Nov. 28, 1967 W. LUDWIG 3,354,885

CARD SUPPORT

Filed Nov. 10, 1964 4 Sheets-Sheet 1

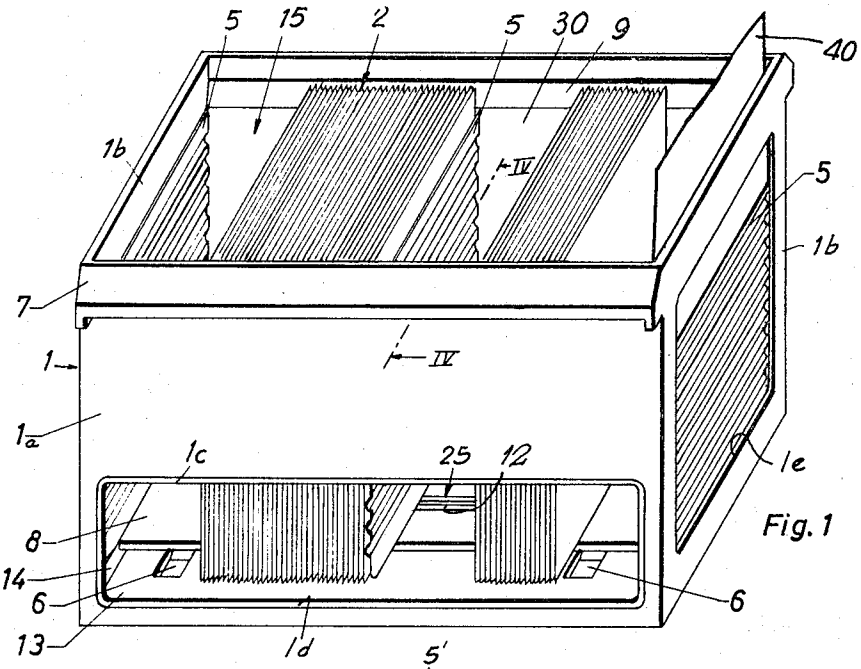


Fig. 1

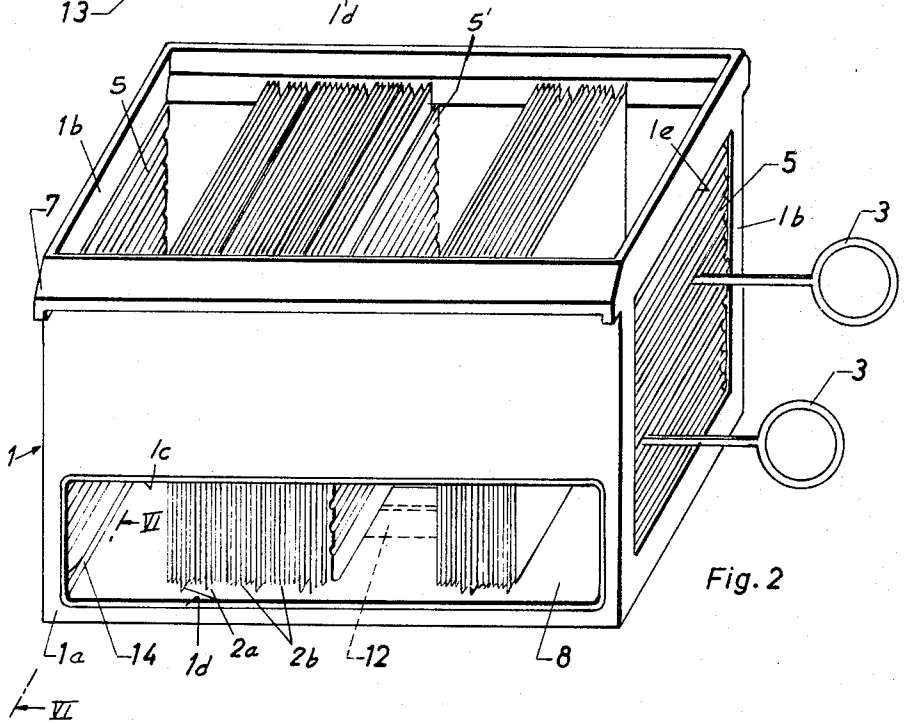


Fig. 2

INVENTOR
WILHELM LUDWIG

BY

Michael J. Striker
his ATTORNEY

Nov. 28, 1967 W. LUDWIG 3,354,885

CARD SUPPORT

Filed Nov. 10, 1964 4 Sheets-Sheet 2

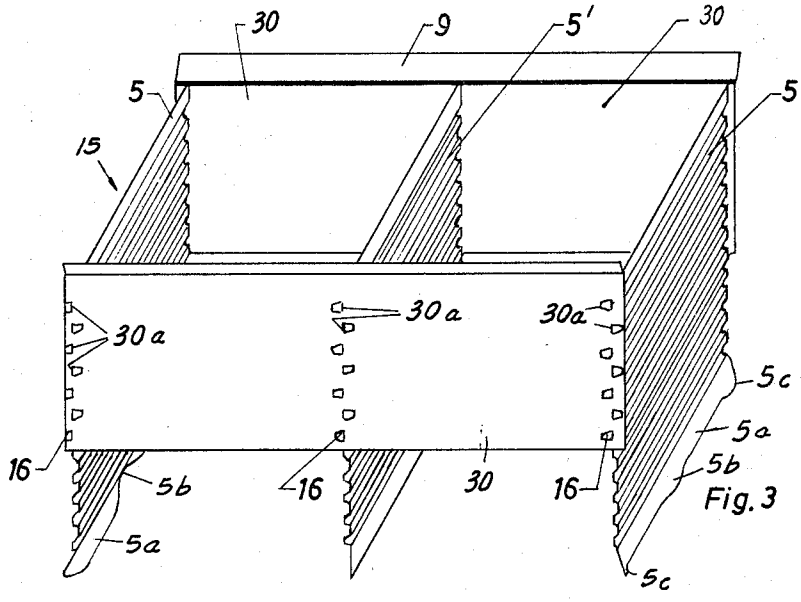


Fig. 3

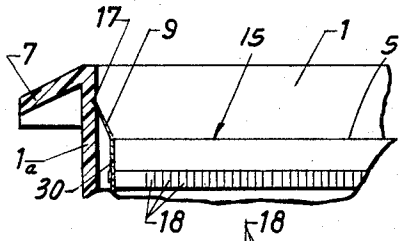


