Dec. 9, 1969 J. R. DEBELIUS 3,482,910

MAGNETIC SUPPORT ARRANGEMENT

Filed March 8, 1967

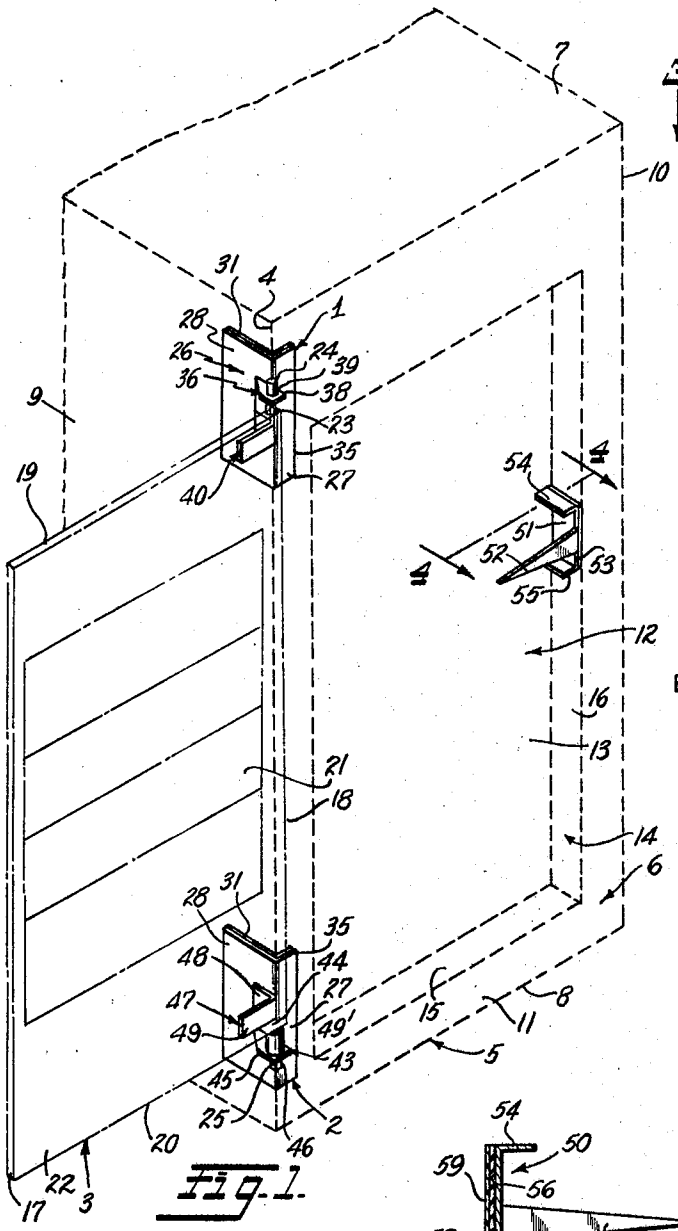


Fig. 1.

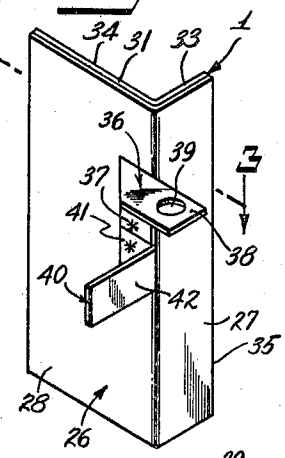


Fig. 2.

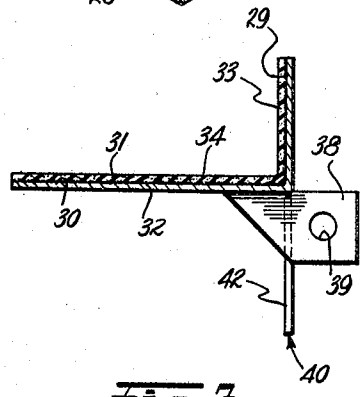


Fig. 3.

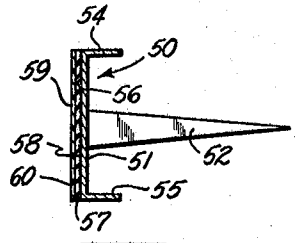


Fig. 4.

