May 12, 1953 O. W. TOEPPER 2,638,098

CARD SELECTING APPARATUS

Filed March 1, 1946 2 Sheets-Sheet 1

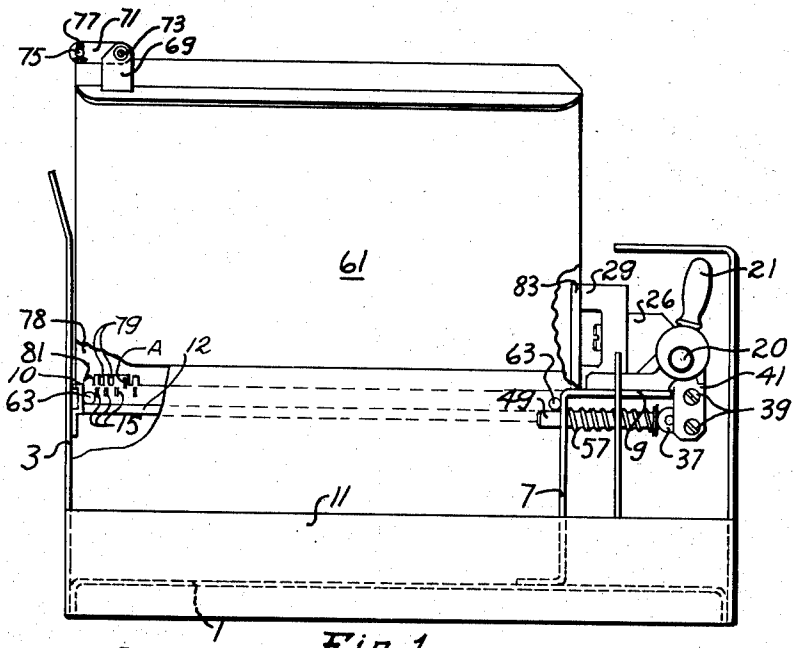


Fig. 1

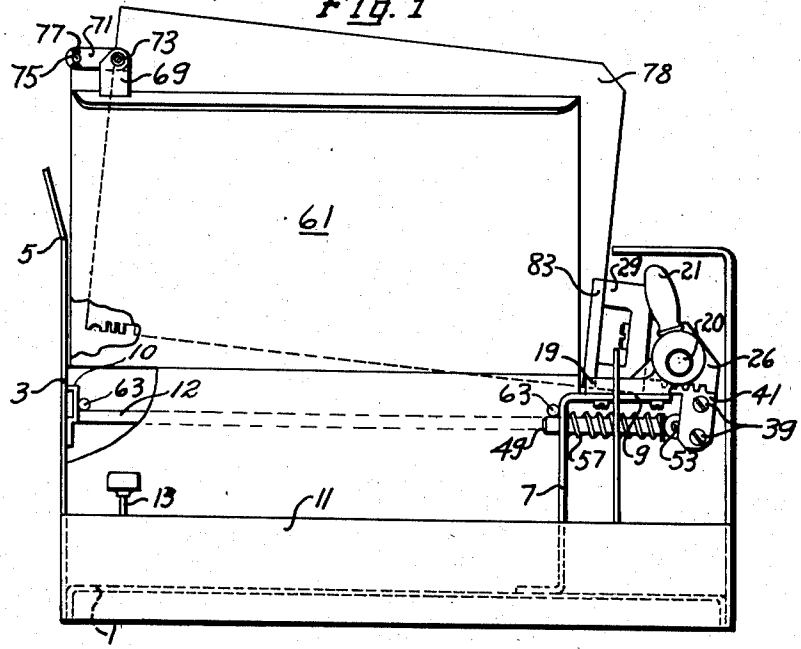


Fig. 2

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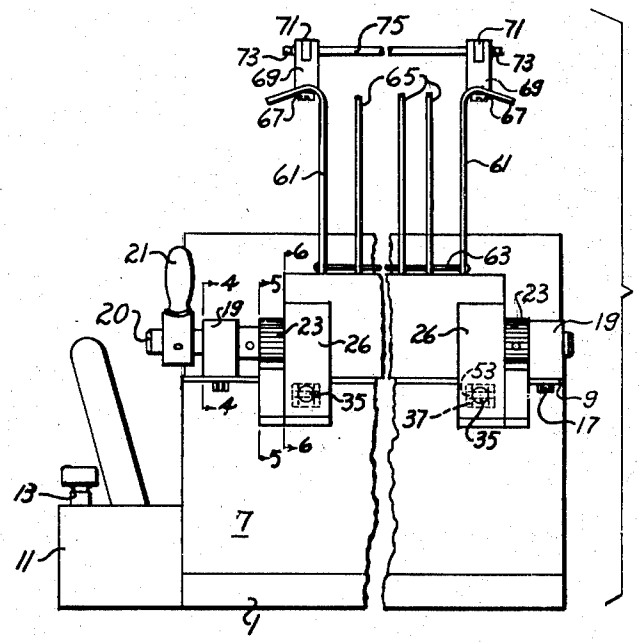


Fig. 3

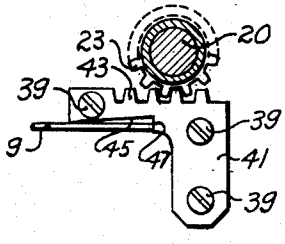


Fig. 5

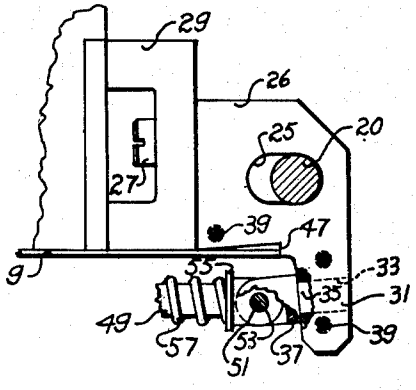


Fig. 6

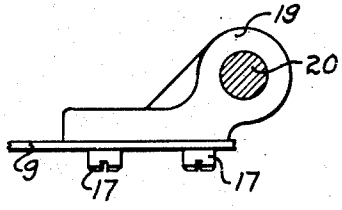


Fig. 4

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CARD SELECTING APPARATUS

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9 Claims. (Cl. 129—16.1)

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This invention relates to improvements in card files. More specifically, it relates to a mechanism by which suitably coded cards can be selectively withdrawn from a file of cards.

Heretofore an apparatus known as an "Electrofile" or "Selectograph" and described in patents numbered 1,846,779; 2,002,807; and 2,002,808, issued to John W. Whitson and dated February 23, 1932; May 28, 1935 and May 28, 1935, respectively, has been used to facilitate the filing of cards and withdrawing of selected cards from the file.

Briefly, the apparatus comprises a file which has means for supporting the cards on edge transversely of the file and in groups which are spaced longitudinally of the file. Each card on its lower edge is provided with a row of spaced projections. The cards are individually coded by clipping off certain of the projections. The cards also have attached to one edge an iron strip or armature.

When it is desired to select a certain card from the file, the file is placed on a machine which has a plurality of bars arranged to enter the notches between the projections; keys are operated in accordance with the code of the desired card and the corresponding bars are raised into the notches. An electro-magnet is disposed adjacent the line of iron strips and when this magnet is energized with the bars raised, the card, which has had the projections on the side of the raised bars away from the magnet clipped off, will be pulled laterally by the force exerted on its armature and will thus be identified and can be manually removed from the file. All the other cards are held in place by the projections which, being intact, engage the raised bars.

The selected card may be replaced anywhere in the file, since it will respond to the magnet from any position in the file.

Certain difficulties have been experienced with such apparatus in that the electro-magnet was fixed and in spaced relation with the armatures so that the pull on the card armatures varied with atmospheric conditions. Further, there was a tendency for all of the cards to tilt if the pull was strong, so that identification of the selected card was difficult. Other troubles were experienced which are cured by the invention herein disclosed, which has for one of its objects the provision of a permanent instead of an electro magnet. This eliminates any need for electrical connections and increases the range of utility of the device.

