April 23, 1935. W. SHEPHERD ET AL 1,998,690

SHUFFLING DEVICE

Filed Oct. 31, 1932 2 Sheets-Sheet 1

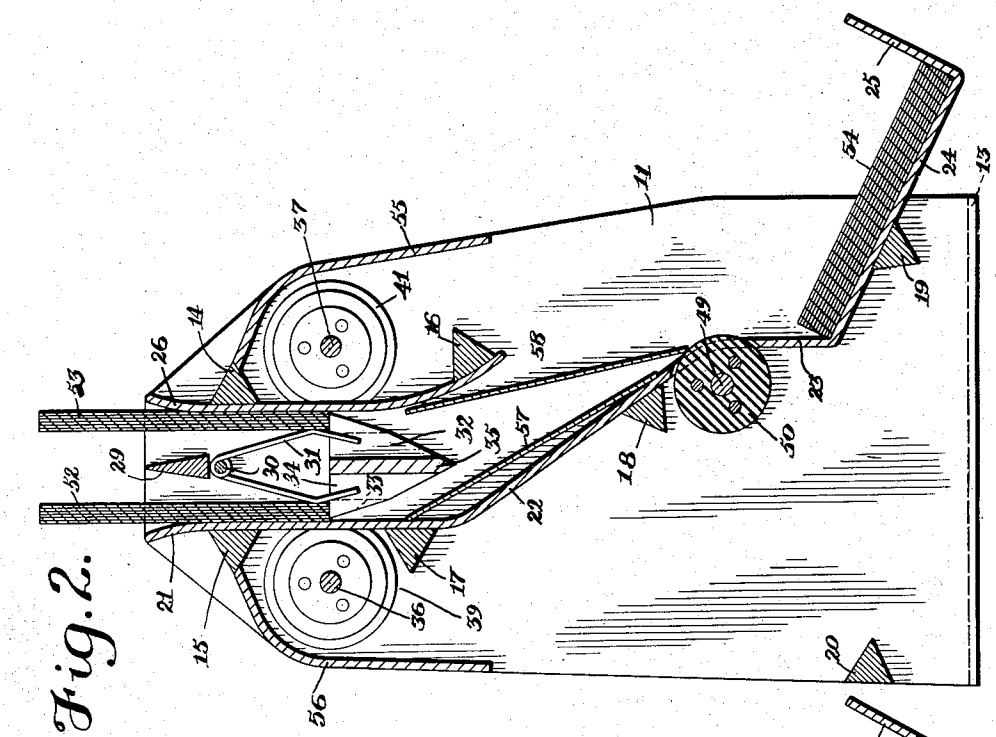

Fig. 2.

