A. GYSI.

DENTAL ARTICULATOR.

APPLICATION FILED MAY 23, 1911.

1,041,270.

Patented Oct. 15, 1912.

3 SHEETS—SHEET 3.

Fig. 6

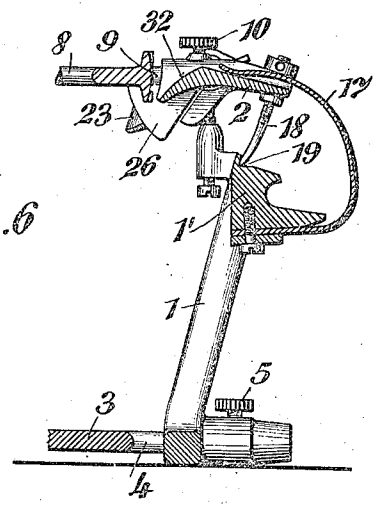


Fig. 7

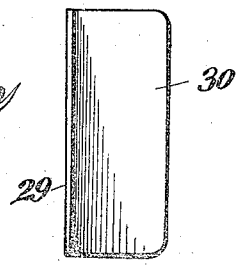


Fig. 8

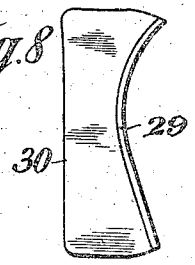
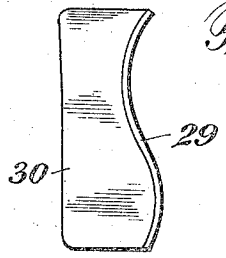


Fig. 9



Witnesses:

B. Dommers

Elizabeth Leckert.

Inventor:

Alfred Gysi

By Henry Orth & Co

Atty.

C. T. HALL.

CARD SHUFFLER.

APPLICATION FILED JULY 22, 1911.

1,041,271.

Patented Oct. 15, 1912.

4 SHEETS—SHEET 2.

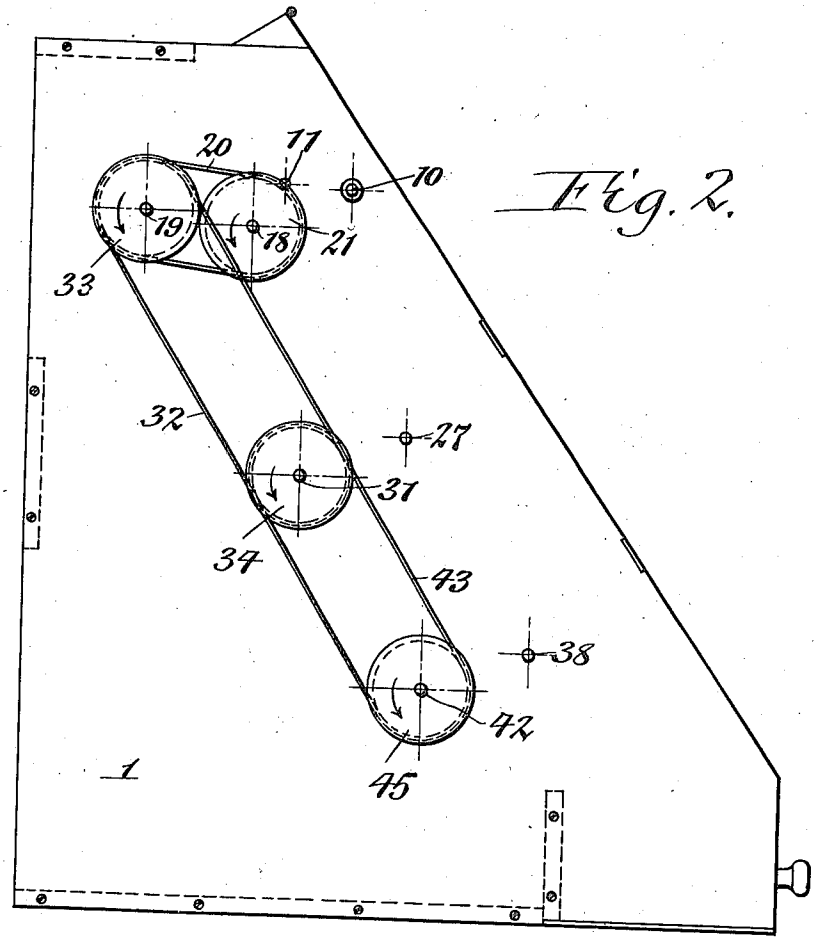


Fig. 2.

