

[54] **MAGNETIC TRAY DEVICE**

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[22] Filed: **June 16, 1972**

[21] Appl. No.: **263,466**

[52] U.S. Cl. .... **40/105.5**

[51] Int. Cl. .... **G09f 7/10**

[58] Field of Search ..... 40/105.5, 158 B, 159; 220/DIG. 25, 4

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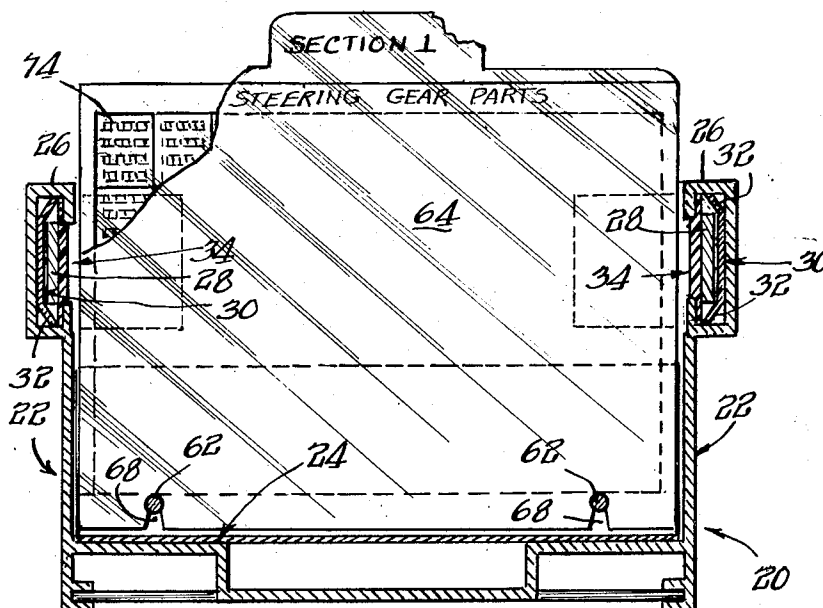
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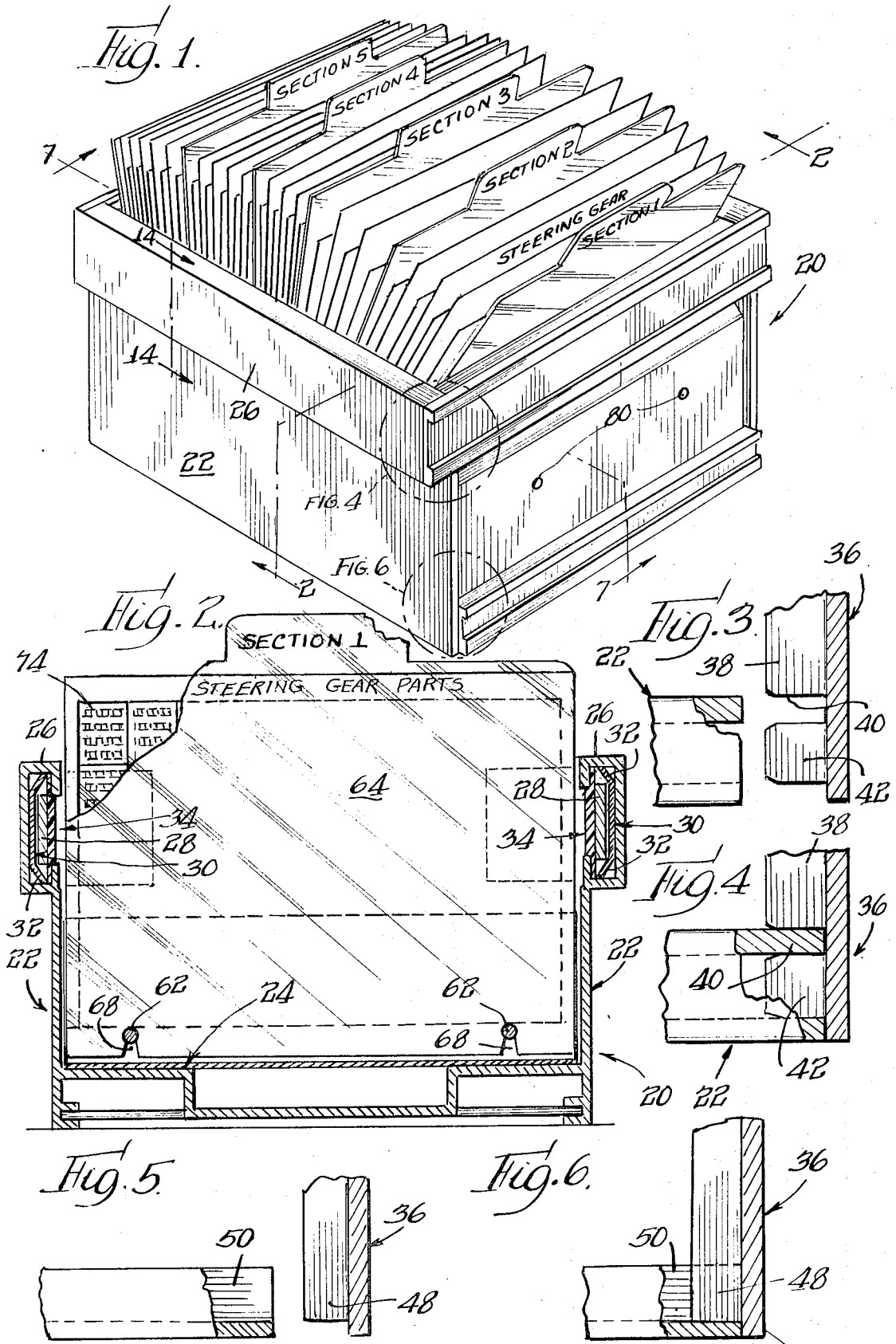