Fig. 4

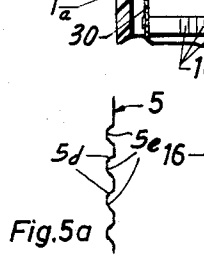


Fig.5a

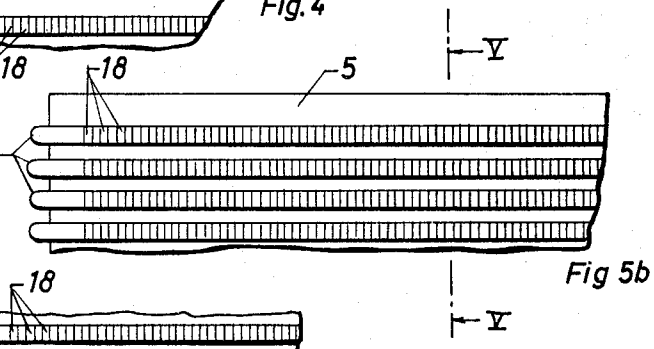


Fig 5b

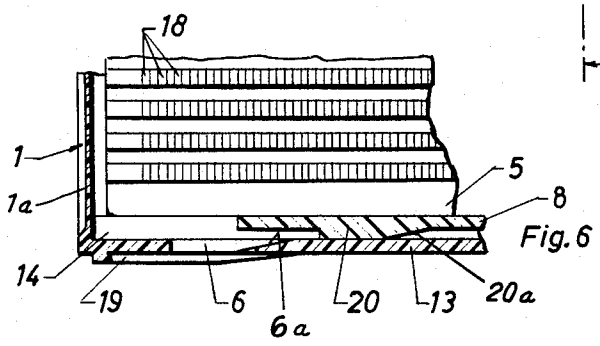


Fig. 6

INVENTOR
WILHELM LUDWIG

BY

Michael J. Striker
his ATTORNEY

Nov. 28, 1967 W. LUDWIG 3,354,885

CARD SUPPORT

Filed Nov. 10, 1964 4 Sheets-Sheet 3

Fig. 9

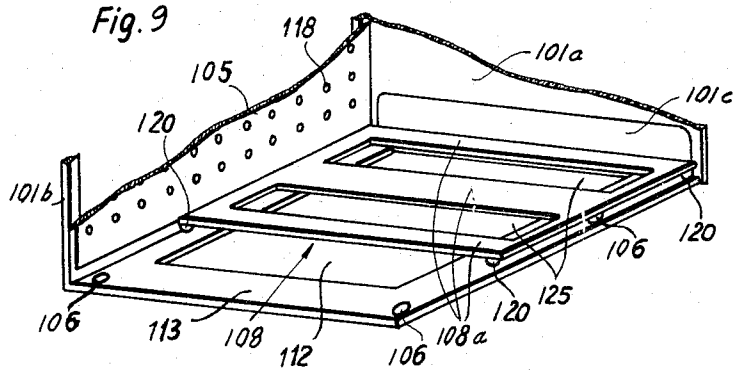
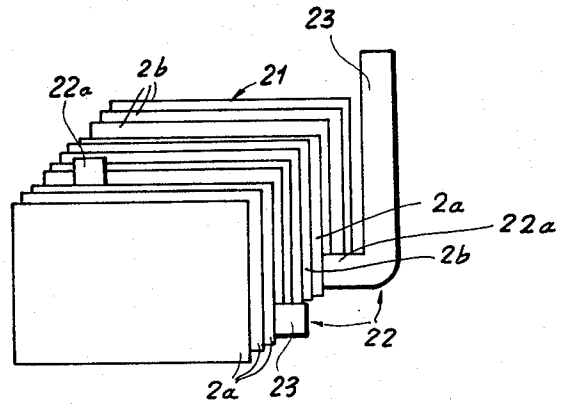


