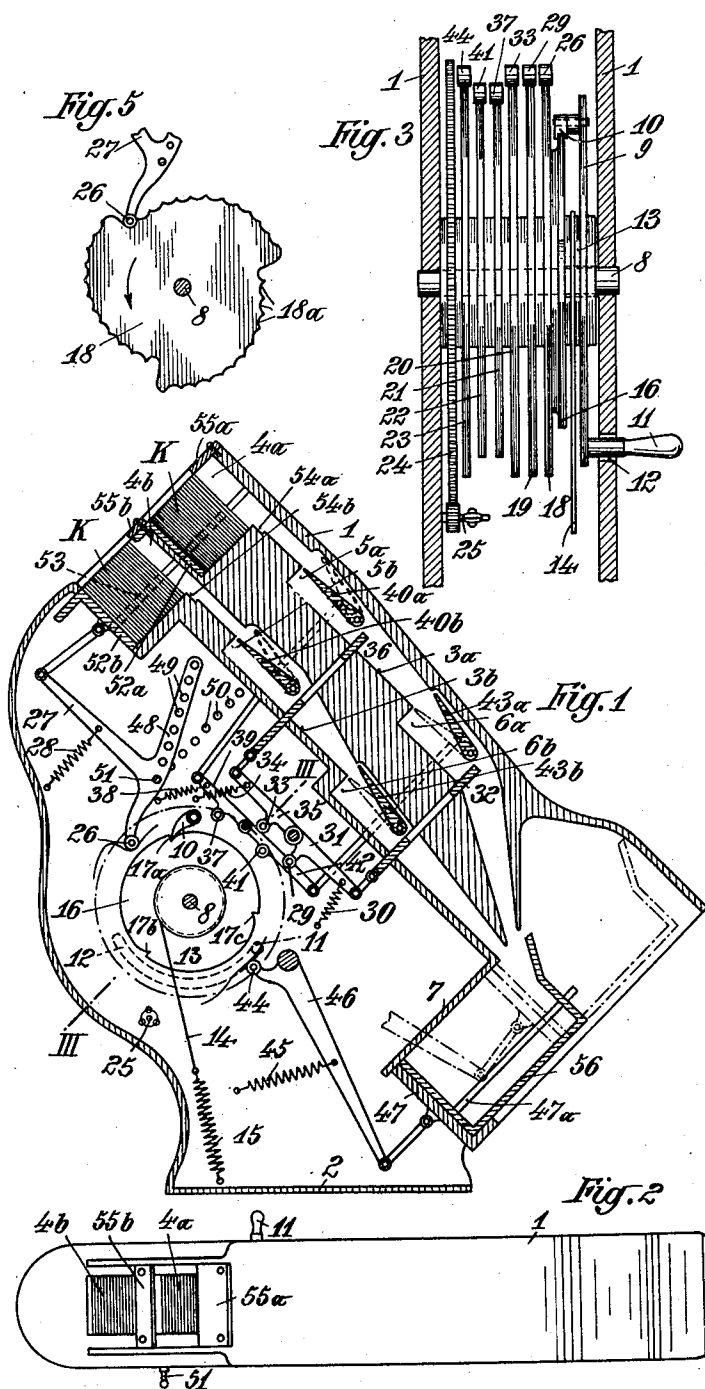
A. GRUNER

2,056,397

SHUFFLING DEVICE FOR PLAYING CARDS

Filed March 20, 1935

2 Sheets-Sheet 1



Inventor:

Anton Gruner

By, Chaturin & Company, Attys

Oct. 6, 1936.