INVENTOR

JOSEPH RUSSELL DEBELIUS

BY Arnold, Roylance, Kruger & Durkee

ATTORNEYS

United States Patent Office 3,482,910 Patented Dec. 9, 1969

3,482,910

MAGNETIC SUPPORT ARRANGEMENT

Joseph Russell Debelius, New York, N.Y., assignor to Kennecott Copper Corporation, New York, N.Y., a corporation of New York

Filed Mar. 8, 1967, Ser. No. 621,636
Int. Cl. G03b 21/00
U.S. Cl. 353—42 11 Claims

ABSTRACT OF THE DISCLOSURE

A support including brackets to removably support a microfilm card rack in a convenient position on the iron or steel cabinet of a microfilm reader. Each bracket has two faces of rubber magnet material which magnetically connect to the intersecting walls at a corner of the cabinet and resist displacement and removal of the brackets. A rubber magnet magnetically connects a pointer to a wall of the cabinet adjacent the screen of the microfilm reader. A coating of low friction Teflon on the surface of the magnet that engages the cabinet facilitates sliding the pointer.

SUMMARY OF THE INVENTION

This invention relates to a support including brackets magnetically connectable to an object having magnetic material walls to hold an article in a convenient position on the object.

Though the invention has many other applications, it is especially useful for supporting a microfilm card rack at the corner of the cabinet of a film card reader with the rack in a readily accessible position so the operator of the film card reader can easily reach the microfilm cards.

Microfilm cards which consist of a strip of microfilm connected to a frame of thin cardboard or plastic are usually filed in the pockets of a plurality of racks which form a film card file system. In one such file system each rack takes the form of a thin but rigid rectangular sheet metal structure with pockets connected to one face of the structure and in which the film cards are stored. A rod is secured to one side of the structure and has ends projecting above the top and bottom edges of the structure. The projecting ends of the rod provide for pivotally mounting the rack in the file system so that each rack may be conveniently turned like the page of a book. Customarily, the upper and lower ends of the rod extend through suitable circular openings of the rack support and the upper end of the rod is slightly longer than the lower end of the rod to permit removal of the rack from the support by lifting the rack until its top edge engages the upper support, then tilting the rack so the bottom end of the rod clears the lower support, and finally lowering the rack to slide the upper end of the rod out of the upper support.

The support arrangement of this invention, which is magnetically connectable to the film card reader cabinet, is particularly useful for removably supporting a rack of the type described in a convenient position on the cabinet. The support arrangement includes a pair of L-shaped brackets with "rubber magnet" material attached to the inner faces of each bracket. With this arrangement, two faces of magnet material extend at an angle to each other which is the same as the angle at a corner of the cabinet, and the magnets securely hold the bracket in position on the cabinet. The faces of the "rubber magnet" material advantageously have a high coefficient of friction to prevent sliding along the smooth walls of the cabinet.

Since microfilm cards are frequently used for storage of information relating to inventory and parts, it is frequently desirable for the operator to be able to temporarily mark a particular portion of the information projected on the film card reader screen. Such temporary marking is readily accomplished with a removable pointer, magnetically connectable to a wall of the cabinet and slidable therealong adjacent the screen of the film card reader. The surface of the magnet which connects the pointer to the cabinet is coated with a low friction material, such as Teflon, a product of Du Pont Company.

Accordingly, a general object of the invention is to provide a support arrangement connectable to at least two magnetic material walls of an object which extend at an angle to each other to support an article in a convenient position on the object without the need for modification of the object.

Another object is to provide a support including brackets magnetically connectable to a cabinet of a film card reader to support a film card rack in a convenient position adjacent the viewing surface of the film card reader.

Another object is to provide a pointer or indicator which includes a magnet that has a surface coated with a low friction material to permit magnetically connecting the pointer to a cabinet of a film card reader for sliding movement along a wall of the cabinet adjacent the screen of the film card reader.

A further object is a support bracket arrangement in which each of the brackets is magnetically connected to two intersecting smooth upright walls of a cabinet adjacent a corner of the cabinet, each bracket having magnet faces extending at the same angle to each other as the intersecting walls of the cabinet, and including connecting means to removably connect an article support rack to the brackets without the need for modifying the support rack.

An additional object is to provide a bracket and pointer arrangement in accordance with the above objects which are quite economical to manufacture.

In order that the manner in which the foregoing and other objects obtained in accordance with the invention can be understood in detail, one advantageous embodiment thereof will be described with reference to the accompanying drawings, which form a part of this specification, and wherein:

FIG. 1 is a fragmentary perspective view illustrating the support arrangement of the present invention;

FIG. 2 is an enlarged perspective view of the upper mounting bracket of FIG. 1;

FIG. 3 is a transverse sectional view through the bracket of FIG. 2 taken on the line 3—3; and

FIG. 4 is a transverse sectional view through the pointer of FIG. 1 taken on the line 4—4.

