

Oct. 20, 1953

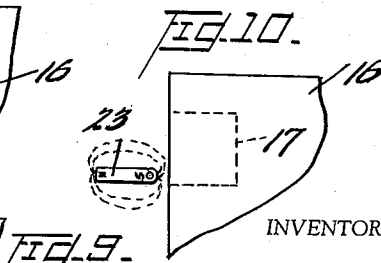
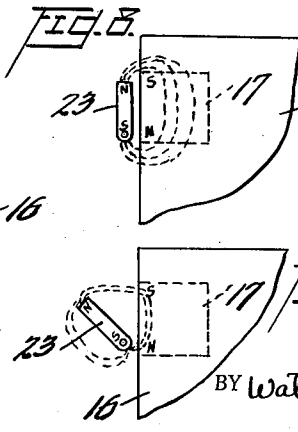
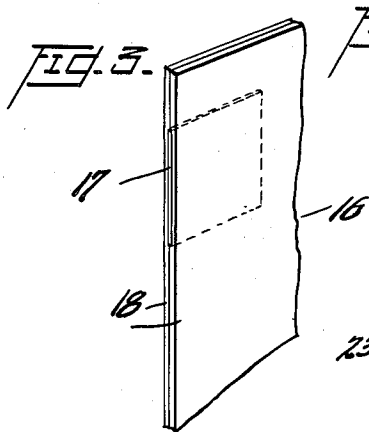
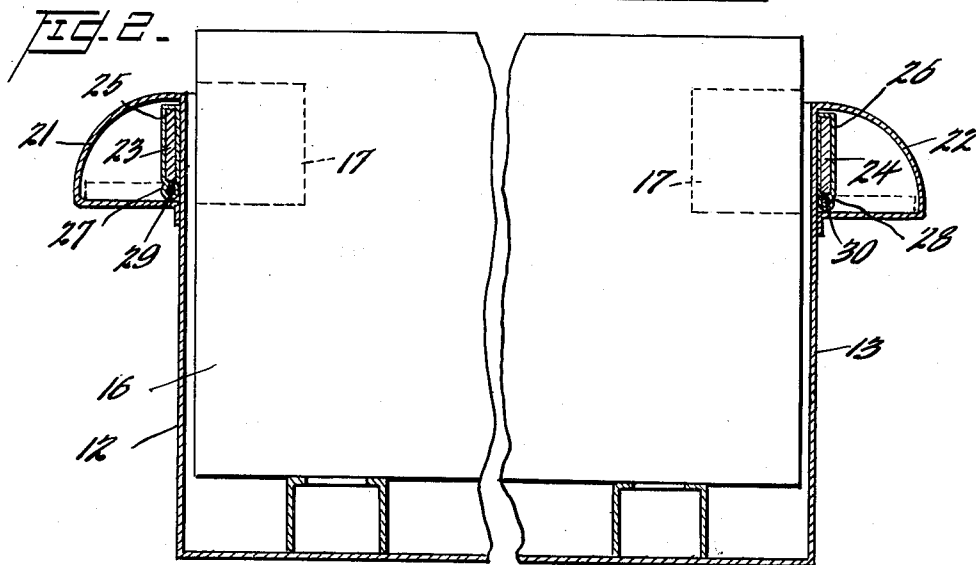
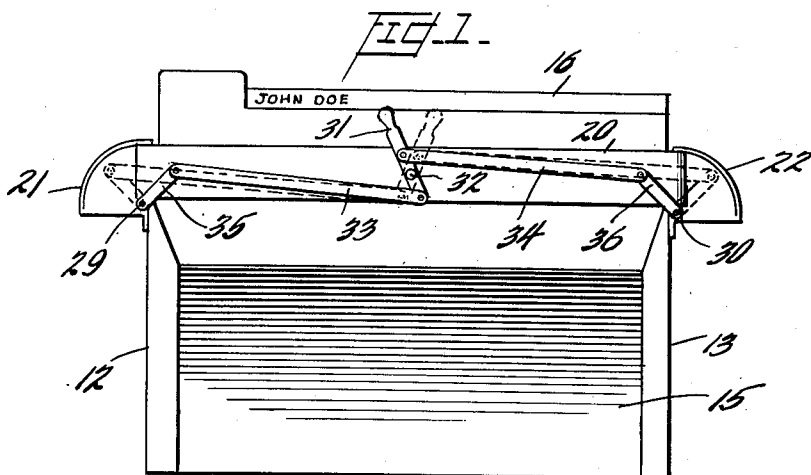
N. P. MATHIESEN