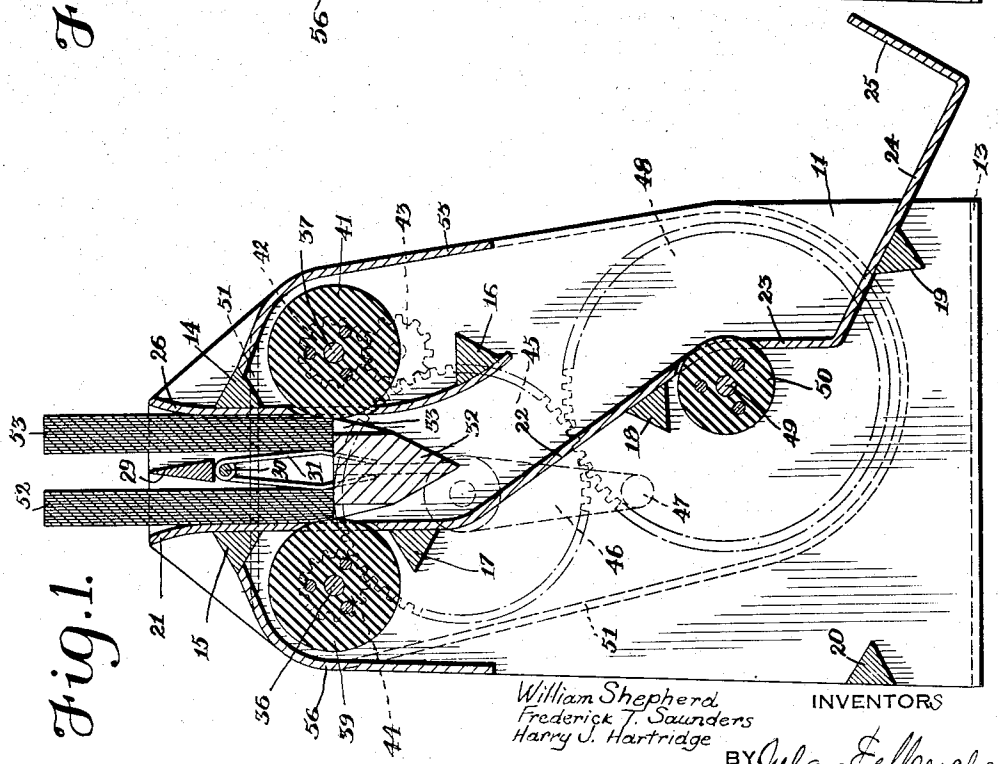

Fig. 1.

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Fig. 3.

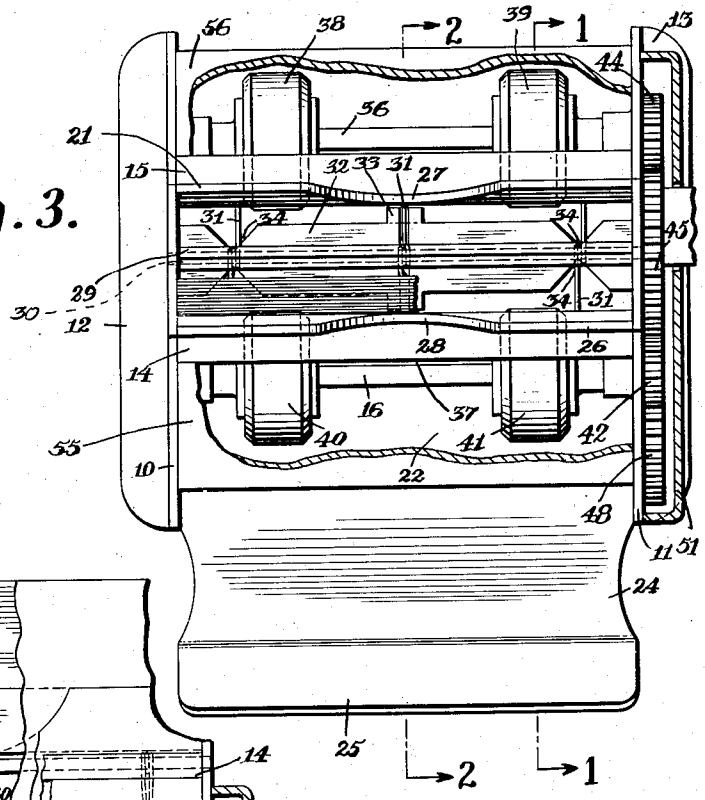
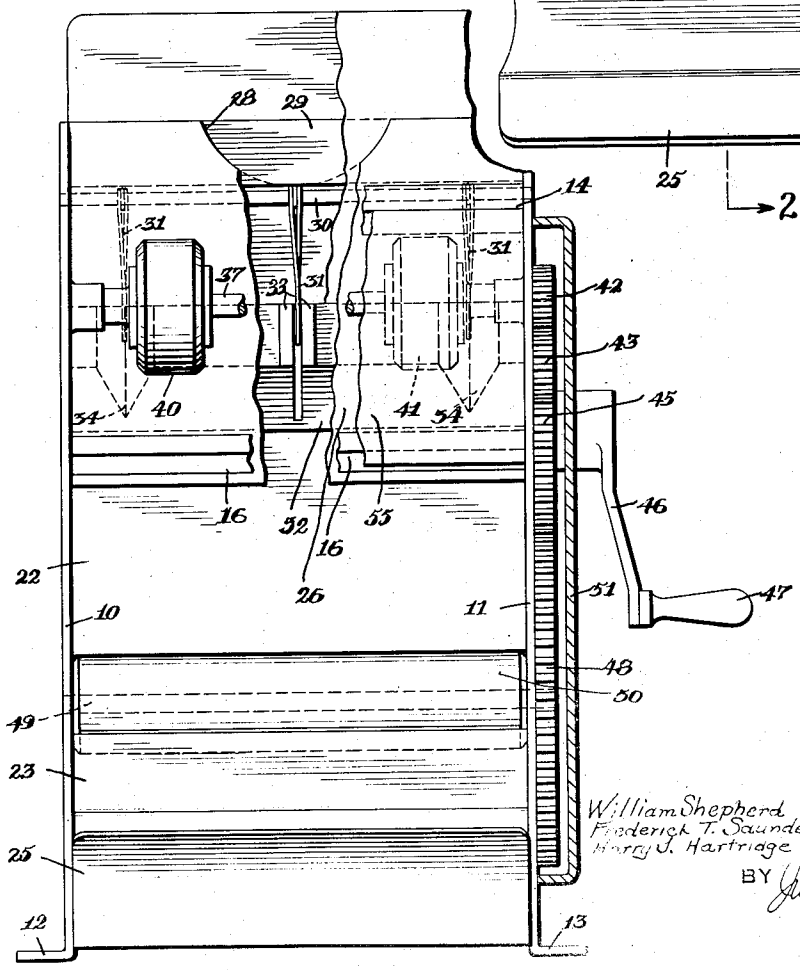