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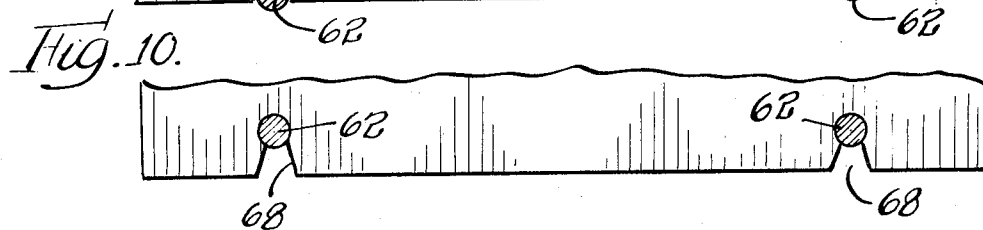
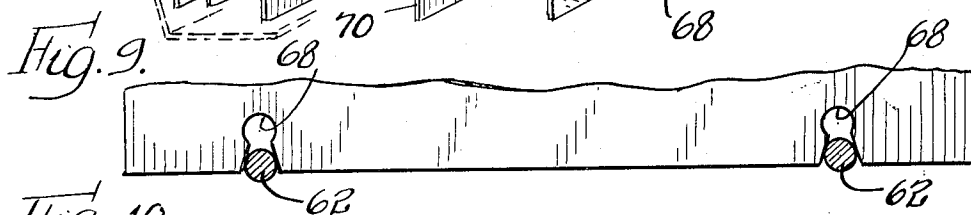
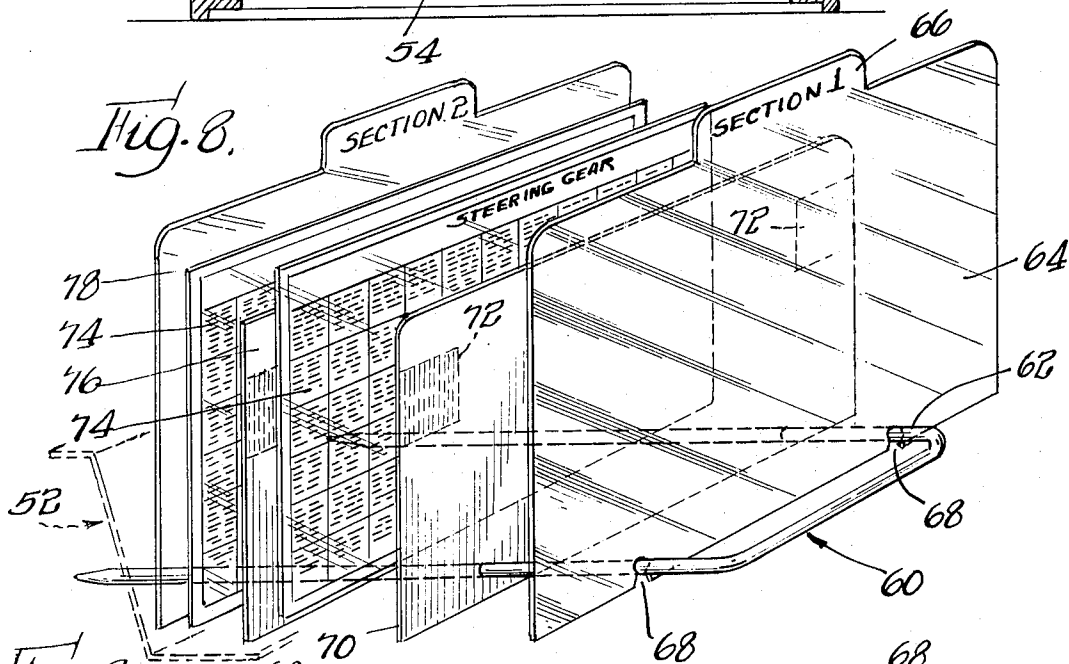
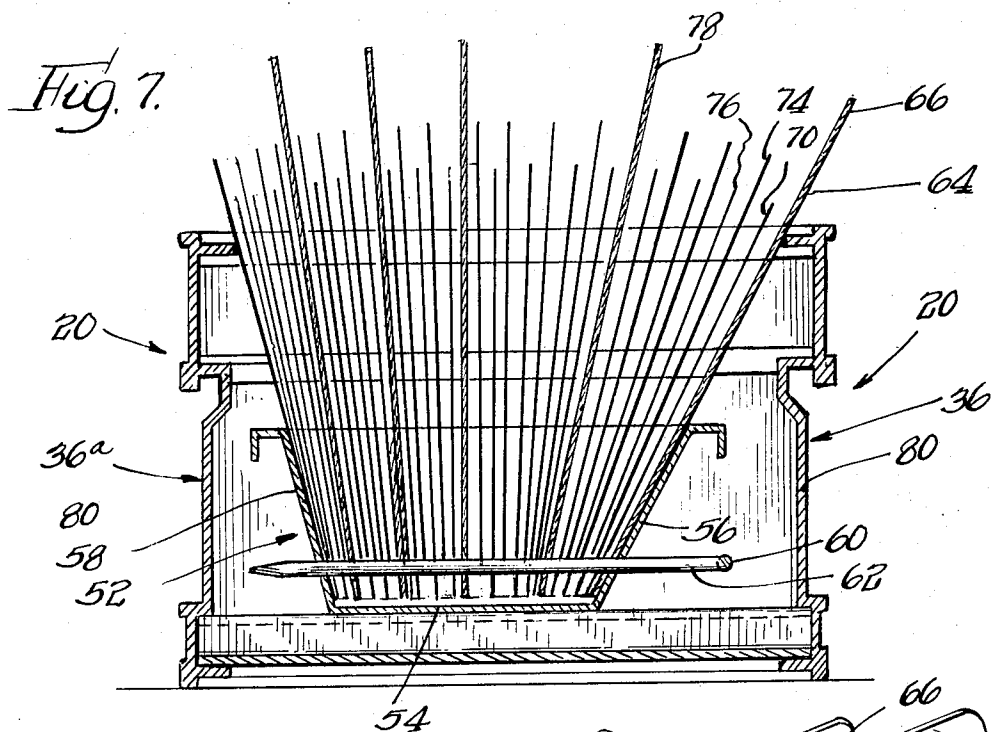
**ABSTRACT**