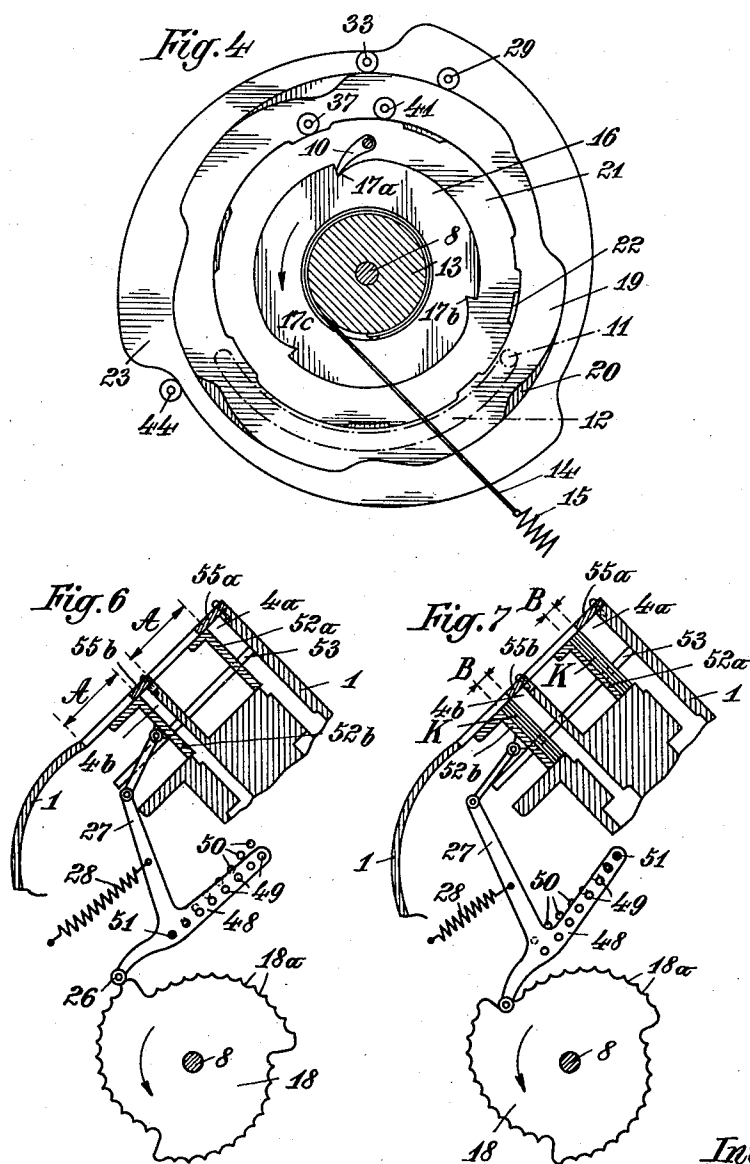
A. GRUNER

2,056,397

SHUFFLING DEVICE FOR PLAYING CARDS

Filed March 20, 1935

2 Sheets-Sheet 2



Inventor:

Anton Gruner

By *Chaturin & Company* Attys.

UNITED STATES PATENT OFFICE

2,056,397

SHUFFLING DEVICE FOR PLAYING CARDS

Anton Gruner, Berlin-Spandau, Germany

Application March 20, 1935, Serial No. 12,054
In Germany November 28, 1934

8 Claims. (Cl. 273-149)

The invention relates to a shuffling device for playing cards.

Card shuffling machines are already known in which the cards are swung to-and-fro over steps and others in which the cards are lifted off the pack by rubber-faced tongues or fingers and then flicked or dropped vertically into a container. All of these devices always mix the cards only in the same sequence.

In addition a shuffling device is known in which the cards fall separately or in little piles into different compartments which are alternately opened and closed mechanically. From these compartments the cards were subjected to several further mixings, according to the additional number of compartments fitted, and then finally fell into the collector. The shuffling is here effected in several ways by cams of different arrangements, the cards being completely shuffled on the cams turning through 120°.

Shuffling with this device requires however a comparatively long time, because at least three or four compartments are required for a thorough shuffling. In addition there is the great disadvantage that only packs with fairly thin cards can be shuffled. All of these disadvantages are overcome by the device according to the invention.

The object of the invention is a shuffling device for playing cards consisting of a closed box in which the mixing is also executed in several ways by means of variously arranged systems of cams and which is characterized by two inclined plane surfaces forming the mixing compartments with two mixing rooms each and a common collector compartment. For each mixing compartment there is provided a card magazine with base plates adjustable vertically. The lever controlling the base plates is fitted with a bar perforated with a member of holes which correspond to holes in the housing and thus this lever has an adjustable fulcrum which makes it possible to alter at will the height of the lift of the plates and the ratio of transmission in accordance with the thickness of the cards. In front of the card magazines there are fitted fixed plates of different sizes, so that with the regulation of the height of the lift of the base plates there are simultaneously obtained two openings of different sizes to the card magazines, the effect of which is firstly that each time only a certain maximum number of cards can be inserted and secondly that the mixing processes do not begin simultaneously in the mixing compartments, so that any calculation is impossible. In the inclined plane surfaces

