July 19, 1932. G. WENDORFF 1,867,690

PLAYING CARD MIXING DEVICE

Filed Oct. 10, 1929 2 Sheets-Sheet 1

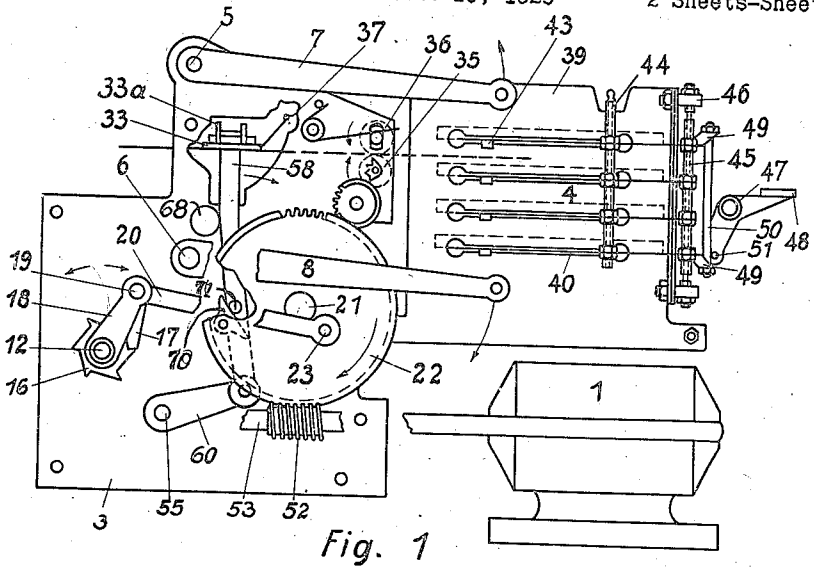

Fig. 1

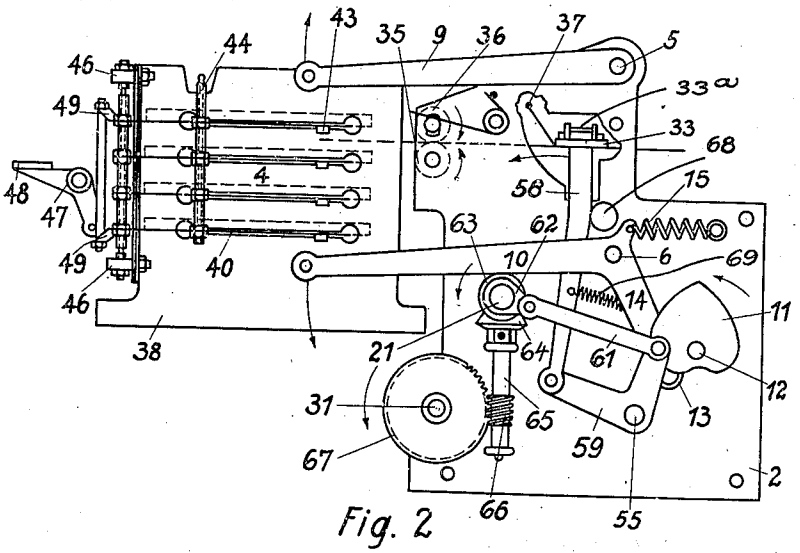

Fig. 2

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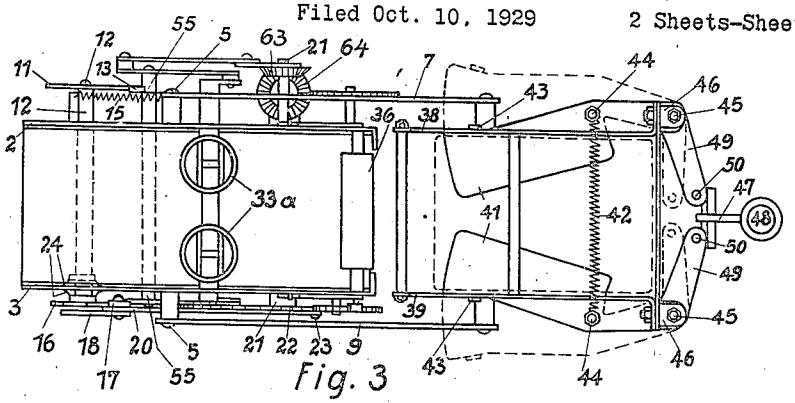