2,656,091

CARD INDEX DEVICE

Filed March 6, 1951

2 Sheets-Sheet 1



INVENTOR

Nicolaus Per Mathiesen

BY Watson, Cole, Grindler & Watson

ATTORNEYS

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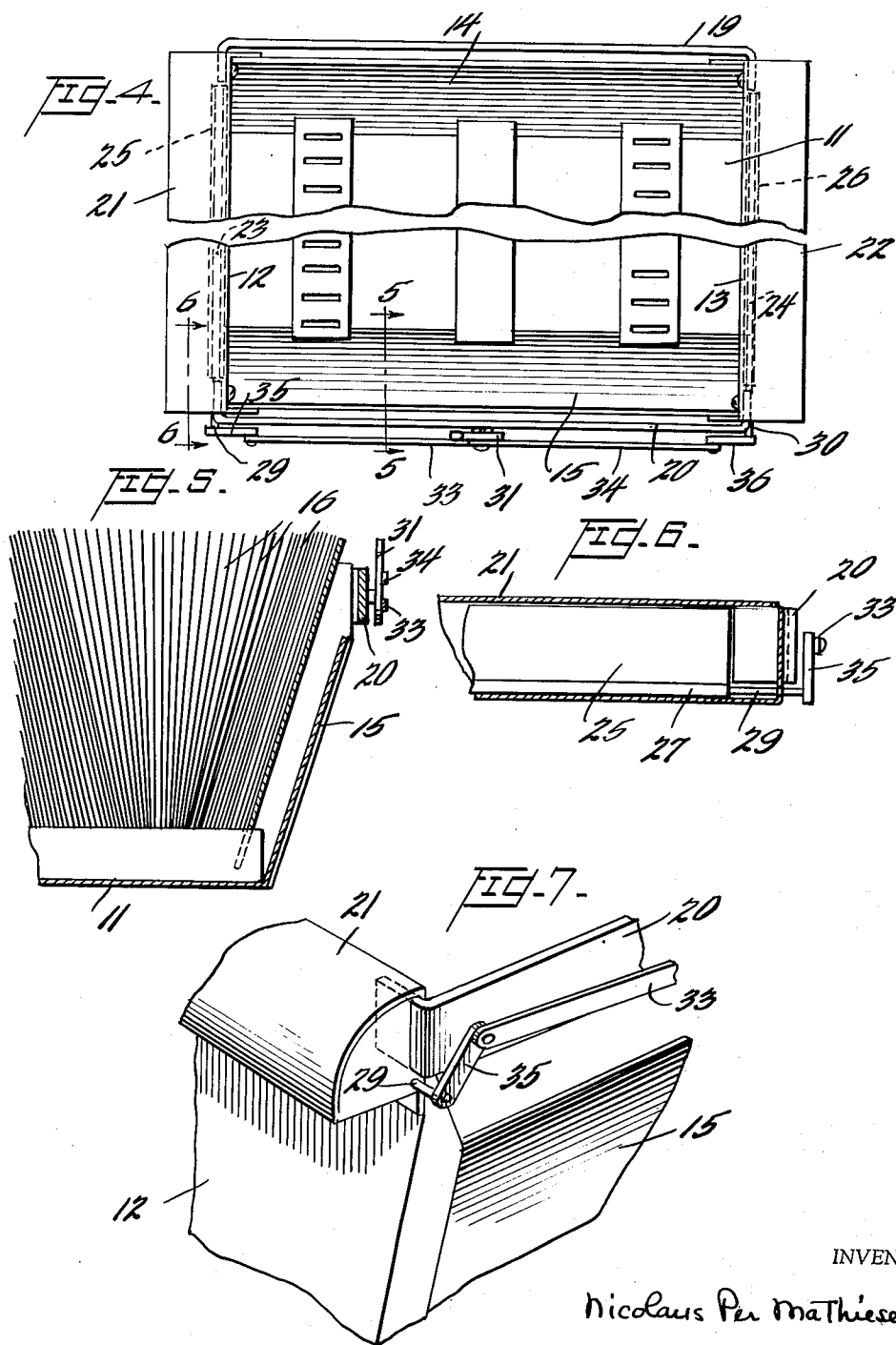
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CARD INDEX DEVICE