recesses are provided next to the card magazines, the purpose of these being to advance the uppermost cards by the length of the recess, whereby the uppermost cards are always loosened from the pile and are able to fall away quickly. On the cam discs controlling the base plates there are provided additional equal recesses arranged in a certain uniform sequence, their purpose being to bring about an interval for the fall of the cards during the opening and closing of the flaps for the mixing rooms. In the common collector room there is fitted a plate which is controlled by a cam disc in such a way that it assumes its highest position shortly after the commencement of the mixing process and then slowly falls, so that the cards falling in have in each case only a small distance to fall and thus always fall in properly and cannot turn over. In addition there is provided in the collector room an exchangeable box open on the side at which the cards fall in, this box being placed on the plate. In this way it is possible to shuffle packs of cards that are to be kept in stock and to seal them without having to touch them by hand.

One form of execution of the object of the invention is shown in the drawings.

Fig. 1 shows a longitudinal section through the shuffling device.

Fig. 2 shows a plan-view according to Fig. 1.

Fig. 3 shows a section through the line III—III of Fig. 1.

Fig. 4 shows a plan-view of the different cam discs.

Fig. 5 shows a plan-view of the cam disc that operates the base plates of the card magazines.

Fig. 6 shows a partial section of Fig. 1 with the end position of the card magazines shortly before the completion of the mixing.

Fig. 7 shows a partial section of Fig. 1 with a different ratio of transmission.

The housing 1 of the device is mounted on a base plate 2 and consists of two inclined plane surfaces 3a, 3b forming the mixing compartments, which said plane surfaces are of such a shape that each of the card magazines 4a, 4b possesses two mixing rooms 5a, 5b, and 6a, 6b, while there is a common collector room 7. In the housing 1 there is mounted a shaft 8 on which several discs and a toothed wheel are fitted, namely a ratchet wheel 9, which is loose on the shaft and has a pawl 10 and a handle 11, projecting at the side, the latter being led through a slot 12 in the housing 1. To the ratchet wheel a pulley 13 is secured, the latter engaging with one end of a cord 14 that is to be placed in the

grooves of the pulley while the other end of this cord is fastened to a powerful draw spring 15 which drives the whole mechanism. Next to the ratchet wheel is mounted a toothed wheel 16 which possesses three cut-in teeth or notches 17a, b, c in which the pawl 18 of the ratchet wheel 9 engages. Adjacent to the toothed wheel 16 are mounted mixing cam discs 18, 19, 20, flap cams 21, 22, a cam disc 23 and a toothed wheel 24, which latter drives, in a known way, a governor 25 in order to make it possible to control the speed, as for example in a gramophone. The toothed wheel 16, the mixing cams 18, 19, 20, the cams 23, the flap cams 21, 22 and the toothed wheel 24 are connected together and turn together on the shaft 8.

The cam discs are divided around their peripheries into three different cam sectors of 120° each. Each of the three cam sectors is arranged differently.

By means of the mixing cam disc 18, which in addition has special recesses 18a, and with the aid of a roller 26 (Figs. 6, 7), a lever 27 is controlled which regulates the lift of the card magazines 4a, 4b and is provided with a draw spring 28. By means of the mixing cam disc 19 and with the aid of a roller 29 and a spring 30 a lever 31 is controlled which operates a bolt 32 of the mixing compartments 6a, 6b. By means of the mixing cam disc 20 and with the aid of a roller 33 and a spring 34, a lever 35 is controlled which operates a bolt 36 of the mixing compartments 5a, 5b. The flap cam disc 21 controls by means of a roller 37 and a spring 38, a lever 39 operating the flaps 40a, 40b which open and close the mixing compartments 5a, 5b, while the flap cam disc 22 controls, by means of a roller 41 and a spring (not shown) a lever 42 which operates flaps 43a, 43b which open and close the mixing compartments 6a, 6b. The cam disc 23 has the object of controlling, by means of a roller 44 and a spring 45, a lever 46 in the collector room 7, which lever moves a plate 47 which slides in a groove guide 47a.

The lever 27 has a bar 48 perforated with a number of holes 49. In the housing 1 the same number of holes 50 (partly shown in Fig. 7) is provided. The bar 48 and the housing 1 are connected by means of a pin 51.