Fig. 7



INVENTOR
WILHELM LUDWIG

BY

Michael J. Striker
his ATTORNEY

Nov. 28, 1967 W. LUDWIG 3,354,885

CARD SUPPORT

Filed Nov. 10, 1964 4 Sheets-Sheet 4

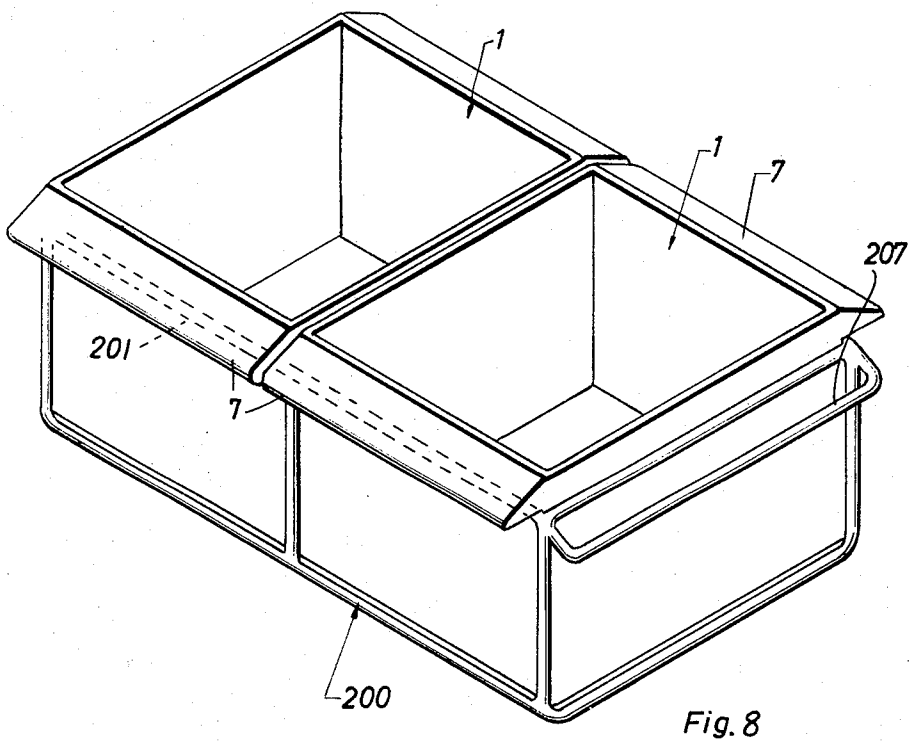


Fig. 8

INVENTOR
WILHELM LUDWIG

BY

Michael J. Striker
his ATTORNEY

United States Patent Office 3,354,885 Patented Nov. 28, 1967

3,354,885

CARD SUPPORT

Wilhelm Ludwig, 79 Kirchheimer Strasse, Nurtingen, Wurttemberg, Germany

Filed Nov. 10, 1964, Ser. No. 410,249
Claims priority, application Germany, Nov. 12, 1963, L 46,313; Apr. 23, 1964, L 47,668
2 Claims. (Cl. 129—16.1)

The present invention relates to card supports, and more particularly to improvements in card supports of the class disclosed in U.S. Patent No. 2,331,175 to Connor and Nevin.

In card supports of the type to which the present invention pertains, a stack of perforated information bearing cards is accommodated in a box-shaped housing which is provided with a movable bottom wall. When the bottom wall is lifted, all cards of the stack are moved in exact registry with each other so that the operator may introduce one or more selector needles by passing such needles through certain perforations of the cards. The needles are then supported by suitable end panels and allow a group of cards which bear the same type of information to descend in response to lowering of the bottom wall. In order to insure that the selector needles cannot prevent the descent of a group of cards which bear the same type of information, certain perforations in such selected group of cards (i.e., the perforations through which the selector needles extend) are configurated in such a way that the needles are received with some play which suffices to allow the cards of the selected group to descend with the bottom wall whereas all other cards of the stack remain suspended on the needles. The end panels of the card support are provided with perforations which register with the perforations of the cards when the bottom wall is lifted, and the perforations of the end panels receive the needles without any clearance so that, once the bottom wall descends, the needles retain all cards which store information that is, at that particular time, of no interest to the manipulator. The end panels are supported by the housing of the card support and are thus held against movement with the bottom wall.

Cards which are used in such types of supports normally bear two forms of information. Thus, in addition to bearing information in the form of written or printed matter (such as words, sentences, pictures, symbols or the like), each card normally comprises a section wherein the information is coded in the form of perforations. Such perforations enable the manipulator to rapidly detect and segregate cards which bear the same type of information by resorting to the aforementioned selector needles or similar elongated implements. The perforations of all cards are in exact registry with each other when the stack is inserted into the housing of the card support provided that the bottom wall is moved to its raised position, but the perforations pertaining to a given type of information resemble elongated slots, i.e., all cards forming a group have one or more slot-shaped perforations which are aligned with each other so that, when the manipulator inserts a needle through a row of aligned slot-shaped perforations and the bottom wall is returned to its lower end position, all cards belonging to the same group will descend with the bottom wall and are automatically segregated from the remaining cards of the stack. Elongated slots may be formed by removing the web between a pair of closely adjacent superimposed circular holes or by providing all cards in a group with open or closed slots which are long enough to allow for some displacement of such cards with reference to the remainder of the stack.

It is clear that the perforations must be formed and distributed with utmost precision. Also, and since the distance between the upper and lower positions of the movable bottom wall should be small, the end panels must also be perforated with utmost precision to insure that the needles will segregate only such cards which belong to the same group. Furthermore, each end panel must be mounted in its support with a very high degree of accuracy to insure that its perforations register with the perforations of stacked cards when the bottom wall is moved to its raised position. The smaller the distance between the two positions of the bottom wall, the more accurate must be the configuration, distribution and alignment of perforations in the cards and end panels.

Card supports of the type to which my invention pertains are known for several decades; nevertheless, they failed to gain widespread acceptance mainly because of excessive cost, inaccuracies in making (particularly improper alignment of perforations in the end panels and information bearing cards), and also because of excessive space requirements. Thus, and in order to insure satisfactory segregation of a selected group of cards, all conventional card supports of which I am aware at this time are constructed to allow for movements of the bottom wall between two distant end positions which adds considerably to the bulkiness of the housing. When a stack of cards is observed from above, it is rather difficult to discern the cards which belong to the same group even though such cards were permitted to descend with the bottom wall. It happens again and again that the person in charge fails to detect a card which belongs to a segregated group, and such failure may result in gathering of incomplete information or other drawbacks.