The present invention relates generally to improvements in filing tray structures, and more particularly to a novel tray device adapted for use in a fanning magnetic filing system. One embodiment of the invention as disclosed herein includes a tray structure wherein the bottom and sidewall sections are integral as well as non-magnetic. Endwall sections are interlockingly secured in a novel manner to the front and rear extremities of said sidewalls. An auxiliary index card or data sheet accommodating tray section having opposed upwardly flaring wall portions is located within the tray device. These flaring wall portions limit the extent to which the index cards or sheets may be tilted toward the front and rear of the tray device. The index cards have magnetic portions which cooperate with elongate magnets associated with the upright sidewall sections to effect fanning of the cards or data sheets.

**5 Claims, 19 Drawing Figures**







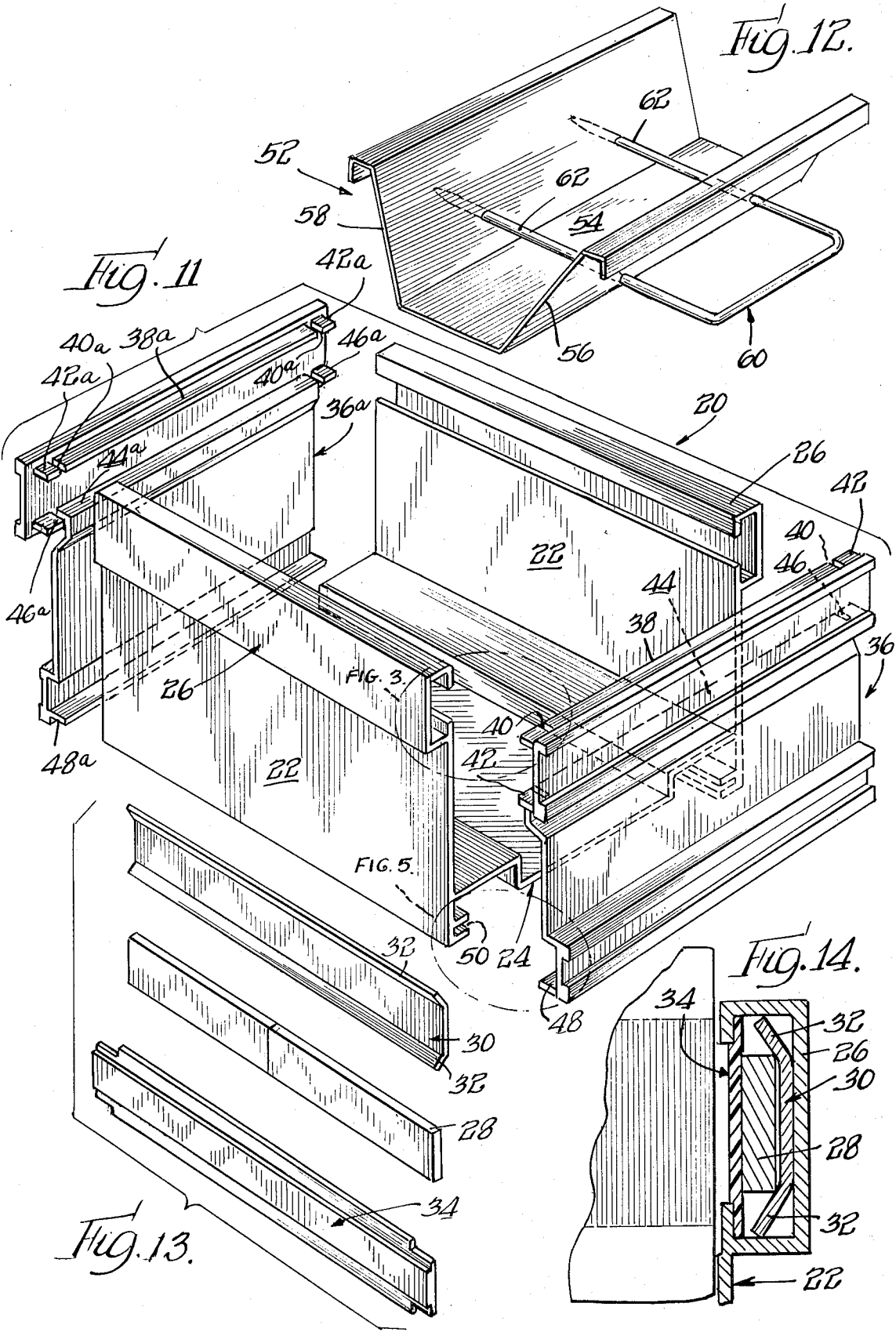


Fig. 15.

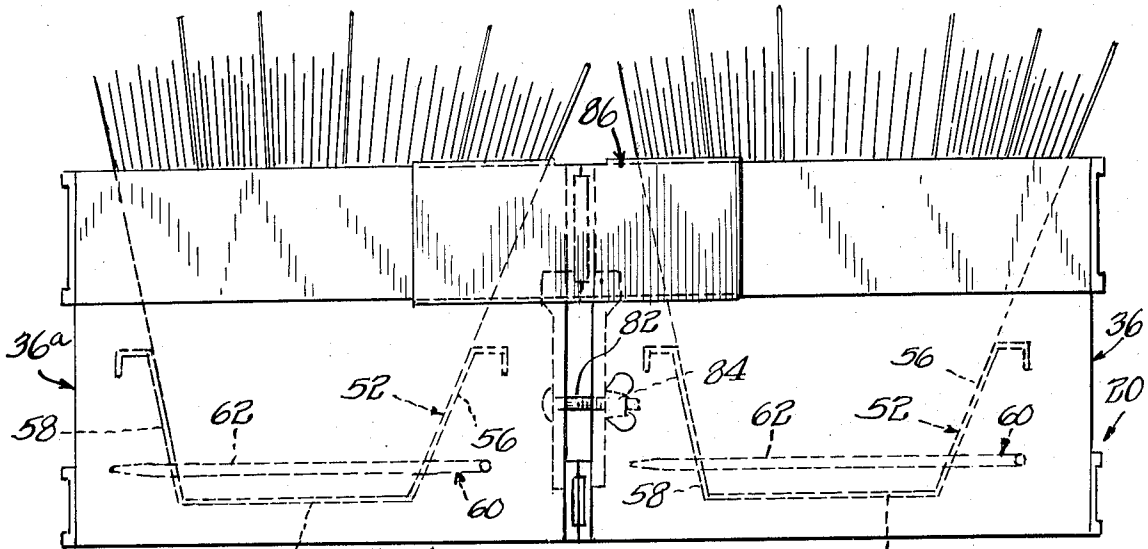


Fig. 16.