Witnesses:-
Richard Sommer
Leroy S. Hodges

Inventor
Charles T. Hall
by Geyer & Tobb
Attorneys

C. T. HALL.

CARD SHUFFLER.

APPLICATION FILED JULY 22, 1911.

1,041,271.

Patented Oct. 15, 1912.

4 SHEETS—SHEET 3.

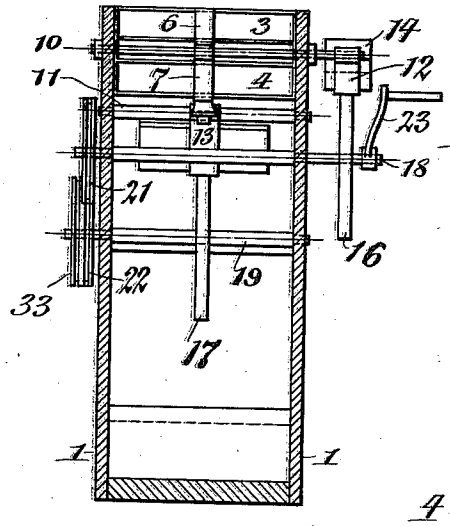


Fig. 4.

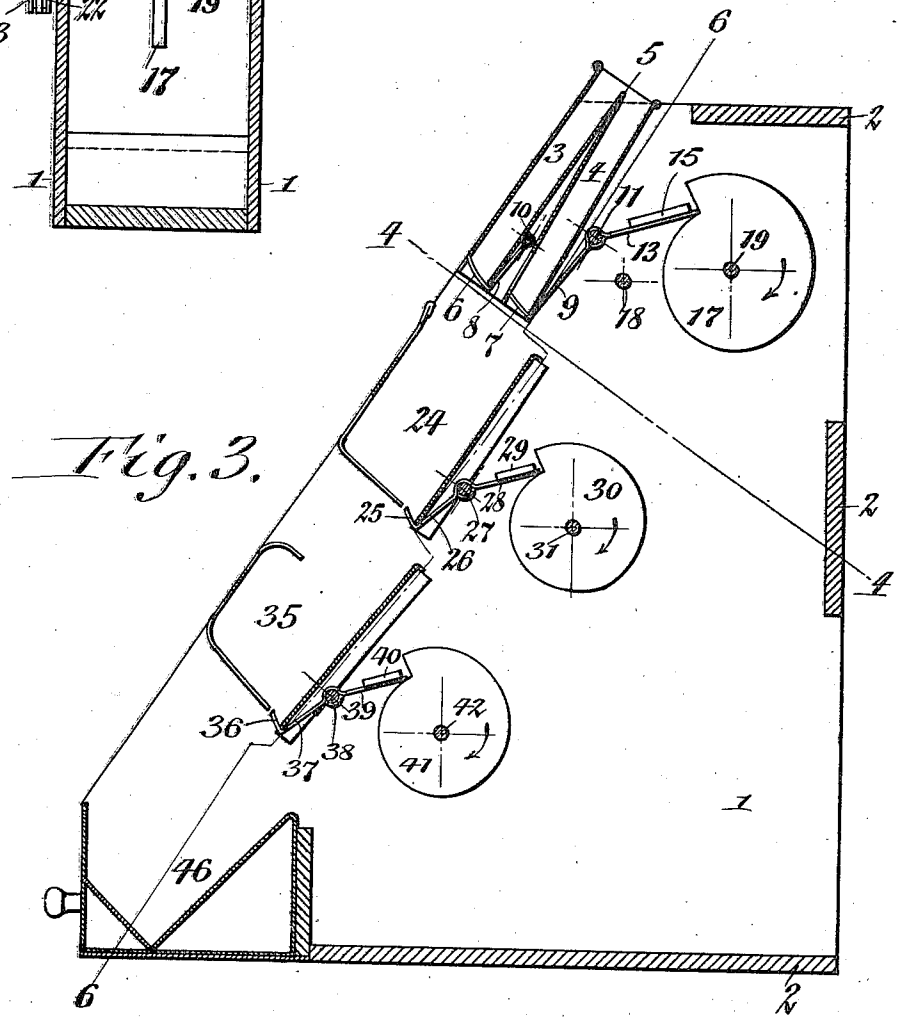


Fig. 3.