Accordingly, it is an important object of the present invention to provide a novel card support which is constructed and assembled in such a way that all cards which belong to a group of cards bearing the same type of information may be rapidly and readily detected at two or more sides of the stack as soon as such a group of cards is segregated from the remainder of the stack.

Another object of the invention is to provide an improved housing for a card support of the just outlined characteristics wherein all movements of the bottom wall are controlled and limited in a novel way to insure exact alignment of all cards when the bottom wall is moved to raised position.

A further object of my invention is to provide a very simple and inexpensive housing of the above outlined character which is constructed in such a way that it may be accurately and easily stacked or stapled with similar housings and that it may be filed away in suspended position.

An additional object of the invention is to provide a novel and improved method of mass producing perforated end panels for use in a housing of the above outlined characteristics and to construct each end panel in such a way that it may be inserted and fixed in the housing with requisite accuracy to allow for satisfactory retention of selector needles and rapid and accurate segregation of related cards even if the distance between the two positions of the bottom wall is extremely short.

A concomitant object of the invention is to provide a card support of the above outlined characteristics which is constructed and assembled in such a way that its end panels form a rigid unit which may be inserted into or removed from the housing with little loss in time and which is automatically locked in operative position when its parts are properly inserted into the housing.

Still another object of the instant invention is to provide a card support which will operate properly and with requisite accuracy even if the distance between the upper and lower end positions of its movable bottom wall is so small that such movability of the bottom wall contributes negligibly to the bulkiness of the housing, for

example, when the distance between the two positions of the bottom wall approximates 2 millimeters.

A further object of the invention is to provide a novel receptacle for a card support of the above outlined characteristics and to construct the receptacle in such a way that it may accommodate a plurality of housings, each for a different stack of cards, and that such housings need not be removed from the common receptacle if the operator desires to segregate a given group of cards from a selected stack.

An additional object of the instant invention is to provide a novel frame which embodies one or more perforated end panels and which may be inserted into, locked in, and readily removed from the housing of a card support.

Another object of my invention is to provide a card support wherein a group of segregated cards may be detected from as many as three and even four sides of the stack, wherein the housing is constructed and configurated in such a way that the operator may readily apply suitable marker strips to identify all such cards which belong to a given group, and wherein the housing will allow for insertion of multi-armed marker strips so that such marker strips may be observed from more than one side of the housing.

Briefly stated, one feature of my invention resides in the provision of a card support which comprises a box-shaped housing including a first bottom wall and pairs of upstanding side and end walls, a frame fixedly received in the housing and including at least two upstanding end panels and a pair of upstanding side panels connecting the end panels to each other and each adjacent to one of the side walls, and a second bottom wall which is disposed in the housing beneath the frame and above the first bottom wall so as to be slidable between two positions with reference to the first bottom wall. One of the bottom walks is provided with projections which extend into complementary recesses formed in the other bottom wall when the second bottom wall is moved to one position whereby, when moved to the other position, the second bottom wall is automatically lifted above and away from the first bottom wall because the projections are withdrawn from the respective recesses and abut against the other bottom wall.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved card support itself, however, both as to its construction and the mode of manipulating the same, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a portion of a card support which embodies one form of my invention and wherein the movable bottom wall is shown in raised position;

FIG. 2 is a similar perspective view of the structure shown in FIG. 1 and illustrates the movable bottom wall in the lower end position to segregate a group of cards from the stack which is accommodated in the frame of the card support while all other cards of the stack remain suspended on a pair of selector needles;

FIG. 3 is a perspective view of a frame which may be utilized in the housing of the card support shown in FIGS. 1 and 2;

FIG. 4 is a fragmentary transverse vertical section as seen in the direction of arrows from the line IV—IV of FIG. 1;

FIG. 5*a* is a fragmentary vertical section through an end panel substantially as seen in the direction of arrows from the line V—V of FIG. 5*b*;

FIG. 5*b* is a fragmentary rear elevational view of an end panel;

FIG. 6 is a fragmentary transverse vertical section substantially as seen in the direction of arrows from the line VI—VI of FIG. 2;

FIG. 7 is a perspective view of a stack of cards which has been segregated into two groups and wherein the position of cards belonging to one of the groups has been indicated by specially configurated marker strips;

FIG. 8 is a perspective view of a complete card support which comprises a special receptacle arranged to accommodate two housings and two stacks of cards end to end; and

FIG. 9 is a fragmentary perspective view of a modified card support.

Referring to the drawings, and first to FIG. 1, there is shown the box-shaped housing **1** of a card support which is constructed and assembled in accordance with a first embodiment of my invention. The housing **1**, which preferably consists of synthetic thermoplastic material, has an open top and defines an internal chamber which accommodates a stack **2** of parallel perforated cards disposed in vertical planes. The stack **2** contains at least two groups of cards and each such group contains cards which bear the same type of information. The housing comprises a bottom wall **13**, shown in FIG. 6, which is normally located in a horizontal plane and is rigid with a pair of upstanding side walls **1***a* and two upstanding end walls **1***b*. The chamber of the housing **1** accommodates a frame **15**, best shown in FIG. 3, which comprises two perforated end panels **5** and two side panels **30** serving to connect the end panels to each other. In the illustrated embodiment, the frame **15** also includes a median panel **5'** which is substantially identical with the end panels **5** and, for convenience, will be referred to as a third end panel. Each side panel **30** is provided with three vertical rows of slots **30***a* which are coplanar with the end panels **5**, **5'** and which receive bent-over lugs **16** provided along the vertical edges of the end panels. As shown in FIG. 3, the adjoining lugs **16** are bent in opposite directions to insure that the frame **15** retains its shape and forms a rigid unit which may be inserted into the chamber of the housing **1**.

