K. E. L. LIEDSTRAND.

CARDS ADAPTED FOR STATISTIC OR SIMILAR PURPOSES AND APPARATUS FOR SORTING THE CARDS.

APPLICATION FILED MAY 20, 1919.

1,334,957.

Patented Mar. 30, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

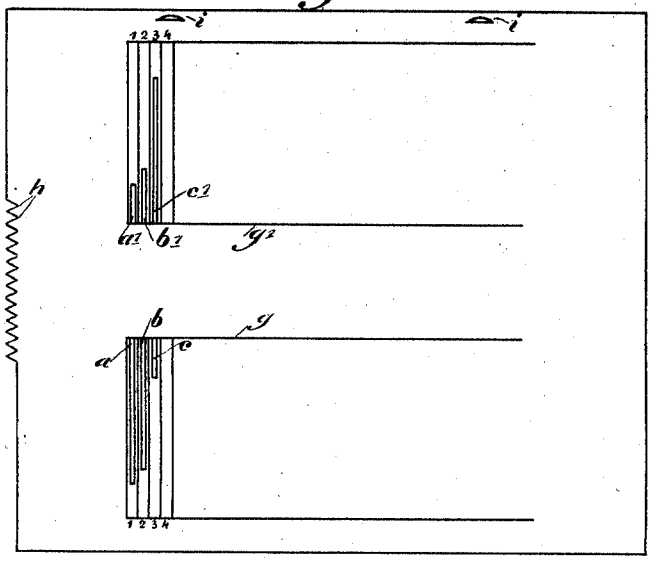
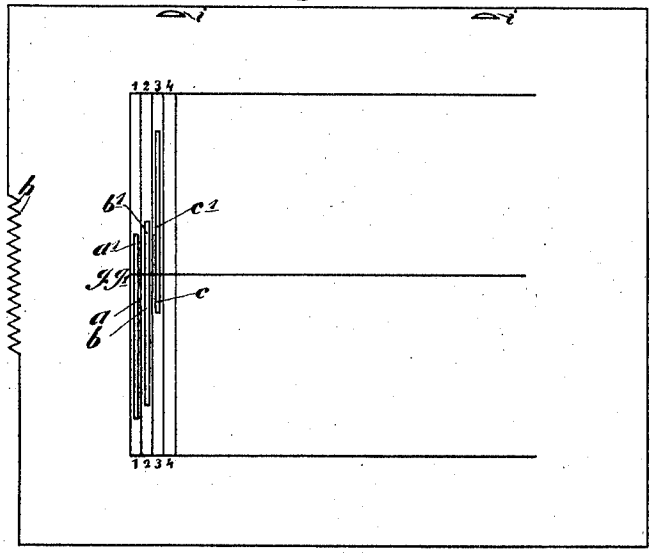