Another object of the invention is the mounting of the magnet so that it can be moved into contact or at least very near the armatures of the cards so that the effect of the air gap is substantially eliminated.

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A further object of the invention is to provide means for holding the cards, not corresponding to the code, in place while the desired card is being selected.

Still another object of the invention is to provide a magnet actuating mechanism which will both withdraw the selected card laterally and tilt it upwardly about one corner, thus rendering its identification positive.

Yet another object of the invention is to provide an apparatus which will withdraw from the file only the card which corresponds to the code set up by the keys and bars.

These and other objects will become apparent from a study of this specification and the drawings which are attached hereto and are made a part hereof and in which:

Figure 1 is an end view of the selector apparatus and the card file, showing the cards in normal position in the file and the magnet in position adjacent the armatures.

Figure 2 is an end view of the apparatus of Figure 1, showing the magnet retracted and the selected card displaced.

Figure 3 is an elevation of the apparatus of Figure 1, viewed from the right of that figure, but showing the card file in an elevated condition with respect to the selector apparatus.

Figure 4 is an elevation of the shaft supports taken on the line 4—4 of Figure 3.

Figure 5 is an elevation of the rack and pinion mechanism taken on the line 5—5 of Figure 3.

Figure 6 is an elevation of the magnet, support and fulcrum mechanism taken substantially on the line 6—6 of Figure 3.

Referring now to Figure 1, the numeral 1 indicates a base member which has a side wall 3 bent at 5 to receive one side of a card file. A second side wall 7 is formed with an outwardly directed flange or magnet guide 9. The side wall 3 is formed with a ledge 10 for supporting the left ends of the cards (Figures 1 and 2) as the file is inserted in the machine. The flange 9 is disposed to support the opposite ends of the cards. The rods 63 of the file normally support the cards but, as the file is inserted in the machine, the cards come to rest with their ends supported on ledge 10 and flange 9 while the file is further lowered until the rods 63 are supported on the members 12 of the machine. The rods thus move out of the notches 81 in the cards, as shown in Figure 1, as the file is placed in the machine so that the

cards are free to move laterally. This structure is old and is shown in the Whitson patents mentioned above. A keyboard guard rail 11 cooperates with a front wall to enclose the key levers 13. A plurality of bars 15 are supported in a horizontal position, parallel with the side walls. The bars are connected by suitable linkage, not shown, with the key lever so that when the lever is depressed, a bar, corresponding to the lever, is raised to the position indicated by A, Figure 1. The bar is held in the raised position, until released, by means which do not form a part of the invention.

Mounted on the upper surface of flange 9 by means of screws 17 are two bearing blocks 19 (Figure 4). An operating shaft 20 is mounted in the bearings and has attached at one end a handle or lever 21. Also pinned to the shaft are two gears 23.

Pivotally mounted on the shaft by means of elongated holes 25 are two pivot blocks 26 (Figure 6) upon which is mounted, by means of screws 27, the U-shaped permanent magnet 29.

The pivot blocks are L-shaped, and the depending leg 31 is provided with an opening 33 which has fixed therein the stem 35 of a clevis 37.

Fixed to each pivot block by screws 39 is an L-shaped member 41. The horizontal portion of the member carries the rack teeth 43, and these mesh with the gears 23. The lower edge of the horizontal portion of the member is cut away as at 45 to form a stop or abutment 47 which is adapted to engage the edge of flange 9 and limit the leftward movement of the magnet.

A clevis rod 49 passes through the hole in the side wall 7 and lies under the flange 9. On its outer end it bears an eye 51 which is received in the clevis 37 and a fulcrum pin 53 passes through the eye and clevis. A collar or flange 55 is formed on the rod and a spring 57 is confined between this flange and the sidewall 7. The clevis spring and slide or rod thus comprises a control mechanism for the magnet to assist in producing the motions of the magnet described herein.

The card file comprises a pair of end plates 61 which are held in spaced relation by a pair of parallel rods 63 fixedly mounted between the end plates and on the rods are a plurality of spacers 65.