The bottom wall **13** of the housing **1** is provided with one or more rectangular or otherwise shaped openings **12** (one is shown by broken lines in FIG. 2) to afford access to a second bottom wall **8** which may consist of synthetic thermoplastic material and is accommodated beneath the frame **15** so that its underside faces the upper side of the bottom wall **13**. The bottom wall **8** is movable between a raised position which is shown in FIG. 1 and a lower position shown in FIG. 2. When in raised position, the upper side of the bottom wall **8** abuts against the lower edges of the cards forming the stack **2** so that all of such cards actually rest on the bottom wall **8** and are maintained in exact alignment with each other. When the bottom wall **8** is caused to descend to the position shown in FIG. 2, the cards of the stack **2** tend to follow such movement, i.e., as a rule, all of the cards will rest on the bottom wall **8** regardless of whether this bottom wall is maintained in the position shown in FIG. 1 or FIG. 2. However, when the operator elects to segregate a certain group of cards which bear the same type of information, he resorts to one or more selector needles **3** (two shown in FIG. 2) which are inserted through selected perforations of the end panels **5**, **5'** and pass through the corresponding perforations of cards which form the stack **2**, it being assumed that the needles **3** were inserted while the bottom wall **8** was held in the raised position of FIG. 1. If the bottom wall **8** is then moved to the lower position of FIG. 2, the cards **2***a* which belong to the same group descend with the bottom wall **8** but the remaining cards **2***b* are suspended on the needles **3** for reasons which were outlined hereinbefore. Consequently, the operator will be in a position to inspect the cards **2***a* or to insert suitable marker strips for further reference subsequent to withdrawal of the needles **3**. Thus, once the cards **2***a* are identified by marker strips, the operator may withdraw the needles **3** and may allow the cards **2***b* to descend onto

the bottom wall 8 since the marker strips will enable the operator to rapidly locate the cards 2*a* even though the cards 2*b* are returned in accurate alignment with the cards 2*a*. In FIGS. 1, 2 and 3, the perforations in the cards 2*a*, 2*b* and in the end panels 5, 5' were omitted for the sake of clarity.

In order to move it between the positions of FIGS. 1 and 2, the bottom wall 8 must be shifted laterally, namely, at right angles to the side walls 1*a*. The arrangement for lifting the bottom wall 8 in response to lateral movement in one direction is shown in FIG. 6 and comprises four projections or legs 20 provided at the underside and at the four corners of the bottom wall 8. When the bottom wall 8 is shifted in a direction to the left, as viewed in FIG. 6, the projections 20 will enter complementary recesses 6 which are provided in the upper side of the bottom wall 13. It will be noted that the projections 20 are formed with inclined faces 20*a* and that the bottom wall 13 is formed with similarly inclined faces 6*a* which surround portions of the corresponding recesses 6 so that the bottom wall 8 is lifted or descends gradually in response to lateral movement between the side walls 1*a*. It is clear that the position of recesses 6 and projections 20 may be reversed, and it often suffices to provide one of the bottom walls with only three suitably distributed projections. On the other hand, it is also possible to provide five or more projections. To facilitate lateral displacements, the bottom wall 8 is provided with one or more finger-receiving openings 25 (one shown in FIG. 1) which are accessible through the opening 12 of the bottom wall 13. Thus, the operator inserts his or her fingers through the opening 12 and engages the partitions between the openings 25 to shift the bottom wall 8 toward the one or the other side wall 1*a* whereby the bottom wall 8 automatically rises or descends, depending upon whether the projections 20 enter into or are being withdrawn from the recesses 6. In the embodiment of FIGS. 1 to 6, the recesses 6 are actually cutouts which extend all the way through the material of the lower bottom wall 13. However, if this lower bottom wall is rather thick, the recesses 6 need not extend all the way therethrough. The height of the projections 20 may be such that the difference between the upper and lower end positions of the bottom wall 8 will not appreciably exceed 2 mm.

In order that the operator may readily locate the cards 2*a* which belong to the same group of cards, the side walls 1*a* of the housing 1 are provided with elongated cutouts 1*c* which extend all the way along the corresponding sides of the bottom walls 8 and 13. Thus, the lower edge portions of all cards which form the stack 2 are readily observable through each of the cutouts 1*c* which means that the cards 2*a* may be detected from two sides and from the top of the housing 1. It is clear that the housing 1 may be modified so that only one of its side walls 1*a* will be provided with a cutout 1*c*. The side panels 30 of the frame 15 are located at a level above the cutouts 1*c* so that they cannot conceal the lower portions of the cards. The arrangement is preferably such that the upper side of the bottom wall 8 (in the raised position of this bottom wall) is coplanar or substantially coplanar with the edge portions 1*d* of the side walls 1*a*, the edge portions 1*d* being located below the respective cutouts 1*c*. This is of advantage because, if the operator desires to "memorize" the positions of the cards 2*a*, he can resort to suitable marker strips 22 (shown in FIG. 7) which may be slid along the upper side of the bottom wall 8 to be inserted in front or in the rear of the cards 2*a*. Each cutout 1*c* is wide enough to allow for convenient insertion of maker strips 22.