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

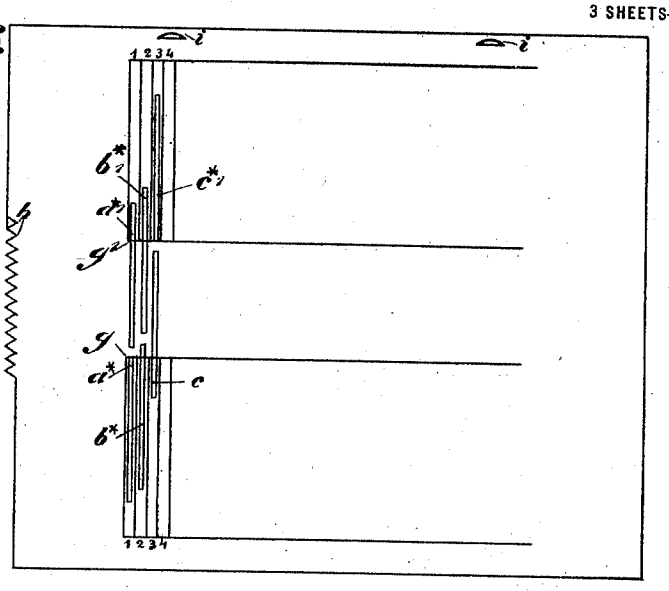
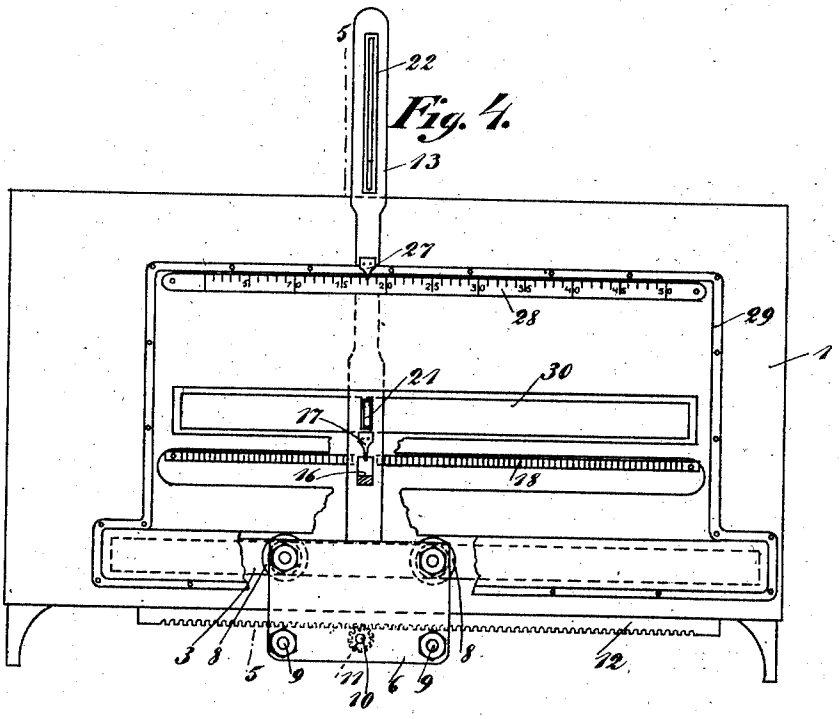


Fig. 4.



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3 SHEETS—SHEET 3.