In the card magazines 4a, 4b are inserted base plates 52a, 52b, adjustable vertically, which are connected together and slide in a guide groove 53. On the inclined plane surfaces, adjacent to the card magazines, recesses 54a, 54b (one on each surface) are fitted. In front of each magazine there is fastened a plate 55a, 55b which close off the magazines at the top, while the base plates close off the magazines at the bottom.

The two inclined plane surfaces 3a, 3b forming the mixing compartments have a common collector room 7. In the latter there is fitted an exchangeable box 56.

The way in which the mixing device according to the invention works is as follows:

The pack of cards K that is to be shuffled is inserted in the card magazines, partly in magazine 4a and partly in magazine 4b; the handle 11, projecting through the side, is then swung as far as the end of the slot 12, that is through 120°. Thereupon, the draw spring 15 operating the whole mechanism is placed under tension. The draw spring is connected at one end to the grooved pulley 13 by means of a cord 14 and passes round the pulley in the grooves, while the pulley itself is joined to the ratchet wheel 9. On

the ratchet wheel 9, which is loose on the shaft 8, the pawl 18 is mounted. The latter engages in the nearest notch 17a, 17b or 17c, formed in the toothed wheel 16 and in this way operates the cam discs 18, 19, 20, 21, 22, 23 and the toothed wheel 24. The ratchet wheel 9 begins to move the cam discs 18-23 and the toothed wheel 24 immediately after the spring is placed under tension. The mixing process is then as follows: the base plates 52a, 52b of the card magazines 4a, 4b are raised in a series of jerks and thus cards fall one after the other along the two inclined plane surfaces 3a, 3b forming the mixing compartments into the mixing rooms 5a, 5b or 6a, 6b according to the position of the flaps 40a, 40b. After the cams have travelled about 30° the cards have fallen according to the arrangement of the cams, into the mixing rooms 5a, 5b or 6a, 6b and some of them into the common collector room 7. After the cams have passed through the next 30°, the remaining cards also fall from the mixing rooms 5a, 5b into the mixing rooms 6a, 6b and into the collector room, so that the cards, already once mixed, now lie in the rooms 6a, 6b and in the common collector room 7. When the cams turn through the next 60° approximately, all of the cards fall into the common collector room 7. In consequence of the arrangement of the cams on the discs, the plates 52a, 52b return to their starting position, as do also the bolts 32, 36 and the flaps 40a, 40b and 43a, 43b.

As a different cam sector then comes into operation the next pack of cards is mixed in a different sequence. Each of the cam sectors has a different arrangement. Thus the sequence of the mixing is always automatically different for the purpose of avoiding irregularities in the insertion of the cards.

In the previously known devices the cards were either only mixed in the same order or else, if mixing cams were used, they were certainly thoroughly shuffled but the process required a comparatively long time as for complete mixing at least three or four mixing rooms were required. In addition only packs with thin cards could be mixed. Owing to the use, according to the invention, of two inclined planes 3a, 3b which form the mixing compartments it is made possible for a very thick pack of cards to be mixed at one time, for example for baccarat where 324 cards are used. By the arrangement of the bar 48 on the lever 27, which bar is fitted with a number of holes 49 and by fitting the same number of holes 50 in the housing 1, these holes being joined by a pin 51, the ratio of transmission and the height of the lift of the plates 52a, 52b can be adjusted so that the correct starting position of the plates 52a, 52b can be obtained to correspond to the thickness of the packs of cards that are to be mixed. If for example the pin 51 is placed in the lowest hole (Fig. 6), then the plates obtain the maximum lift A and at the same time a larger ratio of transmission. If on the other hand the pin 51 is placed in the upmost hole (Fig. 7), then the plates 52 are given the smallest lift B and at the same time a small ratio of transmission is produced.

The fixed plates 55 in front of the card magazines are of different sizes, so that on regulating the height of the lift by adjusting the base plates 52, two openings of different sizes for inserting the cards are obtained, the result of which is firstly that each time only a certain maximum number of cards can be inserted and secondly that the mixing processes do not begin at the

same time in the two mixing compartments, so that any calculation is impossible.

On the cam disc 18 there are additional equal recesses 18a in a certain uniform sequence, their object being to produce a pause for the fall of the cards during the opening and closing of the flaps 40, 43.

The recesses 54 have the object of advancing the uppermost cards by the length of the recesses, so that in each case the uppermost cards are loosened from the pack and are able to fall down quickly.