The panels 5, 5' preferably consist of sheet metal and the end panels 5 are adjacent to the inner sides of the end walls 1*b*. It will be noted that the end walls 1*b* are formed with large cutouts 1*e* so that the entire perforated area of each end panel 5 is fully exposed. Consequently, the operator may insert the needles 3 from either end of the housing 1.

The manner in which the frame 15 may be removably but fixedly retained in the housing 1 is illustrated in FIGS. 3, 4 and 6. The side panels 30 preferably consist of elastically deformable metallic or plastic sheet material and their upper edge portions 9 are bent outwardly (see FIG. 4) so that they may snap into complementary horizontal grooves 17 provided in the inner sides of the side walls 1*a*. Thus, once the frame 15 is inserted through the open top of the housing 1 and the uppermost parts of the edge portions 9 snap into the respective grooves 17, the frame is properly located and locked in the chamber above the bottom wall 8 to retain the perforations of the end panels 5, 5' in accurate alignment with the perforations of the cards 2*a*, 2*b* when the bottom wall 8 is moved to raised position. The edge portions 9 of the side panels 30 may be reinforced by longitudinally extending beads (not shown) which may enter the corresponding grooves 17.

In order to further locate the frame 15 in the housing 1, the lower edge portions 5*a* of the outer end panels 5 are provided with centrally located outwardly extending retaining or locating lobes 5*b* which will snap behind elongated rail-shaped anchoring members 14 provided at the upper side of the bottom wall 13. The corner sections 5*c* of the lower edge portions 5*a* also extend outwardly to snap behind the anchoring members 14 and to cooperate with the lobes 5*b* in preventing longitudinal and vertical displacements of the frame 15. One of the anchoring members 14 is shown in each of FIGS. 1, 2 and 6. As shown in FIGS. 1–4, the manner in which the side panels 30 and end panels 5, 5' are assembled with each other is preferably such that the upper edge portions 9 of the side panels 30 extend beyond the upper end faces of the end panels. When the bottom wall 8 is moved to its raised position, it abuts against the lower end face of the median panel 5'. The anchoring members 14 also serve as a means for guiding the bottom wall 8 in its movements between the side walls 1*a*. These anchoring members may form integral parts of the bottom wall 13 or of the corresponding end walls 1*b*. Once the frame 15 is properly inserted in the housing 1, it is secured to the housing and will remain in locked position until the operator decides to remove the edge portions 9 from the grooves 17 and to withdraw the frame through the open top of the housing, i.e., the card support is then ready for use as soon as the frame receives a stack 2. The frame 15 also retains the bottom wall 8 in the housing 1, i.e., the bottom wall 8 can be removed only upon withdrawal of the frame.

To reduce the cost of the end panels 5, 5', I prefer to utilize sheets of comparatively thin metallic material which is reinforced or stiffened so that the frame 15 will withstand at least some deforming stresses. The sheets may be stiffened by equidistant corrugations 5*d* (see FIGS. 5*a* and 5*b*) which are parallel with the planes of the bottom walls 8 and 13 when the frame 15 is inserted into the housing 1. The crests of the waves defined by the corrugations 5*d* are separated from each other by distances corresponding to the distance between a pair of adjacent rows of perforations 18 in the end panels 5 and 5'. Such perforations are shown in FIG. 5*b*, and it will be noted that the perforations need not be of circular outline. FIGS. 5*a* and 5*b* illustrate a portion of an end panel 5 which is formed with corrugations defining four complete waves or eight half waves. The perforations 18 are formed in alternate half waves and their distribution corresponds to that of perforations in machine punch cards. The lugs 16 extend laterally from the crest of each full wave at one side of the respective end panel 5 or 5' and such lugs are preferably formed by stamping.

The perforations 18 may be formed in a number of ways. For example, such perforations may be formed in a suitable punching or stamping machine. Alternatively, the blanks of end panels 5, 5' may be moved in contact with disk-shaped milling cutters which are mounted on a

common shaft, and the blanks may be moved relative to the shaft so that each cutter will form a perforation **18** of exactly predetermined outline and area. If the blanks are corrugated prior to the formation of perforations **18**, the rows of such perforations will be formed in the crests of corrugations at one side of each blank. In other words, the milling cutters will penetrate only into the crests of corrugated blanks and the length of relative movement between the cutters and the blank will exceed the thickness of the metallic sheet of which the blank consists.

In assembling the panels **5**, **5'** with the side panels **30**, I prefer to utilize a mounting block (not shown) which is provided with slots spaced from each other in the same way as the end panels **5**, **5'** of a fully assembled frame. The end panels are inserted into the respective slots so that their lugs **16** project laterally beyond the block. In the next step, the side panels **30** are placed against the opposite sides of the block whereby the lugs **16** project through the slots **30***a* of the side panels **30** and may be bent over in a final step to fix the end and middle panels **5**, **5'** to the side panels **30** to complete the assembly of the frame **15**.