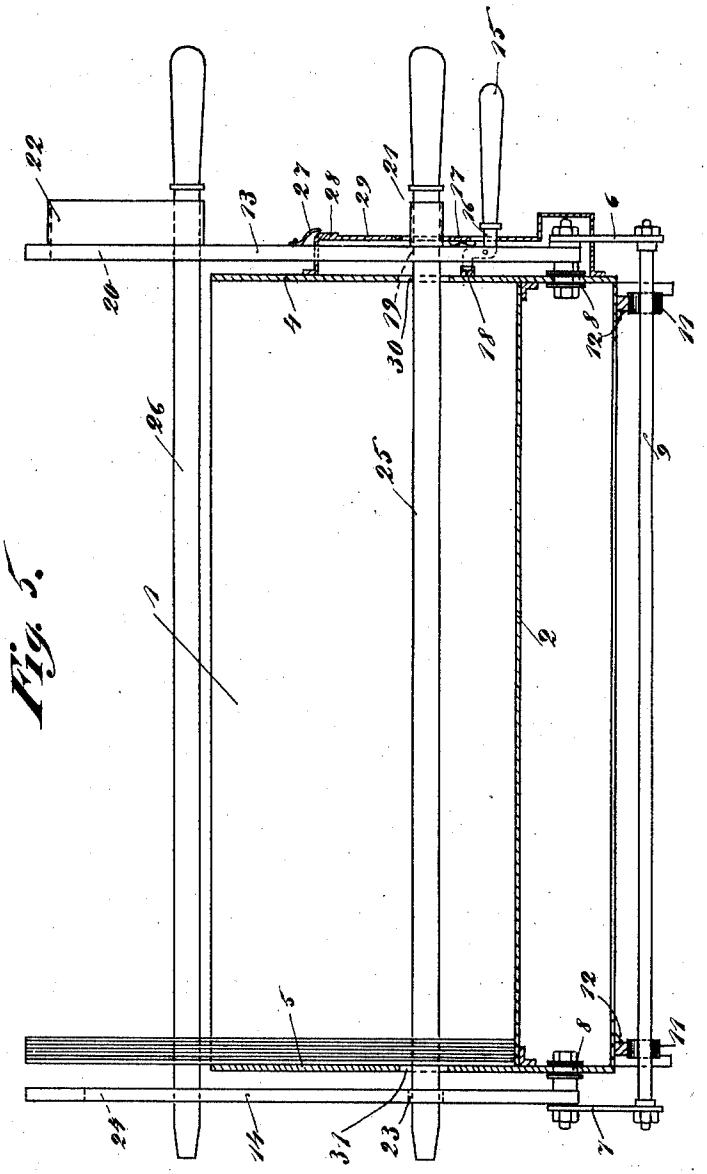


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CARDS ADAPTED FOR STATISTIC OR SIMILAR PURPOSES AND APPARATUS FOR SORTING THE CARDS.

1,334,957. Specification of Letters Patent. Patented Mar. 30, 1920.

Application filed May 20, 1919. Serial No. 298,561.

To all whom it may concern:

Be it known that I, KARL EMIL LEONARD LIEDSTRAND, a subject of the King of Sweden, and resident of Vollmar-Yxkullsgatan 9, Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Cards Adapted for Statistic or Similar Purposes and Apparatus for Sorting the Cards, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in such cards, adapted for statistic or similar purposes, as are stated in the U. S. Letters Patent No. 1261413, whereby the cards in a more rapid and reliable manner and positively are caused to occupy different positions in a certain direction. The invention also relates to improvements of the apparatus serving to sort the cards, corresponding to the improvements of the cards.

The idea of this invention is as follows: On each card two sections are reserved for each ground of classification, for instance age, confession of faith, civil status and so on. The said sections are located on a line with one another either close by or at some distance from one another. Each of the said sections of the card is provided with a slot extending from a certain point and in a certain direction, the slots of the corresponding sections of the cards having the same length or different length, so that a slot of a certain length provided in a certain section designates a certain group of the classification corresponding to the section. The slots of two sections corresponding to a certain classification extend in straight opposite directions from one another. A further characteristic feature of this invention consists in the total length of the slots of two corresponding sections being constant. By means of the said arrangements and two sticks, threaded into two corresponding slots, the cards may be forced into different positions with relation to one another by moving the sticks from one another. Consequently, all cards belonging to the same group of the classification in question occupy the same position, different from the positions of the other cards.

For sorting cards arranged as stated above an apparatus of substantially the same construction as described in the said Letters Patent may be used, except that the apparatus is provided with means for inserting two sticks (instead of one) corresponding to the different starting points of the corresponding slots respectively. One of the said sticks or both sticks are movable in guides provided in the apparatus and so arranged, that the sticks threaded into the guides and the slots of the cards may be moved from one another and thus force the cards into different positions in accordance with the length of the slots.

In the accompanying drawings Figures 1, 2 and 3 show three cards arranged in accordance with this invention. Fig. 4 is a front view of a sorting apparatus, arranged in accordance with this invention. Fig. 5 is a section on the line 5 to 5 of Fig. 4. In Fig. 4 some portions are omitted, in order that parts located behind the same may be visible.

The card shown in Fig. 1 is provided with slots a, a', b, b', c, c' and so on, which are located in respectively two sections of the card, corresponding to certain grounds of classification, according to which the cards may be sorted. Preferably the said slots are located on a line with one another, as shown. The slots extend from points located in the vicinity of the center of the card and from one another toward the edges of the card. Preferably the starting points are located on two lines g, g', parallel with one another and with opposite edges of the card. The total length of corresponding slots is constant. The slots a, a' are located for instance in two sections for the sorting of the cards with age as ground of classification, while the slots b, b' and c, c' are located in sections corresponding to confession of faith and civil status respectively.