Fixed on the upper left hand portion of each of the end plates, when viewed from the front of the file, by means of a screw 67 is a clevis 69. A link 71 is pivoted in the clevis on a pin 73 and is perforated at its free end to receive a hold down rod 75 which is held in place by cotter pin 77.

The file is removable as a unit from the machine and the cards 78 are formed with projections 79 along the bottom edge so that the spaces between them lie over the bars 15. At each end of the card a notch 81 is provided which rests on the file rod 63 so that the card is supported in the file. An armature 83 is fixed to the card on the lower right side in the region of the magnet 29.

It will also be noted that the hold down rod 75 rests on the upper left corner of the card so that some lateral displacement toward the right (Figure 1) is required to free the card from the rod.

Operation

The parts of the machine are normally in the Figure 2 position when the selected file is set in position on the machine. Since the hold down rod 75 is on the file and since the notches 81 and rods 63 position the coded cards in the file, the rod 75 will ride on the top of each card adjacent the upper left hand corner (Figure 1). As the file is placed in the machine, the cards will be supported by the ledge 10 and flange 9 and the rods 63 will disengage the notches 81 so that the cards are free to move laterally except when they are restrained by the key bars.

The key bars 15 are then depressed in accordance with the code of the file card which it is desired to select and this raises the corresponding bars 15 to the "A" position. These bars are held in position and the lever 21 is rotated clockwise (Figure 1) to the Figure 1 position, rotating the gears 23 in the same direction. This urges the rack 41 to the left (Figure 5) and tilts it and pivot blocks 26 about the fulcrum pin 53 until the magnet rests upon the flange 9. Further rotation of the lever causes the rack, pivot blocks, magnet and rod 49 to be moved bodily to the left against the action of springs 57 until stops 47 strike flange 9, as shown in Figure 6.

The magnet, in this position, will attract any card which is not held by the raised bars 15. The card or cards, which are intended to respond to a particular code setting of the levers, have the projections on the left side (Figures 1 and 2) of the selected bars 15 clipped off so that they will be free to move to the right when the magnet is positioned, as explained above.

If the lever is now rotated counterclockwise to the Figure 2 position, the rack, pivot blocks, magnet and rods 49 will first be moved bodily to the right until the springs 57 are fully extended, the frictional "drag" on the rods 49 in the holes in wall 7 serving to stop the rods when the springs are extended, after which further rotation of the lever tilts the pivot blocks about pins 53 to the Figure 2 position. The addition of stops on the side of the wall opposite springs 57 was not found necessary since the frictional drag has been found to be sufficient. The function of the springs 57 is to return the rods to the proper starting position (Fig. 2) and to hold the magnet against flange 9 on the inward stroke of the magnet.

The card or cards which were free, as described, first jump laterally into contact with the magnet then are pulled laterally by the bodily movement just described. This withdraws the corner of the card from beneath rod 75 so that when the magnet tilts the card will tilt with it to the Figure 2 position.

Even though there may be a slight shifting of all of the cards toward the magnet when it is in the Figure 1 position, none except the cards corresponding to the bars 15 set are free to move far enough to escape rods 75. They cannot, therefore, tilt upon approach of the magnet.

The bars 63 and the notches 81 in the cards which fit over them are not in engagement when the card file is positioned in the machine. The cards rest upon the ledge 10 and flange 9 and the rods drop below the lowest level of the cards so that the latter may be drawn laterally across the levers 15 if not stopped thereby. This structure is old in Whitson 2,002,808 identified above.

The rod 75 prevents tilting of the card about the ledge nearest the magnet upon approach of the magnet.

It is obvious that various changes may be made in the form, structure and arrangement of parts without departing from the spirit of the invention. Accordingly, applicant does not desire to be limited to the specific embodiment disclosed herein primarily for purposes of illustration; but instead, he desires protection falling fairly within the scope of the appended claims.