Witnesses:-
Richard Sommer
Leroy S. Hodges

Inventor
Charles T. Hall
by Pierce & Popp
Attorneys

C. T. HALL.

CARD SHUFFLER.

APPLICATION FILED JULY 22, 1911.

1,041,271.

Patented Oct. 15, 1912.

4 SHEETS—SHEET 4.

Fig. 5.

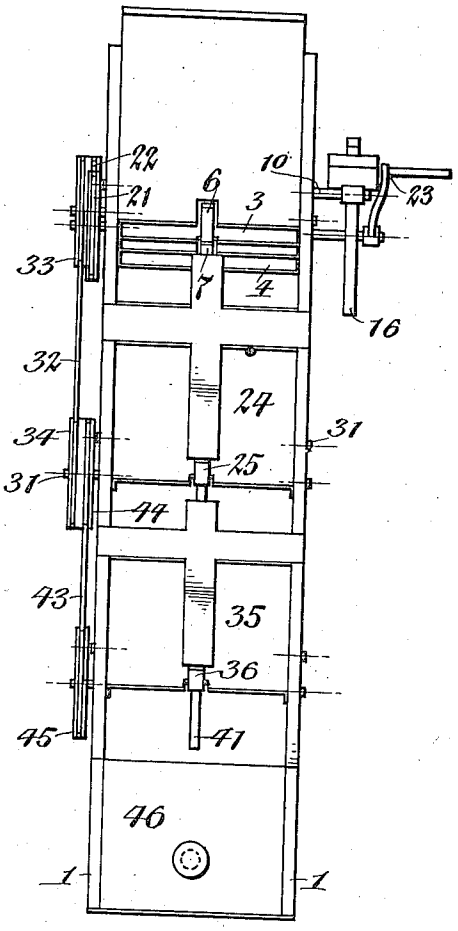
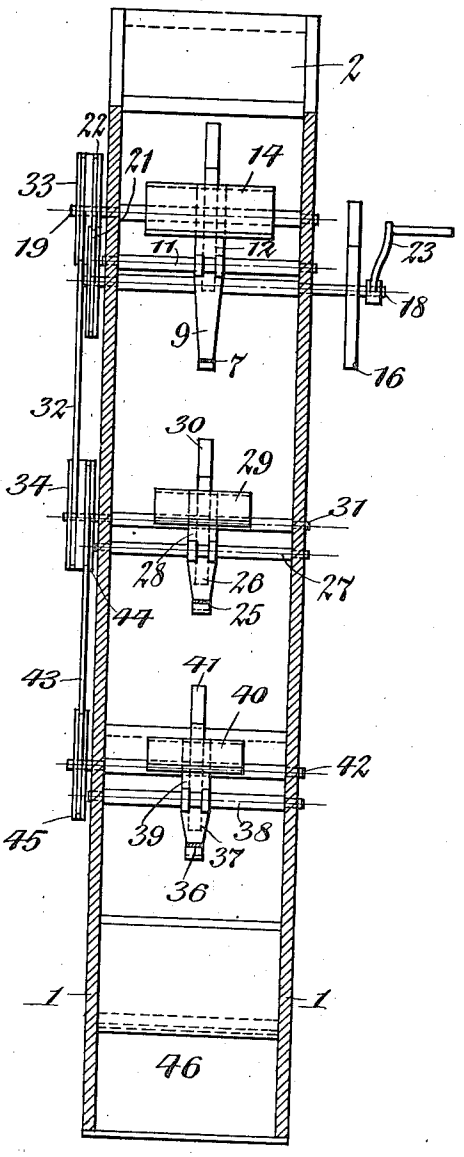


Fig. 6.