The starting points of the slots, shown in Fig. 1, and represented by the lines g and g', may, evidently, be located closer to one another and so close that the said lines g, g' coincide, as shown in Fig. 2. In this case the slots a, a', b, b', c, c' respectively form a single slot. All the said slots have the same length. This is of a great importance for the making of the slots, as it may be done by means of a single die.

The effective length of the slots may start

from a point located at a distance from the inner end of the slot. Fig. 3 shows a card modified in the said manner. g, g' represent the starting points of the slots $a^*, a^{*\prime}, b^*, b^{*\prime}, c^*, c^{*\prime}$. The parts of said slots located inside the lines g, g' have no influence upon the sorting of the cards, as the sticks, mentioned above, are threaded through the cards at the lines g, g' and are then moved from one another. Consequently all the slots may be effected for instance by means of two dies of the same length.

The manner in which the cards shown in Fig. 1 are sorted is described below.

The sorting apparatus, Figs. 4 and 5, consists of a frame or casing 1, on the bottom 2 of which the cards are placed. In Fig. 5 some cards are shown located in the casing. In slots 3, provided in the front and rear walls 4, 5 of the casing and extending longitudinally of the same two carriages 6, 7 are movable, carried by rollers 8 running in the said slots 3. The said carriages are connected by means of rods 9. In the carriages a shaft 10 is journaled, to which toothed wheels 11 are fixed, which engage parallel racks 12, fixed to the lower side of the casing 1. Owing to the said arrangement the carriages will move exactly in unison, as one of the same is moved in one or the other direction. On each of the carriages 6, 7 an upright 13, 14 respectively is provided. An angular arm 16, provided with a handle 15 is pivoted to the upright 13 and is held by a leaf spring 17, fixed to the upright 13, in engagement with a toothed rod 18, fixed to the wall 4 of the casing 1 and extending parallelly with the path of the carriages 6. For the moving of the carriages 6, 7 together with the uprights 13, 14, one grasps the handle 15 and depresses the angular arm 16 thus bringing the same out of engagement with the toothed rod 18. The arm 16 is then moved toward the right or the left, Fig. 1, carrying with itself the carriages. As the handle 15 is released, the spring 17 forces the angular arm 16 into engagement with the toothed rod 18 and locks the carriages and the uprights in adjusted position. The upright 13 is provided with two slots 19, 20 located one above another. Sleeves 21, 22 respectively extend outward from the slots and have the same shape as the slots. Also the upright 14 is provided with slots 23, 24, corresponding to the slots 19, 20. 25 and 26 are two sticks provided with handles and adapted to be threaded through the slots 19, 23 and 20, 24 respectively, as shown in Fig. 5. The height of the slots 19, 23 is substantially equal to the width of the sticks. The edges of the slot of the sleeve 22, Fig. 4, are beveled in order to facilitate the introducing of the stick into said slot. To the upright 13 a pointer 27 is fixed, which together with a scale 28, provided on a hood 29 fixed to the wall 4, serve as a guidance at the adjusting of the uprights. In the walls 4, 5 openings 30, 31 for the stick 25 are provided.