The common collector room 7 is operated by the cam disc 23 with the aid of the roller 44, the lever 46 with the spring 45 and the plate 47, which latter slides in a guide groove 47a. The arrangement of the cams is effected in such a way that at the commencement of the mixing process the collector room remains closed until the plate 47 has reached its highest position, whereupon the plate falls slowly in order that the cards that then fall into the collector room have always only a short distance to fall and thus fall in safely without being able to turn over under any circumstances.

At the same time there is fitted in the collector room an exchangeable box 56 open at the side at which the cards fall in, and into this box the mixed cards fall. In this way it is possible to take out the mixed pack together with the box without any trouble or difficulty, and the box can then be sealed. In this way it is possible to mix cards that are to be kept in stock, without touching them by hand.

The device can be driven in any desired way, for example electrically or pneumatically, instead of by a spring.

I claim:—

1. A shuffling device for playing cards, comprising a casing, two magazines mounted adjacent the top of said casing each adapted to receive part of the pack of playing cards, an inclined mixing compartment leading down from each magazine, means for feeding the cards from said magazine so that they slide through the inclined mixing compartments, two mixing rooms formed in each mixing compartment, flaps controlling the entry of cards to said mixing rooms, bolts controlling the outlet of cards from said mixing rooms, a cam shaft actuating said flaps, bolts, and feeding means, driving means for the cam shaft, and a common collector room adapted to receive the shuffled cards after they have passed through each mixing compartment, the cam shaft actuating said flaps and bolts so that some cards are held temporarily in one or both mixing rooms of a mixing compartment, and some cards pass straight through said mixing compartment.

2. A shuffling device for playing cards as claimed in claim 1, comprising base plates slidably mounted in the card magazines and means for adjusting said base plate vertically.

3. A shuffling device for playing cards according to claim 1, comprising base plates slidably mounted in the card magazines, a cam on the cam shaft for actuating said base plates so that said base plates rise in the magazines and raise the cards causing the top cards to slide down

through the mixing compartments, a lever member for transmitting the drive of said cam to said base plates, and a fulcrum pin adapted to take a bearing in any one of a number of perforations in said lever member and be mounted in any one of a number of perforations in the casing of the device to alter the position of the fulcrum of said lever, so that the height of lift of the base plates and the ratio of transmission of movement there-to can be varied to suit the thickness of the pack of cards in use.

4. A shuffling device for playing cards as claimed in claim 1, comprising plates fixed to the casing to limit the size of the openings for the insertion of the cards into the magazines, said plates, which are mounted in place after the adjustment of the magazine card feeding means, being of such size that said openings are of different size, the result of which is firstly that each time only a certain maximum number of cards can be inserted and secondly that the mixing processes do not begin simultaneously in the mixing compartments, so that any calculation of the result of the shuffling is impossible.

5. A shuffling device for playing cards as claimed in claim 1, comprising a recessed portion at the top edge of each card magazine, which permit the top cards to slide forward the length of said recesses, thereby loosening the top cards so that they are able eventually to slide easily from the magazines.

6. A shuffling device for playing cards as claimed in claim 1, comprising base plates slidably mounted in the card magazines, and a cam on the cam shaft, the periphery of said cam being formed with recesses arranged in a uniform sequence, said cam actuating the base plates to raise them and the cards mounted thereon in the magazines, so that the top cards can slide down through the mixing compartments, the recesses in the periphery producing a pause for the falling of the cards during the movements of the flaps.

7. A shuffling device for playing cards as claimed in claim 1, comprising a plate slidably mounted in the common collector room, and a cam upon the cam shaft adapted to actuate said plate in such manner that said plate reaches its highest position shortly after the commencement of the mixing process and descends slowly, so that the cards falling from the mixing compartments have always only a short distance to fall, and thus fall safely without being able to turn over.

8. A shuffling device for playing cards as claimed in claim 1, comprising a plate slidably mounted in the common collector room, an exchangeable box placed on said plate, said box being open on one side into which the cards are adapted to fall, and a cam upon the cam shaft adapted to actuate said plate in such manner that said plate reaches its highest position shortly after the commencement of the mixing process and descends slowly, so that the cards falling from the mixing compartments have always only a short distance to fall, and thus fall safely without being able to turn over.

ANTON GRUNER.