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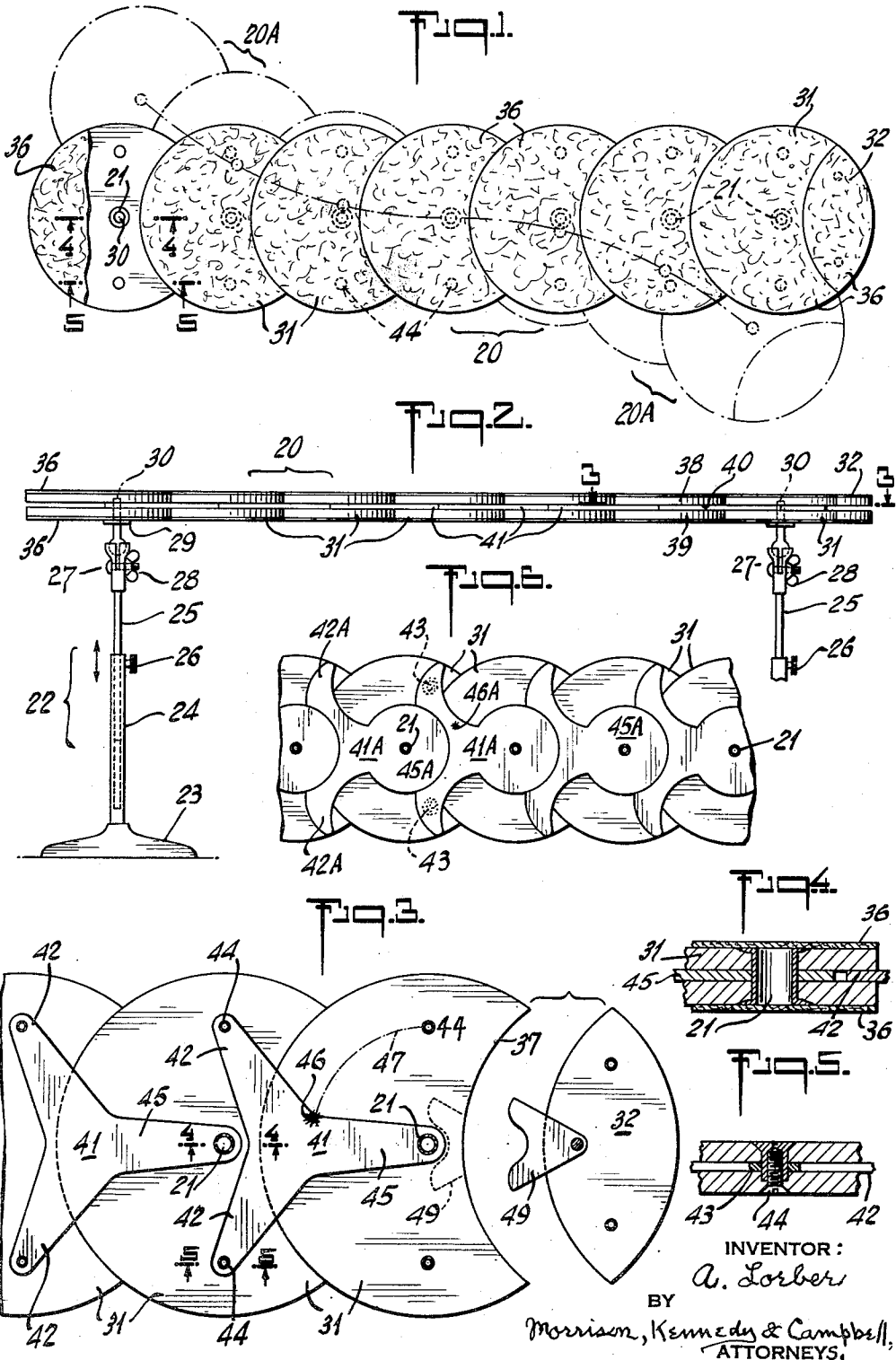
A. LORBER