What I claim to be new and desire to protect by Letters Patent of the United States is:

1. In a card selecting mechanism, a body for receiving the cards having a guide disposed adjacent one side thereof, said guide having a substantially horizontal surface, a plurality of cards each having an armature attached to one edge, means for positioning said cards in said body with said armatures disposed adjacent said guide, holding means operable to selectively hold all but certain of said cards, a magnet, a support for said magnet, a control mechanism, means for pivotally connecting the magnet to the control mechanism, means mounting said mechanism for sliding substantially parallel to said guide surface, toward and away from said armature, and actuating means mounted on the body and movable for pivoting said magnet about said connection into contact with said guide, said connection and guide serving to transmit additional movement of said actuating means to slide said mechanism and magnet toward said armatures along said guide.

2. In a card selecting mechanism, a body for receiving the cards having a guide disposed adjacent one side thereof, said guide having a substantially horizontal surface, a plurality of cards each having an armature attached to one edge, means for positioning said cards in said body with said armatures disposed adjacent said guide, holding means operable to selectively hold all but certain of said cards, a magnet, a support for said magnet, a control mechanism, means for pivotally connecting the magnet to the control mechanism, means mounting said mechanism for sliding substantially parallel to said guide surface, toward and away from said armatures, and actuating means mounted on the body and comprising a rotatable pinion and a rack fixed to said magnet, said rack and pinion cooperating to pivot said magnet about said connection into contact with said guide, said connection and guide serving to transmit additional movement of said rack to slide said mechanism parallel to, and said magnet along said guide toward said armatures.

3. In a card selecting mechanism, a body for receiving the cards having a guide disposed adjacent one side thereof, said guide having a substantially horizontal surface, a plurality of cards each having an armature attached to one edge, means for positioning said cards in said body with said armatures disposed adjacent said guide, holding means operable to selectively hold all but certain of said cards, a magnet, a support for said magnet, a control mechanism including a slide, means for pivotally connecting the magnet to the slide, means mounting said slide for movement substantially parallel to said guide surface, toward and away from said armatures, actuating means mounted on the body and movable for pivoting said magnet about said connection into contact with said guide, said connection and guide serving to transmit additional movement of said actuating means to move said slide from its initial position substantially parallel to, and said magnet along the guide toward said armatures, and yieldable means for resisting the movement of the slide parallel to the guide and for restoring said slide to its initial position.

4. In a card selecting mechanism, a body for receiving the cards having a guide disposed adjacent one side thereof, said guide having a substantially horizontal surface, a plurality of cards each having an armature attached to one edge, means for positioning said cards in said body with said armatures disposed adjacent said guide, holding means operable to selectively hold all but certain of said cards, a magnet, a support for said magnet, a control mechanism including a slide, means for pivotally connecting the magnet to the slide, said magnet having a normal, tilted position, means mounting said slide for movement substantially parallel to said guide surface, toward and away from said armatures, actuating means, operable in two directions, comprising a pinion, and a rack fixed to the magnet for pivoting said magnet about said connection into contact with said guide when operated in one direction, said connection and guide serving to transmit additional movement of said rack, in said one direction, to move said slide and magnet toward said armatures along said guide, and means including said actuating means, when operated in the other direction, for withdrawing said magnet and slide along said guide until said slide is restored.

5. In a card selecting mechanism, a body for receiving the cards having a guide disposed adjacent one side thereof, said guide having a substantially horizontal surface, a plurality of cards each having an armature attached to one edge, means for positioning said cards in said body with said armatures disposed adjacent said guide, holding means operable to selectively hold all but certain of said cards, a magnet, a support for said magnet, a control mechanism including a slide, means for pivotally connecting the magnet to the slide, said magnet having a normal, tilted position, means mounting said slide for movement substantially parallel to said guide surface, toward and away from said armatures, actuating means, operable in two directions, comprising a pinion, and a rack fixed to the magnet above the connection, for pivoting said magnet about said connection into contact with said guide when operated in one direction, said connection and guide serving to transmit additional movement of said rack, in said one direction, to move said slide and magnet toward said armatures along said guide, and means including said actuating means, when operated in the other direction, for withdrawing said magnet and slide along said guide until said slide is restored, said magnet being restored to its normal position upon additional movement of said actuating means in said other direction.