Referring now to the drawings in detail, the support arrangement of this invention, including an upper bracket 1 and a lower bracket 2, will be described as employed to removably connect a film card rack 3 in a convenient upright position at the front corner 4 of a cabinet 5 of a film card reader 6.

Cabinet 5 is of conventional construction having a horizontal top wall 7, a horizontal bottom wall 8, vertical side walls 9 and 10 connected respectively to the opposite side edges of the top and bottom walls, and a horizontal front wall 11 connected to the front edges of walls 7–10. The major central portion of front wall 11 is cut out to provide a rectangular opening 12 for a viewing screen 13. Screen 13 is spaced behind front wall 11 by a rectangular frame 14 which presents a narrow horizontal bottom ledge 15 and a vertical side ledge 16, each of the ledges presenting a smooth plane surface. The several walls and ledges of cabinet 5 are formed from magnetic material such as iron or steel.

Film card rack 3 is a thin rectangular sheet metal struc-

ture having side edges 17 and 18 which are longer than its top and bottom edges 19 and 20. A plurality of upwardly opening pockets 21 are fastened to a front face 22 of rack 3, and film cards are stored in the pockets. Secured to side edge 18 of rack 3 is an elongated cylindrical bar 23 with an upper end 24 that extends above top edge 19 of the rack and a lower end 25 which extends below bottom edge 20 of the rack.

Rack 3 is removably supported in an upright position along front corner 4 of the cabinet by upper bracket 1 which is removably connected to upper end 24 of bar 23 and by lower bracket 2 which is removably connected to lower end 25 of bar 23. The upper and lower ends of bar 23 thus function as connecting members.

Upper and lower brackets 1 and 2 each have a body portion 26 formed from a single piece of thin sheet metal which has a right angle bend to provide a rectangular vertically elongated front leg 27 which is integral with and extends perpendicularly from a rectangular vertically elongated side leg 28. Each front leg 27 has a plane inner surface 29 which joins a plane inner surface 30 of side leg 28. Flexible magnet material 31, in a sheet form, completely covers inner surfaces 29 and 30 of each bracket and is adhered to the surfaces with an adhesive 32. Magnet material 31 presents plane permanent magnetic faces 33 and 34 which extend at a right angle to each other which is the same angle as the angle between side wall 9 and front wall 11, which intersect at corner 4.

Elastic magnet material 31 is what is termed in the art as a "rubber magnet." The "rubber magnet" is a flexible material such as rubber, synthetic rubber, flexible plastic or similar soft elastic material which has incorporated throughout its entire mass particulate or powdered permanent magnetic material. The "rubber magnet" material may be of the type disclosed in U.S. Patent 2,959,832, to Max Baermann. Advantageously, faces 33 and 34 of elastic magnet material 31 have a high coefficient of friction which resists slipping on the smooth walls of cabinet 5.

As shown at FIGS. 1–3, front leg 27 of each bracket is relatively narrow so its side edge 35 terminates outside rectangular opening 12, and thus, screen 13 is not obstructed by either of the brackets.

Fixed to upper bracket 1 is a connecting means in the form of a sheet metal ear 36 with a flat vertical portion 37 fixed to the outer face of side leg 28, as by spot welding, and an integral horizontal portion 38 which extends perpendicularly away from the outer face of side leg 28. Horizontal portion 38 of the ear has a circular opening 39 extending therethrough at a location in front of the outer surface of front leg 27. Immediately below ear 36, on bracket 1, is a stop member 40 which is formed from sheet metal and has a vertical leg 41 spot welded to side leg 28 and a second vertical leg 42, which forms a stop finger that extends from leg 41, and is coplaner with front leg 27.

Fixed to lower bracket 2 is a connecting means in the form of an ear 43 formed from sheet metal and having a vertical portion 44 spot welded to the outer surface of side leg 28 of bracket 2 and a horizontal portion 45 projecting from leg 44. Leg 45 has a circular opening 46 in a portion of the leg which projects in front of front leg 27. Immediately above ear 43 is a stop member 47 having legs 48 and 49 identical to legs 41 and 42 of stop member 40, leg 49 forming a stop finger.