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2 Sheets-Sheet 2



INVENTOR

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2,656,091

CARD INDEX DEVICE

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Application March 6, 1951, Serial No. 214,091

6 Claims. (Cl. 129—16)

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The present invention relates to card index devices and more particularly to those in which magnetic forces are utilized for causing a plurality of cards, resting in a tray or drawer, to fan out or separate, at least toward their upper edges, in order to facilitate the making of a visual survey thereof. One such device is described and claimed in my United States Patent No. 2,341,639, granted February 15, 1944, and a general object of the present invention is to provide an improvement upon the aforesaid patented device.

The said patent describes and illustrates a device in which the individual index cards are provided with magnetic portions or inserts, for example consisting of very thin pieces of soft iron laminated between the layers of paper making up the card, a plurality of such cards being disposed edgewise, in face to face relation, within a tray or drawer having vertical sides, one or both end walls of the tray or drawer being inclined outwardly to provide sufficient space so that a portion of the cards may assume a fan-wise relation. The magnetic field causing the cards to assume, or to retain, as the case may be, such fan-wise relation, is created by means of permanent or electrically energized magnets disposed longitudinally of the tray or drawer and laterally beyond the side walls thereof. Preferably permanent magnets are employed for the sake of simplicity, magnetic material of sufficiently high remanence for the purpose being now readily available on the market. The fanning out of the cards is caused by magnetic repulsion, magnetic poles of like polarity being induced in the soft iron inserts of adjacent cards by means of the external magnetic field just described and causing the cards to spring apart through magnetic repulsion.

The improvement contemplated by the present invention consists in mounting the permanent magnets, which are disposed one at either side of the tray or drawer, each for pivotal movement about a longitudinal axis, that is to say an axis extending lengthwise of the tray and disposed laterally beyond each side wall thereof, so that the magnets may be rocked or oscillated from vertical to horizontal position, or to any intermediate inclination between 0° and 90°, for the purpose of varying the intensity of the magnetic field which influences the soft iron inserts of the cards, and thus varying the intensity of the above described fanning action. In such an embodiment of the invention the respective magnets are of course disposed with their magnetic axes in vertical position, or in other words, with their respective north and south poles vertically spaced

apart when the magnets are in normal, upright position parallel to the respective side walls of the card receptacle.

Another object of the invention is the provision of a device of the character described, the respective magnets being mechanically interconnected for equal and opposite pivotal movements about their respective pivotal axes.

A further object is the provision, in such device, of permanent magnets each comprising an elongated, relatively wide and thin strip, magnetized transversely of its length and in the direction of its width.

A further object is the provision, in a device of the character described, of a mechanical interconnection between the permanent magnets and comprising a lever fulcrumed at one end of the card receptacle, an arm connected to each of the pivotally mounted magnets and adapted to rock the latter about its pivotal axis, and a link connecting each said arm to the lever, one on either side of the fulcrum.

Other and further objects, features, and advantages will be apparent from the description which follows, read in connection with the accompanying drawings, in which

Figure 1 is an end elevation of the card filing device constructed according to the invention;

Figure 2 is a transverse section, on a slightly enlarged scale, of the device illustrated in Figure 1;

Figure 3 is a perspective view of a portion of an index card including a soft iron insert;

Figure 4 is a plan view of the device;

Figure 5 is a fragmentary, sectional view on the line 5—5 of Figure 4;

Figure 6 is a fragmentary, sectional view on the line 6—6 of Figure 4;

Figure 7 is a perspective view of one corner of the device; and

Figures 8, 9, and 10 are fragmentary, diagrammatic views illustrating the disposition of the magnetic lines of force when the permanent magnets are in vertical, inclined, and horizontal positions, respectively.

In order to facilitate an understanding of the invention, reference is made to the embodiment thereof shown in the accompanying drawings and detailed descriptive language is employed.

It will nevertheless be understood that no limitation of the invention is thereby intended and that various changes and alterations are contemplated such as would ordinarily occur to one skilled in the art to which the invention relates.