2,694,611

DISPLAY SHELF OF CHANGEABLE SHAPE

Filed June 21, 1950

2 Sheets-Sheet 1



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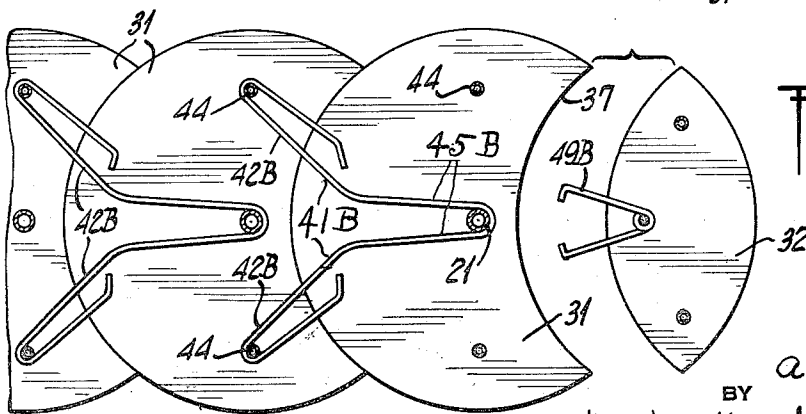
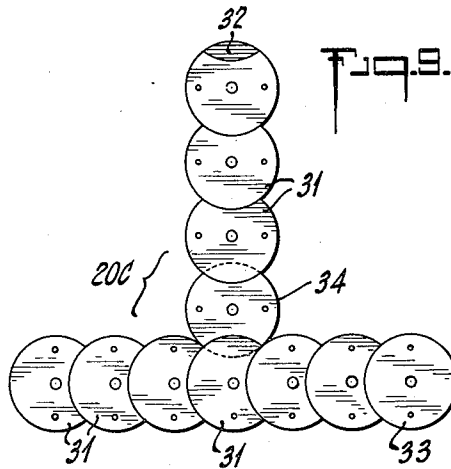
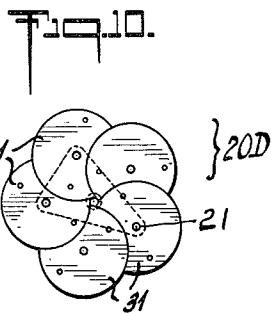
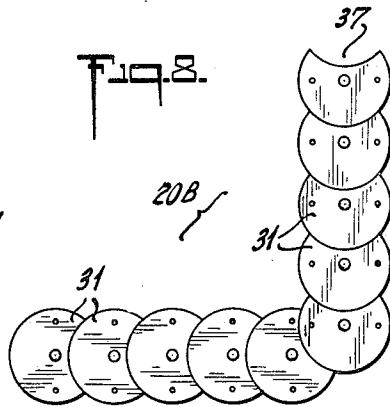
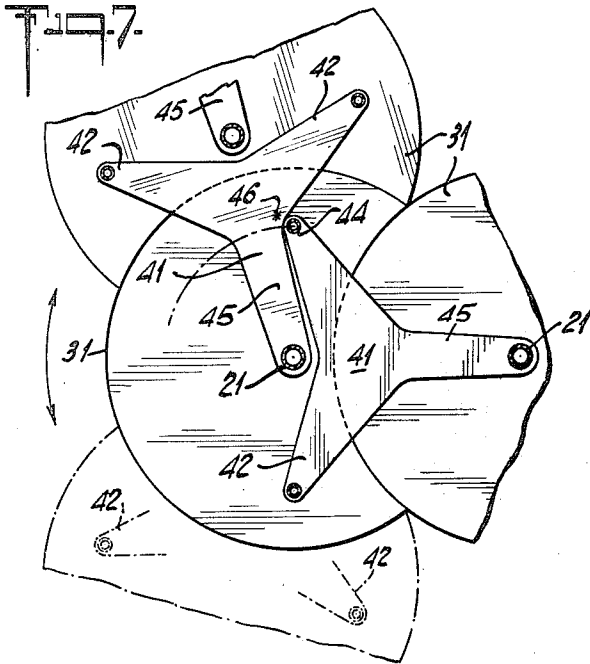
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2 Sheets-Sheet 2