The end panels **5** and the middle panel **5'** are preferably assembled with the side panels **30** in such a way that the perforated crests of corrugations **5***d* are located at the inner side of the respective end panel **5**, i.e., at that side which faces inwardly away from the adjoining end wall **1***b*. In other words, if the operator wishes to insert a selector needle **3** through the right-hand end panel **5** of FIG. 2, he must insert such a needle through a trough **5***e* at the outer side of this right-hand end panel and thereupon through a selected perforation **18** in a given row of such perforations. Such mounting of the panels **5**, **5'** facilitates insertion of selector needles **3** and, furthermore, the needles will be properly guided if a card **2***a* or **2***b* happens to be slightly out of line in either upward or downward direction since in such case the needle will be guided into the respective perforation as a result of their pre-orientation caused by the inclined walls of the respective troughs in the panels. It is to be understood, of course, that this applies only if the amount of dislocation of the respective card is small enough so that the perforation in question is not entirely obstructed and will still permit passage of the needle. Lateral displacements of the cards are prevented by the side panels **30** which are located at such a distance from each other that the frame may receive a stack **2** without appreciable lateral play save for the negligible play which is necessary to allow the cards **2***a* to descend with the bottom wall **8**.

One of the end panels **5** is preferably separated from the adjoining end wall **1***b* by a narrow gap which is just wide enough to accommodate a so-called selector sheet **40**, a portion of this selector sheet being shown in FIG. 1 in the gap between the right-hand end panel **5** and the right-hand end wall **1***b*. The exposed side of the sheet **40** is provided with suitable indicia and with perforations corresponding to those on the end panels **5**, **5'** so that the operator may immediately locate such perforations which must be traversed by one or more selector needles **3** in order to segregate a desired group of cards, e.g., to segregate the cards **2***a* from the cards **2***b* or vice versa. Alternatively, the card support of my invention may be furnished with a set of selector sheets **40** each of which is provided with a single perforation or with a small number of perforations which must be traversed by one or more selector needles **3** in order to segregate a selected group. Referring to FIGS. 1 and 2, the sheet **40** may be provided with two perforations each of which will guide one of the needles **3** through certain perforations of the cards **2***a* and **2***b* so that, when the needles are properly inserted through the perforations of the selector sheet **40**, through the perforations of the end panels **5**, **5'** and through the perforations of the cards **2***a*, **2***b* (while the bottom wall **8** is held in raised position), the cards **2***a* will be segregated from the cards **2***b* by moving to a lower position than the latter as soon as the bottom wall **8** is moved to the lower end position of FIG. 2. Conversely, in order to segregate the cards **2***b* by moving them to a lower position than the cards **2***a*, the operator will replace the sheet **40** with a different sheet having a requisite number of differently distributed perforations which will cause the needles **3** to retain the cards **2***a* in raised position whereas the cards **2***b* will now be free to descend with the bottom wall **8**. It is clear that each selector sheet **40** must be inserted with utmost precision so as to place its perforations in accurate alignment with the corresponding perforations of the end panels **5**, **5'** and cards **2***a*, **2***b*.

As mentioned hereinabove, the cutouts **1***c* will enable an operator to observe the lower edge portions of such cards (**2***a*) which were segregated from the remaining cards (**2***b*) and to insert suitable marker strips **22**. FIG. 7 shows two L-shaped marker strips **22** each of which comprises two legs **22***a*, **23**. The leg **22***a* of the rear marker strip **22** has been inserted behind a card **2***a* (which has been allowed to descend with the bottom wall **8**) and, during such insertion, the leg **22***a* has been introduced through a cutout **1***c*. The marker strip **22** is then turned through 90 degrees (and in a clockwise direction, as viewed in FIG. 7) so that the leg **22***a* extends upwardly (see the leg **22***a* of the front strip **22**) whereby the free end of the leg **23** continues to project through the cutout **1***c* but the free end of the leg **22***a* extends upwardly and beyond the cards **2***b*. In other words, a properly inserted marker strip **22** is observable from above (through the open top of the housing) and also from one side of the stack by looking at the cutout **1***c*. During insertion, the legs **22***a* of the strips **22** slide along the upper side of the bottom wall **8**. As a rule, the length of the leg **23** is selected in such a way that the end portion of this leg projects laterally and beyond one side of the stack even if the leg **22***a* abuts against the side panel **1***a* at the other side of the stack. Of course, the legs **22***a*, **23** are preferably of identical length so that it makes no difference which leg is introduced first through the cutout **1***c*. By making the legs **22***a*, **23** so long that their ends project beyond one side of the stack when the other leg abuts against the side panel at the other side of the stack, one can arrange the marker strips **22** in orderly fashion so that the upwardly extending legs form a single file. Also, one can immediately determine whether or not a marker strip is in requisite position.

It was found that, in utilizing the card support of my present invention, the operator may disregard the upper edges of the cards **2***a*, **2***b* and may utilize his fingers to rapidly locate the cards **2***a* which were allowed to descend with the bottom wall **8**. Thus, instead of relying on his eyes, the operator may actually track the lower edges of consecutive cards **2***a* prior to insertion of marker strips **22**. Such manual (rather than visual) determination of cards **2***a* in a stack is of particular advantage when the difference between the raised and lower positions of the bottom wall **8** is extremely small, e.g., when such distance is in the range of 2–3 mm. It is clear that, the shorter the distance between the two positions of the movable bottom wall, the more difficult it is to detect the cards **2***a* by looking at the top of the stack **2**, particularly if all of the cards are comparatively clean. The operator inserts his fingers through a lateral cutout **1***c*.

It is to be noted that the bottom wall **8** is readily accessible despite the fact that there is no need to provide it with an outwardly extending handle or similar handgrip means. This is of advantage because a series of housings **1** may be readily stacked one above the other. To facilitate such stacking, the underside of the bottom wall **13** shown in FIG. 6 is provided with four downwardly extending legs **19** each of which may extend through the open top of a housing which is located therebelow. The legs **19** are provided at the four corners of the bottom wall **13** and are configurated in such a way that

the upper housing is automatically held against lateral movements with reference to the lower housing. Were the bottom wall 8 provided with a laterally extending handle, the housings could not be stacked one above the other and side-by-side.