In the following description the invention is

embodied in a card index device comprising a portable tray as distinguished from a drawer of a filing cabinet, but the manner of its application to such a drawer or sliding compartment will be readily understood. The tray of the present embodiment comprises a bottom 11, vertical side walls 12 and 13, and inclined end walls 14 and 15. The tray is dimensioned to receive index cards 16 of the desired size so that the upper edges of the latter project slightly above the upper edges of the side walls. Each card 16 is provided, at or adjacent either side edge, with a thin soft iron insert 17 of generally rectangular outline, which is preferably adhesively secured between the layers 18 of paper of which the card is made. The inserts 17 are sufficiently thin and flexible so that the card may be handled in the conventional manner, without regard to the inclusion of the soft iron insert.

The end walls 14 and 15 of the tray are of somewhat less height than the side walls and at each end of the tray there is provided a metal handle or strap 19 and 20, respectively, extending transversely of the tray, either end of each strap being secured by bolting or riveting to the adjacent side wall. At either side of the tray, adjacent the upper edge of the respective side walls, there is provided a tubular guideway 21 and 22, quadrant-shaped in cross-section, within which the respective permanent magnets are housed as now to be described. Conveniently, the guideways 21 and 22 may be formed integrally with the side walls of the tray which may be of any suitable non-magnetic material, such as non-ferrous metal.

The permanent magnets 23 and 24 are in the form of elongated, relatively wide and thin strips of ferrous alloy of high magnetic remanence and are enclosed within envelopes 25 and 26, respectively, of non-magnetic material, for example aluminum. Each envelope 25, 26 is provided along its lower edge with a tubular projection or sleeve 27, 28 for receiving a pivot pin 29, 30, which preferably extends the full length of the magnet and projects sufficiently therebeyond so that it may be journaled in the end plates at either end of the respective guideways 21 and 22, for example as seen in Figure 7. The envelopes 25, 26 are firmly secured to the pivot pins 29 and 30 so as to rock or oscillate therewith.

A lever 31 is fulcrumed as at 32 on the strap or handle 20 at the front end of the tray, for swinging movement in a plane parallel to the plane of the handle 20, and is connected to each of the pivot pins 29, 30 by means of links 33, 34 and arms 35, 36, the latter being fast upon the ends of the said pivot pins and being pivotally connected to the aforesaid links which are in turn pivoted upon the lever 31 at points equidistantly spaced, respectively, above and below the fulcrum 32. As will be readily understood, manipulation of the lever 31 will result in equal and opposite pivotal movements of the magnets 23 and 24, thus altering the disposition of their respective magnetic fields.

The change in position of the magnetic field of one of the magnets, as it is rocked about its associated pivot, is illustrated in Figures 8, 9, and 10. As seen in Figure 8, a large proportion of the lines of force passing between the poles of the magnet when in vertical position will pass through the adjacent soft iron portion 17 of the cards within the tray, and in so doing will establish magnetic poles in said inserts, the poles

at the upper ends of all of the inserts being of like polarity, and the poles at the lower ends of the inserts of the cards being of the opposite polarity. Magnetic repulsion forces between adjacent cards are thus created.

When the magnets are rocked to an inclined position as illustrated in Figure 9, the amount of flux passing through the soft iron inserts in the cards is considerably reduced, and the mutual repulsion between the cards is correspondingly reduced in intensity. When the magnets are rocked to horizontal position, as illustrated in Figure 10, very little if any flux will pass through the soft iron inserts in the cards, and their mutual repulsion effect will disappear.

The above described variability in position of the magnetic fields of the respective magnets 23 and 24 may be utilized, for example, as follows. Supposing that with the magnets in their normal, upright positions, a user wishes to survey the cards to select a particular card, and supposing also that the cards are arranged alphabetically and that the card which it is desired to find is indexed under the "H's". The operator will manually exert a force acting forwardly upon the upper edges of all of the cards indexed under "A" to "G" inclusive, and a force acting rearwardly upon the upper edges of all of the cards indexed under "I" to "Z" inclusive. This will permit all of the "H" cards to respond to the magnetic repulsion forces acting between them and they will fan out, or separate at their upper edges, to such an extent as to permit the topmost line or two of information inscribed on each to be read without removing the card from the tray. The operator can then visibly select the desired card and, grasping this card to hold it in an upright position, can rock the magnets to a horizontal position, removing the magnetic influence from all of the cards in the tray. When this is done the cards indexed rearwardly of the selected card will fall to a rearwardly inclined position, and the cards indexed forwardly of the selected card will fall to a forwardly inclined position, thus leaving an open V-shaped gap or space indicating the proper position, in the pack, of the selected card. This latter may then be bodily removed from the tray for such use as may be desired, and can then be replaced in the tray, in its proper position, without difficulty or chance of error because of the wide space indicating its proper position.