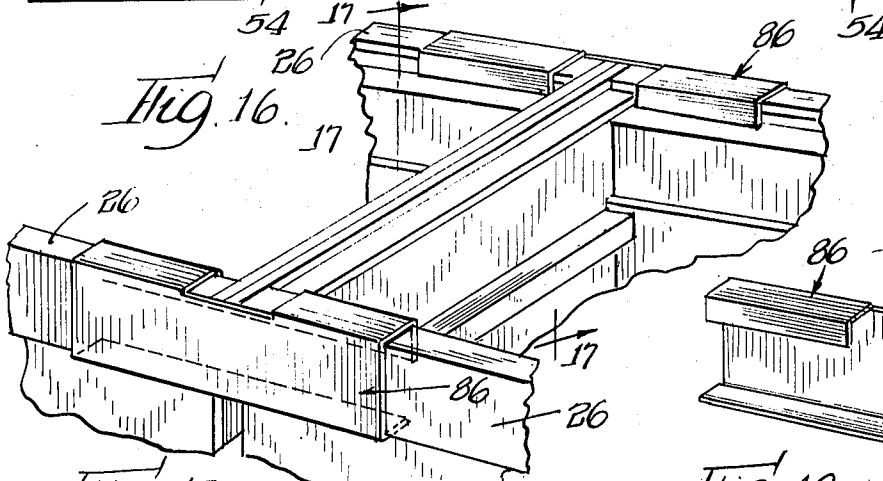


Fig. 18.

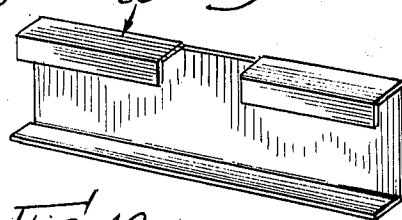


Fig. 17.

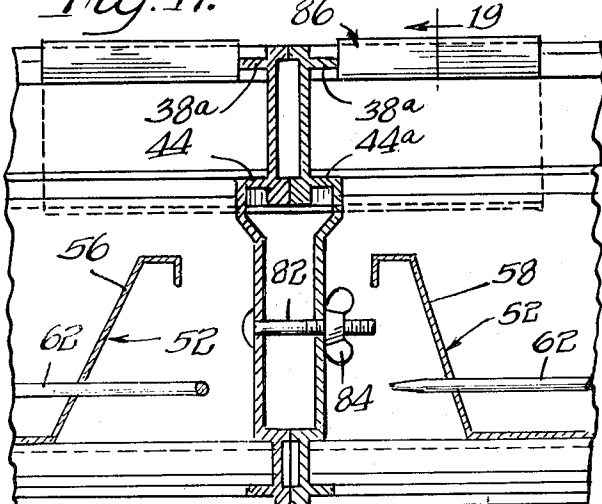
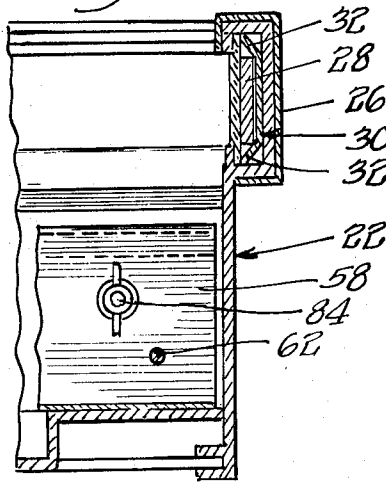


Fig. 19.



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## MAGNETIC TRAY DEVICE

## SUMMARY OF THE INVENTION

In the use of index cards or data sheets in devices for use in fanning magnetic filing systems, there has been a tendency for the cards to tilt under the influence of the magnets and thereby cause upright edges of the cards to frictionally engage the inner surface of the tray sidewall. It has been found that there is also a tendency for the cards or sheets to be urged upwardly due to the influence of the magnetic field acting upon the magnetic portion of the cards. These tendencies for the cards to become misaligned and increase frictional contact with the tray structures prevents proper, free fanning of the cards. It is therefore an object of the present invention to provide a novel tray structure wherein the tendency for developing the above-mentioned friction between the cards and tray is reduced to a minimum.

Not infrequently users of filing devices of the type contemplated hereby experience the necessity of increasing or expanding filing facilities, or in other words to increase the length of the trays. It is also an object of the present invention to provide a tray structure of sectionalized form whereby tray sections may be added and coupled with a minimum of effort and skill.

The present invention also contemplates a very simplified tray construction of suitable non-magnetic material which may be produced at minimum cost, as for example by employing an extrusion process whereby the walls and bottom of said structure may be formed as an integral unit having a predetermined cross-sectional contour of specific shape and design to accommodate elongate magnets and to accommodate interlocking endwall sections at the front and rear extremities of said integral unit.