As best seen in FIGS. 1, 2, 4 and 8, the side walls 1*a* of the housing 1 are provided with horizontally extending upper edge portions and each such upper edge portion comprises an outwardly extending projection or bead 7. These beads enable the operator to accommodate the housing 1 in a special receptacle 200 which is shown in FIG. 8 and which resembles an open framework adapted to accommodate two housings end to end. This receptacle comprises a pair of elongated supporting members 201 which engage the corresponding projections 7 and support the housings 1 in suspended position. The sides and ends of the receptacle 200 are open to form large cutouts so that each cutout 1*c* and one end panel 5 in each housing 1 remains fully accessible even though the housings are accommodated in the receptacle. Both longitudinal ends of the receptacle 200 are provided with handles 207 which enable an operator to suspend the receptacle in a filing cabinet or in a hanger structure of known design. The hanger structure may be mounted in the drawer of an office desk so that the card support is within reach even when filed away in the drawer. The bottom of the receptacle 200 is also provided with a cutout so that the bottom walls 13 of both housings 1 are readily accessible.

FIG. 9 illustrates a portion of a different card support wherein the bottom wall 113 comprises a single and very large opening 112 so that this bottom wall actually forms a rectangular frame consisting of four narrow strips which are secured to or integral with the lower edge portions of the side walls 101*a* and end walls 101*b*, only one of each of these walls being shown in FIG. 9. The side walls 101*a* are provided with cutouts 101*c* corresponding to the cutouts 1*c*. The second bottom wall 108 is provided with two transversely extending elongated openings 125 which are accessible through the openings 112 so that the operator may grasp the partitions 103*a* in order to shift the bottom wall 108 between the side walls 101*a*.

The means for moving the bottom wall 108 toward and away from the bottom wall 113 in response to shifting of the bottom wall 108 comprises six semispherical projections 120 which extend downwardly beyond the underside of the bottom wall 108 and an equal number of semispherical recesses 106 provided in the upper side of the bottom wall 113. When the projections 120 enter the corresponding recesses 106, the bottom wall 108 descends to its lower position. The position of the recesses 106 and projections 120 may be reversed.

The frame of the modified card support comprises end panels 105 having horizontal rows of circular perforation 118, only one such end panel being actually shown in FIG. 9. The thickness of the panels 105 is selected in such a way that each thereof is sufficiently resistant to deformation without requiring corrugations or other stiffening means.

It is clear that the card support of my present invention may be utilized in connection with different types of information bearing cards. Thus, the cards may be of the type wherein selected perforations are enlarged by the provision of overlapping perforations so that the thus obtained enlarged perforations enable the corresponding cards to descend with the movable bottom wall when a selector needle is caused to pass therethrough. On the other hand, the cards may be of the type wherein the web between a pair of superimposed perforations is removed to form in the card an elongated slot which enables the card to move with reference to a selector needle. Furthermore, the card support may accommodate a stack of machine punch cards or stacks consisting of conventional perforated cards. The distance between the two end positions of the bottom wall 8 or 108 need not exceed 3 mm. For example, if certain perforations are enlarged by removing the webs between two superimposed perforations, the distance between the centers of two superimposed perforations may be in the range of 2–3 mm.

Cards with perforations which may be enlarged in order to store information there are shown in German Patent No. 713,179 to Wolf, while cards showing removed webs for the same purpose are described in French Patent No. 865,042 to Tardieu.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapted it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A card support, comprising a box-shaped housing including a first bottom wall having an upper side, and pairs of upstanding side and end walls of which the latter are each provided with a cut out, a frame fixedly received in said housing and including a pair of upstanding side panels and at least two upstanding end panels fixedly secured to said side panels and each being parallel with one of said end walls, one of said end panels being spaced from and defining a gap with the associated end wall, each of said end panels having equidistant parallel rows of perforations in registry with the cut out of the respective end wall and each thereof having an outer side provided with corrugations parallel with said rows of perforations and defining waves whose crests are separated from each other by distances corresponding to distances between adjoining rows of perforations, said rows of perforations being respectively located in said waves and penetrating said crests thereof so that a selector needle to be inserted into the perforations is positively guided thereinto by the walls bounding the respective wave; a second bottom wall disposed in said housing beneath said end panels and having an underside facing the upper side of said first bottom wall, said second bottom wall being slidable between two positions relative to said first bottom wall and one of said bottom walls having projections extending beyond said side thereof and received in complementary recesses provided in the side of the other bottom wall when said second bottom wall is moved to one of said positions whereby, when moved to the other position, said second bottom wall is automatically lifted by said projections; and a selector sheet receivable in said gap and being provided with indicating means for indicating to an operator predetermined ones of said perforations into which said selector needle is to be inserted.

2. A card support as set forth in claim 1, wherein said rows of perforations are parallel with the planes of said bottom walls.

References Cited

UNITED STATES PATENTS

1,842,131	1/1932	Tollefsen	129—16
1,845,470	2/1932	Wood	129—16
2,299,566	10/1942	Connor et al.	129—16.1
2,315,860	4/1943	Jones	129—16.1
2,587,682	3/1952	Bard	129—16.1
3,159,280	12/1964	Condon	129—16

FOREIGN PATENTS

462,905	3/1937	Great Britain.
583,391	12/1946	Great Britain.
713,179	11/1941	Germany.
80,980	3/1956	Netherlands.

JEROME SCHNALL, *Primary Examiner.*