In use of brackets 1 and 2 to support rack 3 at front corner 4 of the cabinet, the brackets are placed on the front corner of the cabinet in the manner shown at FIG. 1 so that magnet faces 33 and 34 of each bracket engage and are magnetically adhered to side wall 9 and front wall 11 respectively, of the cabinet. The brackets are spaced apart so the distance between ears 36 and 43 is slightly greater than the distance from top edge 19 of the rack to the bottom of lower end 25 of bar 23. With the bracket so mounted on cabinet 5, a rack 3 can be connected to the brackets by sliding upper end 24 of cylindrical bar 23 upwardly into opening 39 of upper bracket 1, until the bottom of lower end 25 of the bar clears ear 43, and then tilting the rack inwardly so lower end 25 of the bar enters opening 46 of lower bracket 2 when the rack is lowered. A cylindrical sleeve 49' on lower end 25 of the bar spaces the bottom edge 20 of the rack above the top surface of ear 43. A rack so mounted on the cabinet can be pivoted toward and away from the operator of the film reader who sits facing screen 13. The stop provided by legs 42 and 49 engage the rear surface of rack 3 to prevent the rack from pivoting beyond the plane of the front wall 11 of the cabinet, in a direction away from the operator of the film card reader.

As shown at FIG. 1, the stop fingers provided by legs 42 and 49 on the upper and lower brackets respectively, lie in a common plane with the front legs 27 of the respective brackets when the brackets are mounted on the cabinet as shown. In addition, openings 39 and 46 are seen to have their axes aligned.

It has been found that the generally L-shaped upper and lower brackets 1 and 2 exhibit remarkable resistance to displacement from the walls of the film reader cabinet. It is believed that resistance to displacement is attributable to the use of flexible magnet material 31 with its high fricion surfaces in direct engagement simultaneously with two walls of the cabinet.

As shown at FIG. 1, a pointer 50 is magnetically connected to vertical side ledge 16 and is slidable therealong. Pointer 50 is formed from sheet metal and includes a flat base 51 which is generally rectangular, a pointer arm 52 integral with the base and extending perpendicularly from a side edge 53 of the base, and flat rectangular grip portions 54 and 55 integral with and extending perpendicularly from the opposite ends of base 51 in the same direction as pointer arm 52. As shown at FIGS. 1 and 4, pointer arm 52 is centrally located between grip portions 54 and 55 and projects substantially beyond the ends of the grip portions.

Bottom surface 56 of base 51 is completely covered with a flexible magnet 57 which is adhered to the base by an adhesive 58. Magnet 57 is of the same magnet material as flexible magnet 31, previously described.

The exposed flat surface 59 of magnet 57, which faces away from base 51, is coated with a uniform coating 60 of polyfluorocarbon resin which may take the form of Teflon TFE, a polytetrafluroethylene, or Teflon FEP, a copolymer of tetrafluroethylene, both products of Du Pont Company. Another suitable material for coating 60 is polyvinylidene fluoride available under the trade name Kynar, a product of Penn Salt Company. The Teflon products however are preferred for coating 60 because of their low coefficient of friction of about .02, whereas Kynar has a coefficient of friction of about 0.16.

By using low friction coating 60 on the surface of magnet 57, pointer 50 is easily slidable along vertical side ledge 16 to any desired position so the operator may quickly and effortlessly align the pointer arm with the desired indicia visible on screen 13.

In view of the foregoing, it is apparent that applicant has provided a simple, yet effective and economical bracket arrangement to temporarily support an article, namely, a film card rack on an object with magnetic material walls, namely, the cabinet of a film card viewer, without modifying either the cabinet or the rack. The brackets can readily be moved to different positions along the front corner of the cabinet to support racks of various sizes. It is within the contemplated scope of this invention to modify as necessary the connecting means provided by ears 36 and 43 of the brackets to accommodate the connecting members of different types of racks as well as to use the brackets for various purposes.

While a preferred embodiment has been shown and described, it is to be understood that the scope of this in-

vention is not limited thereby but is as defined in the appended claims.

What is claimed is:

1. A support arrangement for removably connecting an article to an object having at least two walls extending at an angle to each other and formed from magnetic material, the support arrangement comprising, in combination

first support means;

second support means;

first permanent magnetic means connected to said first support means to magnetically connect same to said cabinet, and having

a first face adapted to engage a first wall of the object, and

a second face extending at the same angle to said first face as the angle between the walls of the object, and adapted to engage the second wall of the object when said first face engages the first wall of the object;

connecting means on said first support means to removably connect same to a first portion of said object;

connecting means on said second support means to removably connect same to a second portion of said object; and

second permanent magnetic means connected to said second support means and adapted to engage and magnetically hold itself to at least one wall of the object;

whereby, said article is removably connectable to the object and is securely held on the object by said permanent magnetic means.

2. A support arrangement according to claim 1 wherein

said first support means comprises

a first leg, and

a second leg rigid with said first leg and extending therefrom at the same angle as the angle between said first and second faces of permanent magnetic material;

said first face is a plane surface of a thin sheet of permanent magnetic material;

said second face is a plane surface of a thin sheet of permanent magnetic material; and

which further includes

means adhering said permanent magnetic material to said first and second legs.