It has been found that frictional engagement of the bottom edges of the cards or data sheets with the bottom of the tray introduces friction conditions which also tend to interfere with free card fanning, and it is therefore an important object of the present invention to prevent engagement of said bottom edges with the tray structure.

It is also an object of the present invention to produce filing tray structures of the type referred to above which may be manufactured at a cost which represents a great saving to the ultimate user.

## BRIEF DESCRIPTION OF THE DRAWINGS

The above mentioned and other objects and advantages will be more apparent from the description which follows when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a file structure of the type contemplated by the present invention;

FIG. 2 is a vertical transverse sectional view, taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary sectional view of an upper corner portion of the tray when in separated relation, said view being taken substantially along the line 3—3 of FIG. 11;

FIG. 4 is a view similar to FIG. 3 disclosing the upper corner of an end plate and sidewall when in interlocked relation, said corner being indicated by the dot-and-dash circle 4 in FIG. 1;

FIG. 5 is a fragmentary sectional view of the lower corner of a separated end section and wall section, said view being taken substantially along the line 5—5 of FIG. 11;

FIG. 6 is a fragmentary sectional view similar to FIG. 5 disclosing the lower corner of an end section and wall section in interlocked relation, said corner being indicated by the dot-and-dash circle 6 of FIG. 1;

FIG. 7 is a vertical sectional view taken substantially along the line 7—7 of FIG. 1;

FIG. 8 is a perspective view disclosing the manner in which the U-shaped rod is employed in association with index cards and the like shown in separated relation;

FIG. 9 is a fragmentary elevational view of one of the index cards provided with key-shaped slots to accommodate portions of a U-shaped holding rod, said view disclosing the initial association of the card with the holding rod;

FIG. 10 is a fragmentary elevational view of the card of FIG. 9 after said card has been lowered so as to interlock with said holding rod;

FIG. 11 is a perspective view disclosing the integral sidewall sections and bottom in separated relation with respect to the endwall sections;

FIG. 12 is a perspective view of the auxiliary card accommodating tray section and the U-shaped card holding rod in association therewith;

FIG. 13 is a separated view of the elongate magnet and parts forming the enclosure therefor;

FIG. 14 is an enlarged sectional view taken along the line 14—14 of FIG. 1, disclosing the elements of FIG. 13 in their assembled relation with respect to the housing portion of a complementary upright wall section of the tray structure;

FIG. 15 is a side elevational view disclosing the manner in which two tray units may be coupled to provide expanded or additional card accommodating facilities;

FIG. 16 is a fragmentary perspective view illustrating the manner in which clips may be employed at the juncture of upper margins of a pair of tray structures to lend resistance against forces tending to separate coupled tray units;

FIG. 17 is a vertical sectional view taken substantially along the line 17—17 of FIG. 16, more clearly to illustrate the manner in which the tray units may be coupled;

FIG. 18 is a perspective detailed view of one of the strengthening clips illustrated in FIG. 16; and

FIG. 19 is a detailed sectional view, taken substantially along the line 19—19 of FIG. 17.

## DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings more in detail, wherein like numerals have been employed to designate similar parts throughout the various views, it will be seen that a tray structure embodying the present invention is designated generally by the numeral 20. The tray structure 20 includes a pair of upright sidewall sections designated generally by the numeral 22 and a bottom section formed integral therewith designated by the numeral 24. This unit comprising the sidewall sections 22 and the bottom section 24 may be in the nature of extrusions, as for example aluminum extrusions, and as such may have a desired cross-sectional shape or contour to meet the needs incident to its use. Thus, for

example, the upper margins of the sidewall sections 22 may be formed with an integral elongate housing 26 for accommodating a complementary elongate magnet member 28.

In FIG. 14 the magnet member 28 and parts assembled therewith are disclosed. It will be noted that one side of the magnet 28 is positioned within an elongate magnetic member 30 flared along opposed margins to provide flange portions 32. It will be noted that these flange portions 32 are inclined inwardly with the magnet positioned therebetween. The opposite side of the magnet 28 engages an elongate non-magnetic strip 34. In this manner the magnet 28 is securely housed within the non-magnetic housing 26 and said non-magnetic strip member 34. As will be more clearly understood from the description which follows, this arrangement serves to render the magnet 28 more efficiently operable in causing cards to fan.