Fig. 3

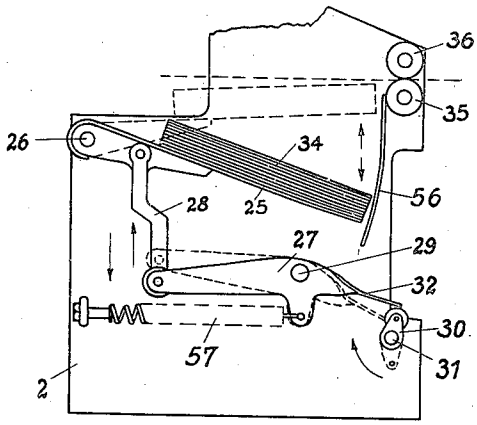

Fig. 4

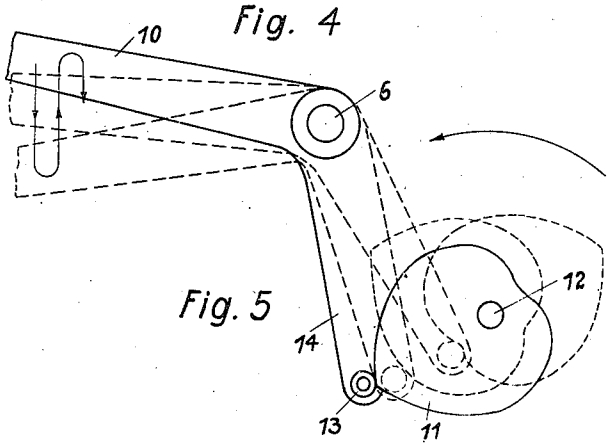

Fig. 5

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UNITED STATES PATENT OFFICE

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PLAYING CARD MIXING DEVICE

Application filed October 10, 1929, Serial No. 398,684, and in Germany December 13, 1928.

This invention relates to a playing card mixing machine; a constructional form thereof is illustrated diagrammatically and by way of example on the accompanying drawings in which Figure 1 is a side elevation view of two vertical walls arranged in a common plane, and of certain mechanisms carried by these walls; Figure 2 is also a side elevation of two vertical walls arranged in a common plane, and of certain mechanisms carried by these walls, these latter being located remote from the first-mentioned two walls and the mechanisms carried by the two walls on the one side of the device and on the other side of the same being located counter to one another; Figure 3 is a plan of the device, or an upper view of the four walls and their mechanisms; Figure 4 is a vertical section through parts located between two oppositely arranged walls, that is to say, inside the device in the one half of the same, and Figure 5 shows a few details drawn to an enlarged scale.

The walls 38 and 39 are suspended from upper arms 7 and 9 and from lower arms 8 and 10. These arms are hinged to the walls 2 and 3, but the lower arms are designed as bell-crank levers. 5 denotes the pivots for the upper arms and 6 the pivots for the lower arms, or bell-crank levers. Each of these latter has a shorter arm 14 and is subjected to the pull of a helical spring 15, the strength of the two springs being such that they can hold the walls 38 and 39 with their mechanisms in raised position, as in Figs. 1 and 2. These walls with their mechanisms are reciprocated vertically when the device is in operation, that is to say, when an electric circuit has been closed. Then an electric motor 1 commences to run. This motor drives a worm 52 secured to the shaft 53 of the motor, and said worm meshes with a worm-wheel 22 that is secured to a shaft 21 and is designed as a crank-disk, in that it is provided with a crank-pin 23 to which is attached a rod 20 connected at its other end with a lever 18 by means of a pin 19. A pawl 17 is attached to this pin and engages a ratchet wheel 16 affixed to a shaft 12. This shaft is rotated in a step-wise manner when the motor is running, the motion being transmitted by the members 53, 52, 22, 23, 20, 17 and 16, as described.