Witnesses:
Richard Sommer
Leroy S. Hodges

Inventor
Charles T. Hall
by Geyer & Pope
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES T. HALL, OF BUFFALO, NEW YORK.

CARD-SHUFFLER.

1,041,271. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed July 22, 1911. Serial No. 639,892.

To all whom it may concern:

Be it known that I, CHARLES T. HALL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Card-Shufflers, of which the following is a specification.

This invention relates to a machine for shuffling cards and has the object to produce a machine for this purpose which will permit of thoroughly and rapidly shuffling a deck of cards and which is compact and comparatively inexpensive in construction.

In the accompanying drawings consisting of 4 sheets: Figure 1 is a side elevation of my improved card shuffling machine viewed from the right hand side thereof. Fig. 2 is a side elevation of the same viewed from the left hand side thereof. Fig. 3 is a vertical longitudinal section of the machine. Fig. 4 is a cross section in line 4—4, Fig. 3. Fig. 5 is a front elevation of the machine. Fig. 6 is a cross section in the correspondingly numbered lines in Fig. 3.

Similar characters of reference indicate corresponding parts throughout the several views.

The main frame or stationary part of the machine which supports the working parts may be variously constructed but preferably comprises two upright longitudinal side walls 1, 1 and cross pieces 2 connecting the upper, lower and intermediate parts of the side walls. In the upper part of this frame are arranged two inclined card receiving pockets, chutes or chambers, 3, 4, these pockets being mounted one above the other and each pocket being closed on its upper, lower and lateral longitudinal sides while its upper and lower ends are open so as to form an inlet at the upper end of each receiving pocket through which cards may be introduced into the same and an outlet at the lower end of each of these pockets through which the cards are discharged therefrom. These supply pockets diverge from their upper inlet to their lower outlet ends and the opposing bottom of the upper supply pocket and the top of the companion lower supply pocket are united at their upper edges so that this bottom and top form a wedge 5 which operates to divide a pack of cards into two piles upon pushing cards downwardly by hand into the inlet ends of the supply pockets and thereby cause one pile to enter the lower supply pocket and the other pile to enter the upper supply pocket. Means are provided, for obstructing the outlets of these supply pockets which means are so constructed that the obstruction of these outlets is gradually removed so as to permit cards to escape successively from both supply pockets in two streams which unite below the outlets of the supply pockets and form the first mixture of the cards. Although various means may be employed for thus gradually discharging the cards from the upper and lower supply pockets the means shown in the drawings are suitable and are constructed as follows:

6, 7 represent upper and lower gates which extend vertically across the outlets of the upper and lower supply pockets and which are mounted by means of rock arms 8, 9 on horizontal rock shafts 10, 11 which are journaled in suitable bearings on the side walls of the main frame. The shaft 10 and arm 8 of the gate 6 of the upper supply pocket are arranged between the upper and lower pockets while the transverse shaft 11 and the rock arm 9 of the lower gate 7 are arranged below the lower supply pocket. The rock shafts 10, 11 are normally held in the position in which their gates 6, 7 are elevated and projected across the path of the cards in the supply pockets by means of shifting arms 12, 13 projecting rearwardly from these shafts and provided with weights, 14, 15, as shown in Figs. 1, 3 and 6. The opening of the gates 6, 7 is effected by means of two cams 16, 17 one of which engages with the shifting arm of the upper gate and the other with the shifting arm of the lower gate. Each of these cams is preferably constructed of volute form and has its lowest point connected with its highest point by means of an abrupt face. By this means each of these cams upon beginning its rotary movement while its lowest part engages with the shifting arm of its companion gate gradually causes this gate to be moved downwardly from the outlet of the respective supply pocket and entirely clears this outlet by the time this cam has made a complete rotation, thereby permitting all of the cards to escape from the pocket. As the cam during its continued rotation passes with its highest part beyond the shifting arm the latter drops by gravity from the highest part of this cam to the lowest part thereof owing to the weight on this arm, whereby the gate associated with this shifting arm