Attention is now directed to the front and rear endwall sections 36 and 36a, respectively, which functions as end closures for the space between the upright wall sections 22. These endwall sections 36 and 36a are identical in structure, and therefore the description of the end section 36 will suffice for the description of both. Structural details of the end section 36a are indicated by numerals having the suffix "a" to identify like or corresponding structural details of the end section 36. The end sections 36 and 36a are also in the form of extruded non-magnetic material, such for example as aluminum. An elongate flange 38 formed integral with and extending along the upper margins of the end section 36 is provided with a slot 40 at each extremity to form tabs 42, FIGS. 3, 4 and 11. A second flange 44, similar to the flange 38, is also slotted to provide a pair of tabs 46. The vertical spacing of the tabs 42 and 46 is such as to provide a close frictional drive fit of these tabs within the elongate magnet housing portion 26 of the sidewall 22. A flange 48 extending along the lower margin of the end section 36 is adapted to be frictionally forced into complementary elongate recesses 50 provided in longitudinal flanges extending inwardly from the lower margins of the sidewalls 22.

From the foregoing it will be apparent that by merely forcing the tabs 42 and 46 into the recesses provided by the housing 26 and the tabs 48 into the complementary recesses 50, the sidewall sections 22, the bottom section 24 and the end sections 36 and 36a will be firmly secured as a unit providing a tray chamber for accommodating an auxiliary card holding tray section, designated generally by the numeral 52, FIGS. 7 and 12. The tray section 52 includes a bottom 54 and upwardly flaring walls 56 and 58. The length of the tray section 52 closely approximates the distance between the upright wall sections 22. The tray section 52 rests upon the bottom section 24 of the tray structure 20 and serves to accommodate various types of index cards, data sheets, and the like.

A plurality of such cards and index sheets are shown in FIGS. 1, 7 and 8. In FIG. 8 these card elements are purposely illustrated in separated relation and are supported by a U-shaped member 60 which presents a pair of parallel spaced prongs 62. A front index card or sheet 64, disclosed in FIG. 8, is preferably formed from transparent, relatively stiff vinyl stock and provides an upper tab portion 66 to which an identifying label may be removably attached, as by means of a suitable adhesive. It should be noted that the bottom margin of the

index card or sheet 64 is provided with spaced key-shaped apertures 68, adapted to accommodate the prongs 62. These key-shaped apertures 68 permit the sheet 64 to be snapped downwardly into interlocked association with the prongs 62, as indicated in FIGS. 9 and 10. In order to replace or reposition the sheet 64, it is only necessary to pull the sheet upwardly with sufficient force to overcome the frictional resistance at the portion of the sheet defining said apertures. Next to the sheet 64 is card 70 which is equipped with magnetic material 72, FIG. 8, embedded within opposite sides or margins of the cards. These magnetic areas 72 are so positioned as to be affected by the magnetic field produced by the magnets 28 and thus cause the fanning of a plurality of cards. It will be noted that the prongs 62 penetrate the cards 70 adjacent the bottom margins thereof. Next to the cards 70 is a microfilm holder 74, commonly referred to as a microfiche. This microfiche rests upon the upper surfaces of the laterally spaced prongs 62. On the opposite side of the microfilm holder 74 is a card 76 which corresponds structurally with and is positioned similarly to the cards 70. Beyond the card 76 is another transparent index card member 78, similar to the previously mentioned card 64. It should be understood, of course, that for purposes of disclosure, only a few cards are illustrated in FIG. 8. In practice the auxiliary tray section 52 may accommodate approximately 100 card members, as indicated in FIGS. 1 and 7.

It will be understood from the foregoing that the hundred or more cards in the auxiliary tray section 52 are held in proper relation within said section by means of the laterally spaced prongs. The tray section 12, together with its cards and the U-shaped rod 60 associated therewith may be handled as a unit for application to or removal from the chamber of the tray structure 20. Particular attention is directed to the fact that by properly arranging the apertures in the cards 64, 70, 76 and 78, such cards are maintained in absolute alignment. Also, any tendency for these cards to shift upwardly or from side to side, due to the urging effect of the magnetic field produced by the magnets 28 is precluded. Thus, any tendency for these cards to frictionally engage the inner surfaces of the upright wall sections 22 or to become vertically misaligned is prevented.

Particular attention is directed to the manner in which the magnets 28 are secured within the housing portion 26 in the sidewalls 22. These non-magnetic elongated strips 34 prevent the magnets from being displaced inwardly with respect to the housing and the elongate magnetic members 30 with the inclined margins 32 serve to increase the active flux area. In more widely distributing the flux area, the flux density is reduced sufficiently to eliminate the tendency for the cards to be urged upwardly or from side to side. It is not uncommon for static conditions to exist between cards and the film holders, and by employing the auxiliary tray section 52 and the above-described prong members 62, the lower edges of the cards 64, 70, 76 and 78 are maintained free from engagement with the bottom section 54 of the auxiliary tray 52. Thus, friction in this area is eliminated and the cards actually float within the auxiliary tray section 52.