Fig. 4.



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UNITED STATES PATENT OFFICE

1,998,690

SHUFFLING DEVICE

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Application October 31, 1932, Serial No. 640,514

4 Claims. (Cl. 273—149)

This invention relates generally to the mechanical shuffling or mixing of thin sheeted objects, and more particularly to a means and method of the mechanical shuffling of playing cards.

A broad object of the invention is to provide a structure which is compact in size, economical to manufacture, easy to operate, and which contains a minimum number of parts conducive to practical operation.

A further object of the invention is provision of structure wherein a deck of playing cards need merely be inserted manually into the mouth of the said structure before the said deck of cards goes through the mechanical steps for effecting a thorough shuffling.

Another object of the invention is provision of means to insure the collection of the individual cards comprising the deck after having been shuffled in a lower receptacle being part and parcel of the invented structure.

Another object of the invention resides in the singular, unique and new provision of effectuating the position of the outer-most cards of the deck so that in each pair of the said outer-most cards, one outer-most will always be beneath the other.

Further objects of the above said structure both in the individual elements thereof and in the combination of elements thereof, will appear incidentally in the progress of this disclosure.

The accompanying drawings forming a part hereof, show a preferred embodiment of the shuffling device, the object of our invention, and in the said drawings corresponding reference characters designate corresponding parts throughout the several views. In these drawings, Fig. 1 is a sectional view through line 1—1 of Fig. 3 and shows a deck of cards split into two packs and ready to go through the shuffling operation.

Fig. 2 is a similar sectional view through line 2—2 of Fig. 3, showing a portion of the cards from each pack of Fig. 1, already shuffled and showing parts of these cards in the lower receptacle and a pair of the outermost cards of these packs one beneath the other between two guide plates.

Fig. 3 is a top plan view of the structure with the upper casing plate partly broken away.

Fig. 4 is a front elevational view of the device with parts broken away.

In accordance with the invention and in accordance with the acompanying drawings, 10 and 11 comprise opposing side walls, having at the lower portions thereof out-turned portions to serve as supports and being designated as flanges 12 and 13 respectively. The said side walls 10 and 11 are provided with a series of cross bars to fix the side walls in spaced and juxtaposed position. The cross bars are situated in positions which are conducive for the support of the remaining structure hereinafter to be set forth more fully. For the time being, the relative positions of these cross bars are now to be given. Cross bars 14 and 15 are mounted between the side walls 10 and 11 at the upper portion thereof in the same plane of the horizontal and parallel to each other. These said cross bars 14 and 15, as is most obvious from Fig. 1 lie exterior to the mouth of a shuffling device, the object of this invention, the said mouth hereinafter to be described. The positions of cross bars 16, 17, 18, 19 and 20 all mounted and fixed by the side walls 10 and 11 are positioned so as not to interfere with the other several elements of the invention. Thus cross bar 16 is situated exterior to a forward guide member 26, cross bar 17 is situated exterior to rear guide member 21, cross bar 18 is situated exterior to a sliding member 22, cross bar member 19 is situated beneath an inclined depositing receptacle 24, while cross bar 20 is situated and mounted at the lower rear portions of side walls 10 and 11.

Turning now to the dividing and holding means for a plurality of cards, we designate a rear guide member by numeral 21, the said guide member being comprised preferably of a vertical and transverse sheet of metal commencing anteriorly in parallelism with the top of side walls 10 and 11 and extending downwardly a substantial distance from which point the said 21 extends forwardly at a downward inclination to form an intermediate sliding element 22. The said guide member continues from the intermediate sliding element 22 to form a substantially short vertical portion 23 and thereafter extends outwardly and downwardly inclined to form a receptacle 24 and an upwardly turned face 25. It is to be understood that the guide member 21 and all its parts including 21, 22, 23, 24 and 25, is preferably of the width fixed by the cross bars 14, 15, 16, 17, 18, 19 and 20.