is elevated so as to again project across the outlet of the respective supply pocket and thereby confine therein any cards which may be placed into the same. The cam 16 and rock arm 12 are preferably arranged on the outer side of the right hand wall of the frame while the cam 17 and shifting arm 13 of the lower gate are preferably arranged between the side walls of the frame, as shown in the drawings. The cams 16, 17 are mounted on transverse shafts 18, 19 journaled in bearings on the main frame and these shafts are caused to turn together, preferably by means of a belt 20 passing around pulleys 21, 22 arranged on the corresponding ends of these shafts on the outer side of the left hand wall of the frame or casing. The turning of these shafts may be effected either manually or by power by any suitable means. As shown, these shafts may be turned manually by means of a hand crank 23 applied to the left hand end of the shaft 18, as shown in Figs. 1, 5 and 6. The timing of the mechanism which operates the upper and lower gate of the supply pockets may be varied as desired, for instance, the upper and lower gates may be opened at the same rate by their cams or one of these gates may be opened faster than the other so as to secure a thorough mixture of the cards as they issue from the outlets of the supply pockets.

24 represents a primary mixing chamber or pocket which is mounted upon the main frame of the machine and which has an inlet at its upper end which is arranged below the outlets of the upper and lower supply pockets and a lower outlet through which the cards are discharged therefrom. The outlet of this primary mixing chamber or pocket is controlled by a vertically movable gate 25 which is carried by the front end of a rock arm 26 which is arranged below the primary mixing chamber and secured at its rear end to a rock shaft 27 journaled on the main frame below the primary mixing chamber, a shifting arm 28 projecting rearwardly from the rock shaft 27 and provided with a weight 29 which normally tends to turn the rock shaft 27 and rock arm 28 in the direction for bringing the gate 25 across the outlet of the primary mixing chamber, and a cam 30 preferably of volute form engaging with the rear shifting arm 28 and journaled on the side frames of the machine. The face of this cam is so constructed that when its lowest part engages with the shifting arm 28 the weight 29 turns the rock shaft 27 in a direction in which the gate 25 crosses the outlet of the primary mixing pocket but as this cam turns forwardly its face gradually raises the rear arm 28 and lowers the front arm 26, thereby causing the outlet of the primary mixing chamber to be gradually uncovered and permit the cards to gradually escape downwardly therefrom. The cam 30 is mounted on a transverse shaft 31 journaled in bearings on the main frame and the same is turned preferably by means of a belt 32 passing around pulleys 33, 34 on the shafts 19, 31, as shown in Figs. 2, 5 and 6. As the cards issue from the primary mixing pocket the same are deposited one after the other in a secondary mixing pocket 35 which is constructed substantially like the primary mixing pocket and provided with an inlet at its upper end and an outlet at its lower end. As the cards issue successively from the outlet of the primary mixing pocket the same are discharged successively in a pile on the bottom of the secondary mixing chamber, whereby the cards are caused to be mixed the second time. The discharge of the cards from the second mixing chamber is controlled by a vertically movable gate 36 which is adapted to obstruct the outlet of this pocket more or less. This gate is mounted on the front end of a rock arm 37 which is mounted on a transverse shaft 38 journaled in bearings on the adjacent part of the main frame. 39 represents a shifting arm projecting rearwardly from the rock shaft 38 and provided with a weight 40 whereby this arm and the parts associated therewith are normally turned in a direction in which the gate 36 fully obstructs the outlet of the secondary mixing pocket.