6. In a card selecting mechanism, a body for receiving the cards having a guide disposed adjacent one side thereof, said guide having a substantially horizontal surface, a plurality of cards each having an armature attached to one edge, means for positioning said cards in said body with said armatures disposed adjacent said guide, holding means operable to selectively hold all but certain of said cards, a magnet, a support for said magnet, a control mechanism including a slide, means for pivotally connecting the magnet to the slide, means mounting said slide for motion substantially parallel to said guide surface, toward and away from said armatures, actuating means movable for pivoting said magnet about said connection into contact with said guide, yieldable means for resisting motion of said slide, said connection and guide serving to transmit additional movement of said actuating means to move said slide and magnet toward said armatures along said guide, and stop means for limiting the motion of said magnet toward said armatures.

7. In a card selecting mechanism having a base, a plurality of selectively settable, card selecting, projection locking bars mounted in said

base, means for selectively setting said bars, a card file removably mounted on said base, a plurality of cards each having a longitudinal axis and mounted in face-to-face relation in said file, means for mounting said cards for motion on said base parallel with said longitudinal axes, when said file is mounted thereon, each card having projections disposed adjacent the bars for engagement with the set bars and an armature attached to one edge, said cards being coded for motion parallel to said axes by the removal of certain of said projections, the combination of a magnet having a pole, means for mounting the magnet on the base adjacent the armatures for movement relative thereto, means operatively connected to the magnet for tilting the pole thereof angularly with respect to the armatures into a position substantially parallel thereto and in alignment therewith, and means mounted on the base for moving said magnet in a substantially rectilinear path which is substantially parallel to the longitudinal axes of the cards to engage said pole with said armatures.

3. In a card selecting mechanism having a base, a plurality of selectively settable, card selecting, projection locking bars mounted in said base, means for selectivelly setting said bars, a card file removably mounted on said base, a plurality of cards each having a longitudinal axis and mounted in face-to-face relation in said file, means for mounting said cards for motion on said base parallel with said longitudinal axes, when said file is mounted thereon, each card having projections disposed adjacent the bars for engagement with the set bars and an armature attached to one edge, said cards being coded for motion parallel to said axes by the removal of certain of said projections, the combination of a magnet having a pole, means mounted on the base for positioning the magnet with the pole adjacent, substantially parallel with and substantially in contact with the armatures for attachment thereto, means mounted on the base for withdrawing the magnet with the attached movable cards, from the cards locked by the bars, in a rectilinear path which is substantially parallel to said longitudinal axes, and means on the base for thereafter tilting said magnet angularly with respect to the armatures of the locked cards to move the cards withdrawn by the magnet to a position in which the longitudinal axes of the withdrawn cards are disposed at an angle to the axes of the cards engaged by the bars.

9. In a card selecting mechanism having a base, a plurality of selectively settable, card selecting, projection locking bars mounted in said base, means for selectively setting said bars, a card file removably mounted on said base, a plurality of cards each having a longitudinal axis and mounted in face-to-face relation in said file, means for mounting said cards for motion on said base parallel with said longitudinal axes, when said file is mounted thereon, each card having projections disposed adjacent the bars for engagement with the set bars and an armature attached to one edge, said cards being coded for motion parallel to said axes by the removal of certain of said projections, the combination of a magnet having a pole and occupying an initial tilted position, means mounted on said base for tilting the magnet angularly with respect to the ends of the cards to position the pole substantially parallel to and to align it with said armatures, means operably connected with the magnet for thereafter advancing the pole in a rectilinear path, substantially parallel with the longitudinal axes of the cards, toward and into contact with the armatures to attach the movable cards, means mounted on the base for operating the magnet in a reverse direction, through said rectilinear path, to withdraw the pole and the attached movable cards away from the cards held by the bars, and means operatively connected with the magnet for thereafter tilting the magnet angularly with respect to the ends of the cards held by the bars, to its initial position, with said pole out of parallelism with the armatures, for tilting the withdrawn cards to a position in which their longitudinal axes are disposed at an angle to the axes of the cards held by the bars.

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