26 represents a forward guide member oppositely situated, spaced and juxtaposed with respect to rear guide member 21 and also is comprised preferably of a plate of metal of the same width as 21, having the upper and lower portions thereof outwardly curved. The vertical height of the said guide member 26 preferably extends somewhat below the vertical height of 21.

27 and 28 represent intermediate notched por-

tions cut out from the upper edges of the rear guide plate 21 and the forward guide plate 26 respectively. These notched portions as will hereinafter appear, are included merely as a matter of convenience when inserting a plurality of cards into the mouth or holding mechanism of the shuffling device herein.

Intermediate the width of the upper portions of guide members 21 and 26, is a divider 29 mounted between the side walls 10 and 11 and as shown in the accompanying drawings is on the same plane of the horizontal with the upper surface of the mouth of the divider. The said divider 29 as shown is triangular in cross section. It is also within the contemplation and within the spirit of this invention to have the upper apex of the said divider 29, a little below the upper edges of 21 and 26, so that by merely dropping a plurality of cards into the mouth of the shuffling device the upper apex of 29 will ipso facto cut the said plurality of cards into two packs.

Mounted directly below the base of divider 29 is a shaft 30 as best seen in Figs. 1 and 2 of the accompanying drawings. This said shaft 30 has a plurality of preferably diverging and wire springs 31, affixed along the said shaft. The function of these springs as will hereinafter be more fully set forth is to bear pressure against each pack of cards, the said packs resulting from the division by virtue of divider 29.

32 represents a shelf on which the cards of packs 52 and 53 are supported, the said shelf being mounted between side walls 10 and 11 and in the same vertical axial plane of divider 29 and shaft 30, and being positioned a distance beneath said shaft 30. The said shelf 32 intermediate the width thereof, is provided with opposite extensions 33, the said extensions being slotted vertically to allow for the penetration therein of the side arms of spring 31 as best shown in Fig. 2 of the accompanying drawings. The said shelf 32 is also provided in its thickness with opposite notches 34 adjacent the ends thereof so as to provide penetrating places for the side arms of springs 31, affixed along the shaft 30 as best shown in Fig. 3 of the accompanying drawings. It is easy to be seen that when a plurality of cards such as 54 is inserted into the mouth of this shuffling device the object of the invention, the said cards are divided by divider 29 into two packs and in forcing said cards onto the upper flat portion of shelf 32, the said packs of cards are pressed against the rear and front guide members 21 and 26 by virtue of the operation of springs 31. This pressure is significant as will hereinafter appear in the operation of the feeding mechanism hereinafter to be described. 35 as best shown on Fig. 2, represents that portion of the intermediate shelf 32 from which the vertical notches extend. Insofar as the mechanism herein, the object of the invention, concerns itself with the division of a plurality of cards into two packs by virtue of the structure hereinbefore described, it is necessary that the feeding mechanism be of a duplex character. Therefore, on the same plane of the horizontal and exterior to adjacent guide members 21 and 26 are similar shafts 36 and 37 journaled between side walls 10 and 11, the said shaft 36 bearing friction roller units 38 and 39, while shaft 37 bearing friction roller units 40 and 41. The rear guide member 21 is penetrated by rollers 38 and 39 as is best shown by a reference to Fig. 3 and Fig. 1 of the accompanying drawings. The penetration of the said friction rollers 38 and 39 are to effect a downward movement of the outermost card of pack 52, while rollers 40 and 41 penetrating guide member 26, similarly function to feed the outermost cards of pack 53. In order to insure as much as possible the feeding of the outermost cards of packs 52 and 53 individually, a slight space is provided between the inner walls of guide members 21 and 26 and the extensions 33 of shelf 32 as is best shown by a reference to Fig. 3 of the accompanying drawings.

42 and 43 are speed spur gears, 42 actuating shaft 37, while 44 is a chain speed spur gear actuating shaft 36. 45 is a larger gear wheel which engages chain speed spur gears 43 and 44, the said gear wheel 45 being actuated by crank lever 46 and handle 47. It is within the contemplation of this invention to employ a spring or electric motor to actuate the rotation of gear wheel 45. In accordance with the accompanying illustrations, all the gears herein described are mounted preferably on the outer surface of side wall 11. Additional gear 48 actuates shaft 49 and being in geared connection with gear wheel 45, rotates a continuous roller 50 which penetrates the rear guide member at the top portion of 23. The purpose of friction roller 50 as will hereinafter be more fully set forth, is to aid gravity in the withdrawing of the cards into receptacle 24 from the portion 22 of the rear guide member.