It will therefore be apparent from the foregoing that the above-described tray device greatly facilitates the ease with which the cards will fan or separate along

their upper margins by reducing any tendency for the cards to encounter frictional engagement with the tray interior. The above-described auxiliary tray section 52 and spaced prong members 62 penetrating the oppositely disposed, upwardly flaring walls 56 and 58 constitute an important feature in bringing about the above-mentioned satisfactory results. Also, use of the strips 30 in controlling the effectiveness of the magnetic field produced by the magnets 28 greatly contributes to the satisfactory functioning of the tray device. The end sections 36 and 36a may be extruded forms which are severed into lengths which will satisfy the width of the upright wall sections 22 formed integral with the bottom section 24. Hence, the invention contemplates the production of a tray structure at minimum cost with a minimum number of parts to be assembled with the exercise of minimum skill and effort.

FIGS. 15 to 18, inclusive, illustrate the manner in which the above-described tray structure 20 may be coupled with a similar tray structure in instances where it is desirable to expand filing facilities. A pair of spaced apertures 80, FIG. 1, are formed in each of the endwall sections. These apertures 80 are adapted to accommodate fastening bolts 82, FIGS. 15 and 17, which receive wing nuts 84. With the apertures 80 of the abutting end walls in alignment, as shown in FIG. 17, the bolts 82 and wing nuts 84 serve to securely clamp the tray structures together as a unit. In instances where it is deemed advantageous, additional strengthening means in the form of a clip 86, FIGS. 16 and 18, may be snapped over abutting portions of the elongate housing sections 26. It will also be observed that it is preferable to have the front wall section 56 of the auxiliary tray section 52 inclined from the vertical to a greater degree than the rear wall section 58. With this arrangement the visibility of the subject matter along the upper margins of the cards is materially enhanced.

It will be apparent from the foregoing description that the present invention contemplates an improved tray structure for use in fanning magnetic filing systems. The integral arrangement of the upright sidewalls and bottom section together with the use of identically shaped endwall sections contributes materially to the economy of manufacture and to the ease of assembly. The auxiliary tray arrangement for accommodating index cards, data cards, and the like, in combination with the novel mounting arrangement for the elongate magnets, eliminates misalignment of the cards and frictional engagement of the card edges with the interior of the tray. In fact, the cards are suspended freely within the auxiliary tray section. Also, the present invention makes possible the expansion of filing facilities by simply clamping one tray structure against another like tray structure in perfect alignment.

It should be understood that the tray structure defined herein is adapted to accommodate a wide variety of cards and is not in any sense limited to the filing of

microfilm holders, and contemplates changes and modifications without departing from the spirit and scope of the appended claims.

I claim:

1. A device adapted for use in fanning magnetic filing system including a tray structure of non-magnetic material having spaced upright, extruded sidewall sections formed integral with an extruded elongate rectangular horizontal bottom section, said extruded sidewall sections providing pockets for accommodating elongate magnets, said tray structure also including two non-magnetic endwall sections, interlocking coupling means for attaching said endwall sections to the opposed ends of a bottom and sidewall section, whereby to present a tray chamber, elongate magnets housed within the pockets of said sidewall sections in the vicinity of the upper margins thereof, an elongate rectangular index card accommodating auxiliary tray positioned within and traversing the aforesaid chamber, said auxiliary tray including a bottom portion and a pair of longitudinally spaced upwardly flaring wall portions whereby to limit the extent of tilting toward the front and back of the tray structure, and a plurality of rectangular index or data cards in vertical face-to-face relation traversing within said tray chamber and positioned between said flaring wall portions, each card having a magnetic portion adjacent opposed sides thereof in the vicinity of a complementary magnet,

said filing device further including parallel and laterally spaced longitudinal prongs, said prongs being secured adjacent the bottom portion of the auxiliary tray and adapted to penetrate said cards so as to maintain the cards in a substantially vertical alignment,

- whereby the tendency of said cards to tilt or become dislodged is avoided and the lower edge of the cards is stabilized so as to preclude dragging along the bottom of the auxiliary tray.

2. A device adapted for use in a fanning magnetic filing system, as set forth in claim 1, wherein said spaced prongs form portions of a U-shaped rod.

3. A device adapted for use in a fanning magnetic filing system, as set forth in claim 1, wherein the auxiliary tray section is movable as a unit into and out of association with the interior of the tray structure.

4. A device adapted for use in a fanning magnetic filing system, as set forth in claim 1, wherein elongate magnetic means is associated with each of said magnets to increase the effective magnetic flux area of said magnets.

5. A device for use in a fanning magnetic filing system, as set forth in claim 4, wherein said elongate magnetic means associated with each of the magnets is in the form of a channel, opposed flanges of which serve to increase the effective magnetic flux area of each magnet.

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