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DISPLAY SHELF OF CHANGEABLE SHAPE

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Application June 21, 1950, Serial No. 169,317

3 Claims. (Cl. 311—35)

This invention is a novel display shelf in the nature of a portable flat support adapted to be set in and fitted to various situations and constructed to be readily changeable, as by manual adjustment of its components, in respect to its general outline and extent, so that it may be varied at will as to its shape or contour. The basic purpose is to afford such an elongated shelf which is well adapted to support articles of various kinds that are to be placed on display; and a specific object is to provide selective variation of the shelf contour such as to render it available to be altered at will to suit changes in the character of the goods to be displayed or to suit the arrangement thereof upon the shelf. Typical practical uses of the changeable shelf of this invention include instances wherein the articles are placed on or within show cases or shop counters, or in display cabinets for museums and the like, as well as in show windows for exhibiting to the public articles which for example are on sale, or are shown to attract attention. It has of course been well known to provide for display purposes rigid shelves of desired contour and shiftable in location but lacking the convertibility or changeable character of such shelves with respect to the contours thereof, as herein disclosed.

The general object of the present invention is to overcome the above-mentioned restrictions and shortcomings of the prior art of display shelving, and particularly to provide for the ready changeability of an elongated display shelf as to its outline or extension by means of adjustment, or swing, with respect to each other, of the component members or disks making up the shelf, and to provide a manner of so varying the shelf as to afford desirable departures in selective ways and degrees from mere straightness or normality of the shelf and in a manner to facilitate, by artistic skill, the devising of unusual and attractive arrangements and effects. Other and further objects and advantages of the invention will be explained in the hereinafter following description of certain typical embodiments of the invention or will be understood by those conversant with the subject.

To the attainment of the objects and advantages mentioned the present invention consists in the novel changeable-shape shelf, and its features of construction, combination and detail herein disclosed. Particularly the invention consists of the combinations comprising the following elements: An aligned, elongated and interlinked series of at least three flat and rigid disks of generally circular form and with equal given radii and being functionally substantially identical. Each one of at least three of the disks in line is of crescent-like shape by reason of having a peripheral recess or cutaway of arcuate form drawn to the given radius, and accommodating with working fit a portion of the circumference of the next succeeding disk but extending somewhat short of the center of the first mentioned disk. A concealed interconnector member bridging and linking the two disks of each adjacent pair by reason of having a first extension or body rigid or integral with or anchored non-rotatively to the first of such two disks, and having a second extension or radial arm which is pivotally connected to the center of the second of such disks, by reason of which the first disk of each pair may be bodily swung, or the second disk rotated adjustably, about the center of the latter, to selected positions of the two disks relatively to each other. By these combined features, for any setting or adjustment of the disk series and during adjusting thereof, the articulated disks of such series are

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maintained in mutual working contact within such recesses, rendering unitary the changeable shelf comprising the same, while the interconnector devices, overlapping the disk pairs, confer rigidity on the entire disk series and shelf. The invention consists also of various other disclosed features of structure and operation; such as advantageous particular disks, including a duplex construction of disk composed of upper and under disk-halves, plates or sections, with a flat shallow interspace between, produced by and occupied by the aforesaid interconnectors, spacers or interior articulating link members, which unify the whole disk series into the shelf of this invention; also various particular shelf shapes, mounting means and details.

In a broader aspect the combination including the following recited elements constitutes an illustrative means for attaining their functions, namely, the concealed interconnector member bridging and linking the two disks of each adjacent pair and having a body anchored rigidly or integral with the first of such two disks and a radial arm extending to the central pivot of the second disk; other mechanical means being available to afford the same actions and results.