The reason for the use of two chain speed spur gears in the actuation or rotation of shaft 37, is to rotate friction rollers 41 and 42 oppositely to the rotation of friction rollers 38 and 39 so that the outermost cards of packs 52 and 53 will proceed in a downward direction, the turning of the crank handle 48 being away from the operator. 55 is merely a hood to cover up rollers 40 and 41 and preferably extends from cross bar 14 to approximately the lower end of the front guide member 26. 51 represents a covering for the gear mechanism and is provided with an aperture for the actuating members 46 and 47. 56 corresponds to 55 and is a short hood for the covering of the friction roller units 38 and 39.

In operating this device, a plurality of cards is placed into the mouth of the holder, determined by guide members 21 and 26. The effect of gravitation and the divider 29 causes the said plurality of cards 54 to be divided into two packs 52 and 53. Thereafter the hand is merely placed on the upper edges of said packs of cards to bring the lower edges thereof onto the upper flat surface of shelf 32. This manual operation causes the plurality of springs 31 to bear against the said packs of cards so that the outermost card from each of the packs 52 and 53 will bear against the rollers 38 and 39 and 40 and 41 respectively. Upon turning hand crank 47 away from the position of the operator, the friction wheels 38 and 39 will cause the outermost card of pack 52, namely card 57 to fall down along the rear guide member 21 and hit the downwardly inclined portion 22. Simultaneously, with this operation, friction wheels 40 and 41 will cause the same effects to the outermost card of pack 53, namely card 58. By virtue of the fact that card 57 has to travel a lesser vertical distance in order to rest momentarily on the inclined portion 22 of the rear guide member 21 than the outermost card 58 of 53, it is seen that whatever cards come from pack 52 they are always beneath the cards of pack 53, thereby affording a very good shuffle. Whether or not the outermost cards of packs 52 and 53 fall and hit the inclined or sliding

member **22** singly or severally a good shuffle nevertheless is effectuated. It is readily understood that in order to effectuate simultaneous feeding of cards from packs **52** and **53** and in order to effectuate the feeding of individual cards, these operations depend upon the general structure of the mechanism, for instance, the pressure to be borne by the rollers against the outermost cards and the space between extensions **33** of shelf **32** at the inner surface of the guide members **21** and **26**.

The inclination of **22** with the cooperation of natural gravity assures the position of all cards from pack **52** to be beneath all cards from pack **53** after they are fed through the rollers. Because of a possible jamming of the cards between members **22** and **23**, we have incorporated herein roller **50** to aid in the sliding of the said cards into receptacle **24** where the cards are lifted by the fingers and are ready to be dealt either by the preliminary act of cutting or turning over.

We wish it understood that minor changes and variations in the size, location, material and number of parts may all be resorted to without departing from the spirit of the invention and without departing from the scope of the appended claims.

We claim:

1. The combination in a card shuffling device of means for dividing and maintaining a deck of cards into two packs in upright and vertical position, means for simultaneously feeding the outermost cards of the two packs downwardly, chute means in which is deposited the outermost card of the rear pack beneath the outermost card of the forward pack.

2. The combination in a card shuffling device of means for dividing and maintaining a deck of cards into two packs in upright and vertical position, means for simultaneously feeding the outermost cards of the two packs downwardly, forward and rear plate members into which the outermost card of the rear pack slides and rests beneath the outermost card of the forward pack on the rear plate member following feeding of each pair of cards, and rotatable means to aid the power of gravity in carrying said cards off the rear guide member.

3. A card shuffling device comprising holding means adapted to divide and maintain a plurality of cards into two packs in upright and vertical position feeding means for feeding the outermost card of each pack downwardly and substantially simultaneously, and a chute to slide the cards from the rear pack beneath the cards of the forward pack.

4. In a card shuffling device, holding means adapted to divide and maintain a plurality of cards into two packs in upright and vertical position, duplex friction rollers adapted to bear against the outermost cards of the said two packs to feed the same from each pack, spring means to exert pressure against each pack bearing against said friction rollers, foward and rear plate members along which is effected the deposit of the cards from the rear pack beneath the cards of the forward pack on the rear guide member, and receiver means for the shuffled cards sliding off the said rear guide member.

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