At the other end of the shaft 12, viz. outside the wall or plate 2 where there is the bell-crank lever 10/14, a cam 11 (Fig. 2) is affixed to that shaft end and co-operates with a roll 13 attached to the end of the lever arm 14. It will be obvious that when the shaft 12 is turned in steps, also the cam 11 will be turned in this manner, and as the shape of the cam is such that the bell-crank lever 10/14 is alternately lifted and lowered, also the other arms from which the walls or plates 38 and 39 are suspended will be lifted and lowered in steps, as will, of course, also these plates and their mechanisms.

The bell-crank lever 10/14 is shown in Fig. 5 in three positions, but there are, in fact, four, as will appear from what is described later on.

34 (Fig. 4) denote the playing cards; they are supported on a plate 25 which is inclined towards a plate 56 by which the cards are prevented form sliding down. At the upper end of the plate 56 are located rubber rollers 35 and 36 which serve as conveying rollers for the individual cards and are rotated by any suitable means as long as the device is in operation. In front of these rollers, that is to say, above the cards 34, are two suction heads 33 (Fig. 3), the purpose of which is to take the cards singly from the pile or stack. The suction heads are of a known construction and I abstain, therefore, from entering into details concerning them. They are attached to a transverse plate 37 (Fig. 1) affixed at its ends to vertical members 58 (Figs. 1 and 2), of which the one is connected at its lower end with a

lever 60 and the other with a bell-crank lever 59, the other arm of which is connected by a rod 61 with a crank 62 secured to the transverse shaft 21 which is that to which also the worm wheel 22 is affixed. There is also affixed to this shaft a bevel-wheel 63 meshing with another bevel-wheel 64. This wheel is affixed to a vertical shaft 65 provided with a worm 66 meshing with a worm-wheel 67 secured to a shaft 31 (Figs. 2 and 4) provided between the plates 2 and 3 with a short arm 30 co-operating with a double-armed lever 27 supported upon an axle 29. This lever is subjected to the action of a helical spring 57 and that arm which is counter to the arm 30 is connected by a rod 28 with the oblique plate 25 bearing the stack or pile of cards 34.

The mechanisms described up to this part of the specification serve partly for lifting and lowering in steps the plates 38 and 39 with their mechanisms, as already described, and partly for moving the cards slowly upwards, viz, in correspondence with their removal by the suction heads. These are moved downwardly and upwardly by the members 55, 59, 60, 58 and 33, and in that measure in which the cards are singly removed and conveyed to the rollers 35 and 36, the pile is slowly lifted by the members 57, 27 and 28. While this is being done the lever 27 is turned from the position shown in Fig. 4 in full lines into that shown in dotted lines, but when the members 28 and 25 are in their lowest position, the arm 30 of the shaft 31 is in such a position that it is just about to leave the arm 32 of the lever 27, when the plate 25 will be lifted so as to be ready for the reception of another pile of cards.

When mixing the cards of a complete pile of cards has been finished, the plate 25 is swung down into its lowermost position which is that oblique position shown in full lines in Fig. 4. When the plate has assumed this position, the motor is switched off, and a fresh pile of cards can now be inserted into the apparatus, i. e. shoved upon the plate 25. Owing to the intentional obliquity of this plate in its position of rest, the pile of cards will simply slide down along it until it is stopped by the abutment plate 56. When the motor is again switched on and all parts of the apparatus commence anew to operate, the plate 25 with the cards thereon will be gradually lifted in correspondence with the removal of the individual cards by means of the suction cups, the distance between the uppermost card and the highest position of said cups remaining always the same. The cups are continuously drawn downwards by the vertical members 58 and the other parts connected with them and moving them. Each of the members 58 is guided by a projection 68 against which it is drawn by a helical spring 69, and when the cups with the one card they hold have arrived in the uppermost position in which the card is located just in front of the rollers 35 and 36, they receive a movement in the direction to said rollers, the extent of that movement being such that the front edge of the card is introduced between the rollers which then seize the card and convey it further in the direction to mixing plates 40 more fully dealt with hereinafter.