In the accompanying drawings, Fig. 1 is a top plan view of an illustrative display shelf of disk construction, elongated character and changeable shape, embodying the present invention; the figure showing in full lines a normal or straightaway arrangement and in dot-and-dash lines one of the many possible changed adjustments of the interconnected or articulated disk components, there being shown as an example seven of the disks, wherein those between the middle and one end of the series or row are displaced or swung away successively from the centerline to produce a general curvature in a direction from the observer, while those toward the other end are shown swingingly adjusted or offset toward the observer, with the total effect of a reverse curvature of the general median line of the disk series.

Fig. 2, on a smaller scale and in front elevation, shows the same series or elongated row of shelf disk members, indicated as arranged horizontally, in this case at an elevation above the floor line, by means such as upright standards or posts, rather than resting upon the floor, table or other support.

Fig. 3, on a scale larger than Fig. 1, shows in top view certain details of disk structure and the relationship between each two adjacent disks of the shelf; the upper part of each disk being omitted in order to expose the interior structure, including certain disk interconnector devices, members or links; this figure illustrating the basic principles of the invention and showing supplementally a certain special "filler disk."

Fig. 4, in further enlarged view, is a detail section taken on the line 4—4 of Fig. 1 or 3, showing a pivot or eyelet piece extending centrally through a disk and through an enclosed linking device; while Fig. 5 is a similar section taken on the line 5—5 of Fig. 1 or 3, showing one of the two similar fastening pieces for riveting or attaching the linking device to a disk, when the adhesive plan or that of integrality of disk and device, hereinafter referred to, is not used.

Fig. 6 in a view like Fig. 3, but on a smaller scale, shows a modified form of the basic structure.

Fig. 7 is a view similar to Fig. 3 but with one of an adjacent pair of disks changed and swung from a straight alignment to one of the extreme or limiting positions thereof.

The figures thus far described disclose the complete structure of the preferred shelf hereof and one way of mounting the same for affording a view of the shelf top and the articles exposed therein.

Figs. 8, 9 and 10 show three different ones of many possible rearrangements of shelf disks; Fig. 8 showing a general arrangement in the form of the letter L, two of which could be combined to afford substantially a square arrangement; Fig. 9 showing a T-shape general arrangement produced by combining two series of disks; and Fig. 10 showing a compact and generally circular shelf or support composed of five tightly closed-together shelf members; which could be attained also with six

disks, leaving a central hole useful to support the shelf atop a single standard.

Fig. 11, in a view like Fig. 3, shows a modification of structure wherein the interior connector or linking devices of the shelf are composed of bent wires rather than sheet material.

Referring to the drawings, at Figs. 1 and 2, the illustrative shelf 20 is a multiple-disk structure with at least three and preferably more disks 31 in series, to be fully described, seven being shown, these being interconnected and articulated in line so as to afford a unitary shelf. This shelf is shown in full lines as a straightaway shelf, with a straight centerline, but is changeable, as seen in dot-dash lines, to a reversely curved shelf 20A. Many changes of extent, length or shape are available, for example, the ten-disk series of Fig. 8 is manipulated into an L-form shelf 20B, with two straight stretches or groups set at 90° apart. In Fig. 9 with a straight group of seven disks a T-shape shelf 20C is afforded by adding a lateral group of four disks. Fig. 10 shows a very compact shelf form 20D, with five or more disks adjusted snugly into a closed ring.