The apparatus is used in the following manner: A collection of cards is placed in an upright position on the bottom 2 of the casing 1, after the sticks 25, 26 have been withdrawn. With the guidance of the scale 28 and the pointer 27 the uprights 13, 14 are adjusted for the sections of the cards, through the slots of which the sticks should be threaded, for instance the sections, in which the slots a, a' are provided. The sections of the cards are numbered and the division lines of the scale 28 are located opposite to the sections respectively of the cards having the same numbers. The sticks 25, 26 are then threaded through the slots 19, 20, the slots of the cards and the slots 23, 24, guided by sleeves 21 and 22, so that the sticks catch the slots of the cards and the slots 23, 24. The distance between the slots 19, 20 and 23, 24 respectively is equal to the distance between the inner ends of the slots a, a', b, b' etc. respectively, Fig. 1. Besides, the distance between the top edge of the slots 19, 23 and the bottom 2 of the casing is equal to the distance between the lower edge of the cards and the inner ends of the slots a, b, c, etc. Consequently, as the stick 25 is threaded through the slots 19, 23 it passes through the inner end of the slot a (b, c, etc.). The stick 26 is threaded through the lower ends of the slots 20, 24 and, consequently, passes through the inner end of the slot a' (b', c', etc.). After the sticks have been mounted in the casing in the said manner, one grasps the ends of the stick 26 and moves the stick upward. Owing to the fact that the total length of the slots of the sections respectively of the cards is constant, as stated above, the stick 25 may always be elevated to the same level or be moved through a distance equal to the said total length. The position, on the other hand, occupied by the cards respectively after the stick 26 has been elevated, is dependent partly on the distance through which the stick may be moved in the slot a' without bringing the card with itself, partly on the length of the slots a. Assume, that the width of the stick 26 is equal to the length of the slot a', the card will then be moved upward for a distance equal to the length of the slot a less the width of the stick 25. If on the other hand the length of slot a' is equal to the length of the slot b' for instance, in which case the length of the slot a is correspondingly shorter, the stick 26 does not bring with itself the card during the first part of its upward movement but only when the stick 26 strikes the top end of the slot a'. Consequently, the card is not moved to such

a high level but has a lower position in the collection after the raising of the stick 26. If the slot a' extends along the whole upper section (as is the case with the slot c'), the card is not moved at all by the stick 26. Consequently, the cards will occupy different positions in the collection after raising the stick 26, *i. e.* after the sorting operation. The cards, thus sorted, may be locked by means of any suitable device (not shown) for instance a device of the construction shown in the Letters Patent mentioned above and engaging notches h provided in one of the edges of the cards. After the removing of the sticks 25, 26 the cards are withdrawn by groups by means of a fork or the like, which is threaded through holes i provided in the cards, the said groups being released in their proper turns by disengaging the locking device from the notches h.

The starting position of the cards in the apparatus is determined by the bottom 2 and also the starting position of the stick 26 is determined by the bottom ends of the slots 20, 24. Consequently, it is of no importance, where the starting points of the slots of the different sections are located, provided only that the sticks may be threaded through the slots at predetermined parts of the same. Counting from the said parts the slots must have the features stated above and their effective total length be constant. Consequently, also cards provided with slots of the types shown in Figs. 2 and 3 may be sorted in an apparatus of substantially the same construction as shown in Figs. 4 and 5, the slots 19, 23 and 20, 24 being so located that the sticks 25, 26 will be located back to back at the line g, g', Fig. 2, or at the lines g and g', Fig. 3, of the cards located in the apparatus.

As seen from the above, the cards are moved positively during the sorting operation in consequence of the described arrangement of their slots and the sorting apparatus. This is of great importance, as the moving of all the cards to their proper position in the sorted collection is insured.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Cards for statistic or similar purposes having one or more sections on the cards provided with slots of different effective length and one or more sections, located substantially on a line with the said sections respectively and provided with slots of corresponding different effective length, which slots extend away from one another from the adjacent ends of coöperating sections, the total effective length of the slots of corresponding sections being unvariable and the slots provided in certain coöperating sections designating a certain group of a classification corresponding to the said sections, substantially as described and for the purpose set forth.

2. Cards for statistic or similar purposes having one or more sections on the cards provided with slots of different length and one or more sections, located substantially in line with the said sections respectively and provided with slots of different length, the slots of coöperating sections extending from the same point on the card and the total length of coöperating slots being unvariable, substantially as described and for the purpose set forth.

3. In an apparatus for sorting cards for statistic or similar purposes having one or more sections on the cards provided with slots of different effective length and one or more sections, located substantially on a line with the said sections respectively and provided with slots of corresponding different effective length, which slots extend from the ends of coöperating sections facing one another, the total effective length of the slots of corresponding sections being unvariable, the combination of a frame, in which the cards are mounted, movable parts provided with slots, through which and the slots of the cards sticks may be threaded, adapted for the sorting of the cards, and means for fixing the said parts in different positions corresponding to the sections of the cards.

In witness whereof I have hereunto signed my name.

KARL EMIL LEONARD LIEDSTRAND.