41 represents a cam of volute form which engages the shifting arm 39 and turns the same in a direction for gradually withdrawing the gate 36 from the outlet of the secondary mixing pocket. When the low part of this cam bears against the shifting arm 39 the gate 36 fully obstructs the outlet of the mixing chamber and as this cam turns forwardly this gate is gradually lowered until the highest part of this cam engages with this shifting arm at which time this gate is wholly withdrawn from the outlet of the secondary mixing pocket and all the cards therein are permitted to discharge from the same. As the high part of the cam 41 passes beyond the shifting arm 39 the weight 40 depresses this shifting arm into engagement with the lowest part thereof, thereby closing the outlet of the secondary mixing pocket. The cam 41 is mounted on a transverse shaft 42 which is journaled in suitable bearings on the main frame and is driven by means of a belt 43 passing around pulleys 44, 45 on the shafts 31, 42, as shown in Figs. 2, 5 and 6. As the cards issue successively from the outlet of the secondary mixing pocket they drop into a box or drawer 46 which is removably mounted on the lower part of the frame and which has an angular bottom so that the cards are stacked in the same successively and in a position to be removed by hand ready for dealing.

In using this machine a deck of cards is pushed against the front edge of the wedge 5 formed by the walls between the upper and lower supply pockets while the gates of these pockets are closed, whereby the deck is divided into two groups which enter the two supply pockets respectively and are prevented from escaping therefrom by the gates thereof. At this time the gates of both the primary and secondary mixing pockets are also closed. Upon now turning the crank so as to rotate the several cams in the direction of the arrows the gates of both the upper and lower supply pockets will be gradually opened thereby permitting the cards to slide successively from the tops of the stacks in both of these pockets at the same time and become mixed as they fall into the first mixing pocket. When about one third of the deck of cards has been transferred from the two supply pockets to the upper or primary mixing pocket the gate at the outlet of this last mentioned pocket also begins to open so as to permit the cards to discharge successively therefrom into the lower or secondary mixing pocket. After some of the cards have accumulated in the lower mixing pocket the gate at the outlet of this last mentioned pocket also begins to open, thereby permitting the cards to discharge successively therefrom into the gathering box. In this manner the cards are first shuffled in passing from the supply pockets or chutes to the primary mixing pocket and again as they pass to the secondary mixing pocket and to the gathering box. The inclination of the several pockets is such as to cause the cards to slide freely by gravity from one pocket to the next lower whenever the gates are in a position to release the cards. It has been found in practice that upon inclining the pockets at an angle of 60° the cards slide from one pocket to another perfectly free and sufficiently rapid for all practical purposes.

This machine is very simple in its construction, it has no parts which are delicate and liable to get out of order and it insures thorough shuffling of the cards so that every one of the players will receive a square deal.

I claim as my invention:

1. A card shuffler comprising a pair of supply pockets arranged one above the other and separated from each other by an intervening space and each having an inlet at one end and an outlet at its opposite end, upper and lower independently operable gates controlling the outlets of said pockets, an upper operating shaft arranged transversely in the space between the upper and lower pockets and having an upper arm which carries the upper gate, and a lower operating shaft arranged below the lower pocket and having a lower arm which carries said lower gate.

2. A card shuffler comprising a pair of inclined supply pockets arranged one above the other and adapted to receive two parts of a deck of cards, respectively, and each having an outlet at its lower end, gates controlling said outlet, and means for operating said gates independently of each other.

3. A card shuffler comprising two inclined supply pockets arranged one above the other and adapted to receive cards and each provided at its lower end with an outlet, independently operable gates controlling said outlets, an inclined mixing pocket having an inlet at its upper end for receiving the cards from said supply pockets and an outlet at its lower end for discharging the cards therefrom, a gate for controlling the outlet of the mixing pocket, and means for gradually withdrawing the several gates from their respective outlets.

Witness my hand this 20th day of July, 1911.

CHARLES T. HALL.

Witnesses:
THEO. L. POPP,
ANNA HEIGIS.