Said forward movement of the individual cards is effected by means of a pawl-like member 70 (Fig. 1) hinged to the worm-wheel 22, and by a pin 71 inserted into one of the arms 58 and being acted on by said member 70. This member engages the pin 71 shortly before the completion of one rotation of the wheel 22 which is secured to the shaft 21, as has already been stated; and as also the crank 62 (Fig. 2) that effects the vertical movement of the arms 58, the plate 33, and the suction cups 33^a, is secured to that shaft, it will be clear that these members 58, 33 and 33^a will be moved not only vertically, but also horizontally, the two movements being so timed that the horizontal movement follows immediately upon the vertical one, that is to say, every lifted card will be moved towards the conveying rollers 35 and 36 until it is grasped by the same and conveyed between the mixing plates.

Concerning now the plates 38 and 39 with their mechanisms the chief object of these latter is to form a plurality of superposed compartments that are to receive the individual cards which are conveyed successively in the said compartments, always one card in one compartment, this distribution being continued until all cards have been introduced into the said compartments. Each of the plates 38 and 39 is provided with four horizontal slots 40 (Fig. 1) and through these slots extend movable plates 41 (Fig. 3), each of which forms a part or an arm of a double-armed lever 41/49 attached to a vertical axle 45 supported between lugs 46. The plates 41 on the one side an the plates 41 on the other side are connected with one another by vertical pins 44, and these two pins are connected with one another at their upper ends by a helical spring 42 tending to draw the plates into the space between the plates 38 and 39. The plates may be regarded as uncomplete bottoms, or bottom parts; they subdivide the space between said plates into compartments which are those that are to receive the cards, as already mentioned.

While the cards are conveyed forwardly, out of the space between the plates 2 and 3, the compartments are moved upwardly and downwardly by the means already described, the movements being so timed that the first card is conveyed into the first compartment, the second into the second compartment, the

third into the third compartment, the fourth into the fourth compartment, the fifth again into the third compartment, the sixth again into the second compartment, the seventh again into the first compartment, the eighth again into the second compartment, and so on, until all cards have been distributed in this way.

Instead of making all plates 41 double-armed levers, such as 41/49, it is sufficient to provide the axles to which the plates 41 are affixed with arms or lugs 49 (Figs. 1 and 3) and to connect the arms of the one side and those of the other side with one another by short vertical rods 50 which can be moved horizontally by means of a transverse pin 51 extending through one arm of a bell-crank lever 47 provided with a finger piece 48 at its free end. When this piece is depressed, the card-supporting plates 41 are turned outwardly into the position shown in dotted lines in Fig. 3, in consequence whereof all cards will fall down into a box or the like (not shown); they are now thoroughly mixed and ready for the next play. When the finger piece 48 is released, the spring 42 draws the plates 41 back into their normal position, and now another pack of cards may be introduced into the device.

I claim:

1. A playing card mixing machine, comprising, in combination, members arranged to form superposed compartments, means adapted to introduce the cards singly and successively into said compartments, and means for withdrawing the first-mentioned members from card supporting position so as to cause the cards to drop and form a pile of thoroughly mixed cards.

2. A card mixing machine, comprising, in combination, vertical parallel plates having each a set of horizontal superposed slots; plates adapted to be moved through said slots into the space between said vertical plates, and reversely; means for thus moving said plates; means by which the first-mentioned plates and the second mentioned plates can be moved vertically in steps in timed intervals; a card distributing device comprising a card support and means for withdrawing the cards singly from the support and delivering them singly between the second mentioned plates, substantially as set forth.

3. A playing card mixing machine, comprising, in combination, two parallel vertical spaced plates having each a plurality of superposed horizontal slots in it; horizontal plates attached to said vertical plates in such a manner that they can be inserted through said slots into the space between the vertical plates and form compartments; means tending to keep the horizontal plates in said space; means for withdrawing them from the said space; a vertically movable plate adapted to receive a pack of the cards; means for removing the cards singly from the pack; means for conveying them into the spaces between the said horizontal plates; and a mechanism by which the compartment-forming members constituted by the first-mentioned two kinds of plates are moved up and down in timed intervals and in front of the card delivering means, substantially as set forth.

In testimony whereof I affix my signature.

GUSTAV WENDORFF.