Variation of the intensity of the magnetic repulsion effect, for various other reasons, may be desired, which variation can be readily accomplished by the above described means.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. Card index device comprising a tray having a bottom, side walls, and end walls, and a plurality of cards disposed therein in face to face relation and generally upright position, each said card having a magnetic portion adjacent each side edge thereof, said magnetic portions of successive cards being in horizontal alignment adjacent said side walls, magnets movably associated with said tray and extending longitudinally thereof adjacent said side walls and each forming part of a magnetic circuit including one of said lines of magnetic card portions, and means for simultaneously moving said magnets transversely to their length to an extent sufficient to selectively include or exclude the said magnetic card portions from the effective fields of said magnets.

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2. Device according to claim 1, said magnets being elongated horizontally and being magnetized transversely thereof.

3. Card index device comprising a tray having a bottom, side walls, and end walls, and a plurality of cards disposed therein in face to face relation and generally upright position, each said card having a magnetic portion adjacent each side edge thereof, said magnetic portions of successive cards being in horizontal alignment adjacent said side walls, magnets movably associated with said tray and extending longitudinally thereof adjacent said side walls and each forming part of a magnetic circuit including one of said lines of magnetic card portions, and means for simultaneously moving said magnets transversely to their length to an extent sufficient to selectively include or exclude the said magnetic card portions from the effective fields of said magnets, each said magnet comprising an elongated, relatively wide and thin strip, and being magnetized transversely of its length and in the direction of its width.

4. Card index device comprising a tray having a bottom, side walls, and end walls, and a plurality of cards disposed therein in face to face relation and generally upright position, each said card having a magnetic portion adjacent each side edge thereof, said magnetic portions of successive cards being in horizontal alignment adjacent said side walls, and magnets associated with said tray and extending longitudinally thereof adjacent said side walls and said lines of magnetic card portions, each said magnet being supported for pivotal movement about a horizontal axis extending longitudinally thereof, said magnets being mechanically interconnected for equal and opposite movements about their pivots.

5. Card index device comprising a tray having a bottom, side walls, and end walls, and a plurality of cards disposed therein in face to face relation and generally upright position, each said card having a magnetic portion adjacent each side edge thereof, said magnetic portions of successive cards being in horizontal alignment adjacent said side walls, and magnets associated with said tray and extending longitudinally thereof adjacent said side walls and said lines

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of magnetic card portions, each said magnet being supported for pivotal movement about a horizontal axis extending longitudinally thereof, said magnets being mechanically interconnected for equal and opposite movements about their pivots, said mechanical interconnection comprising a level fulcrumed at an end of said tray, an arm connected to each said magnet and adapted to rock about the pivotal axis of its associated magnet, and a link connecting each said arm to said lever, one on either side of the fulcrum.

6. Card index device comprising a tray having a bottom, side walls, and end walls, and a plurality of cards disposed therein in face to face relation and generally upright position, each said card having a magnetic portion adjacent each side edge thereof, said magnetic portions of successive cards being in horizontal alignment adjacent said side walls, and magnets associated with said tray and extending longitudinally thereof adjacent said side walls and said lines of magnetic card portions, each said magnet being supported for pivotal movement about a horizontal axis extending longitudinally thereof, said magnets being mechanically interconnected for equal and opposite movements about their pivots, said mechanical interconnection comprising a lever fulcrumed at an end of said tray, an arm connected to each said magnet and adapted to rock about the pivotal axis of its associated magnet, and a link connecting each said arm to said lever, one on either side of the fulcrum, each said magnet being enclosed in a non-magnetic envelope, said arm being secured to said envelope.

NICOLAÛS PER MATHIESEN.

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