3. A support arrangement according to claim 1 wherein

the object is a cabinet with walls that extend perpendicular to each other and intersect at a corner of the cabinet; and

said first and second faces of permanent magnetic material

lie in planes perpendicular to each other, and engage the respective walls of the cabinet adjacent the corner of the cabinet.

4. A support arrangement according to claim 1 wherein

said article is a rack with first and second connecting members each including a cylindrical portion

said connecting means of said first and second support means each include

an ear fixed to the respective one of the support means;

one of said ears having an opening therein of a size to slidably receive the cylindrical portion of one of said connecting members; and

the other of said ears having an opening therein to slidably receive the cylindrical portion of the other of said connecting members.

5. A support arrangement according to claim 1 wherein

said connecting means of said first and second support means mounts the article for pivotal movement; and

which further includes

stop means rigid with at least one of said support means to limit the pivotal movement of the article in at least one direction.

6. A support arrangement according to claim 1 wherein

said second permanent magnetic means includes

a first face adapted to engage a first wall of the cabinet, and

a second face extending at the same angle to said first face as the angle between the walls of the object, and adapted to engage the second wall of the object when said first face engages the first wall of the object.

7. A support arrangement according to claim 1 wherein

said first and second permanent magnetic means each comprise

a non-magnetic binder having incorporated therein a powdered magnet material with a surface having a high coefficient of friction.

8. A support arrangement according to claim 1 wherein

the object is the cabinet of a microfilm reader having a viewing screen adjacent a flat magnetic material wall of the cabinet;

the walls of the cabinet intersect at a generally vertical corner;

the article is a rack and said support means mount the rack in an upright position adjacent the vertical corner of the cabinet;

and which further includes

pointer means comprising

a base,

a pointer arm connected to said base,

a magnet connected to the base, and

a thin coating of a polyfluorocarbon resin on said magnet and presenting a surface with low friction characteristics;

said magnet of said pointer magnetically connecting the pointer to the flat magnetic material wall of the cabinet with the low position surface engaging the wall;

whereby, said pointer means is readily slidable along the flat wall of the cabinet to a desired position adjacent the viewing screen of the cabinet.

9. A bracket arrangement for removably supporting an article holding rack on a cabinet having portions of walls thereof formed from magnetic material and intersecting at an upright corner, said bracket arrangement comprising, in combination

first bracket means magnetically connectable to the cabinet and comprising

a first flat leg,

a second flat leg rigid with and extending from said first leg at the same angle as the angle between the walls of the cabinet at the upright corner,

a layer of permanent magnetic material adhered to the inner surface of each of said legs, and

connecting means attached to one of said legs and removably connectable to a first portion of the article holding rack to be supported;

second bracket means magnetically connectable to the cabinet and comprising

a first flat leg,

a second flat leg rigid with and extending from said first leg at the same angle as the angle between the walls of the cabinet at a corner thereof,

a layer of permanent magnetic material adhered to the inner surface of each of said legs, and

connecting means attached to one of said legs and

removably connectable to a second portion of the article holding rack to be supported;

each of said layers of permanent magnetic material of said first and second bracket means including

a non-magnetic binder having incorporated therein particles of magnet material and presenting a surface engageable with the cabinet and having a high coefficient of friction;

whereby, said first and second bracket means can be removably connected to the cabinet adjacent the upright corner thereof, in spaced apart relation to each other, to securely hold the article holding rack on the cabinet.

10. A bracket arrangement according to claim **9** wherein

said legs of said first bracket means

are integral and are formed from a single piece of sheet metal;

said legs of said second bracket means

are integral and are formed from a single piece of sheet metal;

said first and second bracket means are each connectable to the cabinet along the upright corner of the cabinet; and

said first and second legs of each of said bracket means and permanent magnetic material thereon is elongated in a direction along the upright corner.

11. A bracket arrrangement according claim **10** wherein

said connecting means of said first and second bracket means are each

ears formed from sheet metal and fixed to the side of a leg opposite from the permanent magnetic material,

said ears each having an opening therein to pivotally support the rack on the cabinet; and

a sheet metal stop finger on at least one of said bracket means to limit pivotal movement of the rack.

References Cited

UNITED STATES PATENTS

3,124,725 3/1964 Leguillon ---------- 335—303

FOREIGN PATENTS

1,033,559 7/1953 France.

NORTON ANSHER, Primary Examiner

R. L. MOSES, Assistant Examiner

U.S. Cl. X.R.

16—149; 248—201, 206, 222