Each regular or normal disk 31 is provided with a central disk-securing member 21 having certain functions to be described; and when in eyelet form, as in Figs. 1, 3, 4, 6 and others, constituting a socket piece useful for the elevated mounting of the shelf. Thus the socket members 21 of the first and last disks cooperate in mounting the shelf, according to Fig. 2, showing a typical means, as one or more standards 22, for the purpose. This standard is shown as comprising a base 23 to rest upon a table or floor, and upstanding from the base a lower post section 24, continued as an upper section 25, the two being mutually adjustable in a telescoping manner to vary the height of the standard, with a set screw 26 to fix the adjustment. At the top of the post is carried a rocking joint or hinge to permit lateral tilting of the shelf, this being shown as a ball and socket joint 27 adapted to be clamped in its adjusted position by a wing nut 28, the upper part of this joint being formed with a collar 29 providing a supporting shoulder, above which projects upwardly a pin 30, adapted to receive the socket or eyelet piece 21 of one or more disks of the shelf. In this way the shelf 20 may be supported at or near each of the two ends of the shelf, or by other desired arrangements, utilizing or not the socket pieces 21.

Among other ways of disposing or mounting a disk shelf such as described are the following. The shelf may be laid directly upon a floor or a table or may extend as a bridge across a space from one support or shelf to another. When the shelf rests upon upstanding supports, as shown in Fig. 2, instead of the single tier shown, the total arrangement may be with successive tiers. One such arrangement, using preferably two or more upright standards, is to arrange a superposed series of shelves, those above the lowest being of progressively decreasing dimensions widthwise or lengthwise. By suitably employing upright standards or the like an associated group of shelves may be arranged in stepped fashion, each of the higher shelves being offset relatively to the lower ones. The facilities being provided it remains for the decorator to make his selections and arrangements according to the character of the goods being displayed and his own taste therein.

The disks making up any of the shelf forms of this invention may be of several different types thus facilitating the laying out and erecting of the shelf. What may be considered as the main or regular or normal type 31 of disk may be described as of crescent shape or the like by reason of having a peripheral recess or cutaway area 37 of arcuate form, drawn to the given radius, uniform throughout the system. This disk form is best shown in Figs. 1, 3 and 6 and as well the supplemental Figures 7 to 11. The recess accommodates with working fit the next succeeding disk as to a substantial extent of arc or segment of the latter, but the recess (and segment) extending, as shown, somewhat short of the center of the former disk. By this arrangement each disk is rotatively adjustable about its own center relatively to the preceding disk.

In structure, each of the disks is of generally circular outline, drawn to the given radius, although interrupted as for the crescent shape as already described. Each disk is flat and rigid and may be composed of various materials, such as plywood, presswood, a light metal such

as aluminum or various fiberboard or plastic compositions or the like. As will be further described the series of disks in any given shelf has its individual disks linked or interconnected in a single plane by means of linkages or devices to be described.

Disk types other than the regular or crescent type include some with and some without central pivots. For example there is shown in Figs. 1, 3, 8, 9 and 11 a filler type 32 of disk, being a special type of lenticular form, drawn to the given radius, and useful to apply at the end of a series of crescent disks to complete and round out the second terminus, affording a better appearance than the concave end recess that one of the normal disks 31 would present. The disk 32 may be symmetrical, with both edges struck from the standard radius. A full-round type 33 of shelf disk is shown in Fig. 9 at the righthand end of the main series. Another disk type 34 is one with double or opposed arcuate recesses, as in Fig. 9, useful in adding to the main series or shelf a laterally extending supplement.

It is preferable that instead of being bare, the disks at their visible surfaces should, for appearance sake, be provided with facings or coverings 36 of one kind or another. At least the top sides of the disks of a given shelf should be faced, and both top and bottom sides if the shelf is to be used reversely or with inversion for certain set-ups. A suitable facing to support small articles, jewelry for example, is a covering of soft material, such as velvets or pile fabrics, felt and the like; although sometimes painted coatings or oilcloth layers may be sufficient. In any case the facings may be appropriately colored, in one or more colors; and when composed of fabrics the material may be cut to the disk outline including the arcuate shape of the recess 37 and applied by means of driven fastenings such as tacks, or by adhesives, permanently holding the facings in place, separately upon each of the relatively shiftable disks, so that the facings can be preapplied, corresponding to the outline of each of the disks, in such way that when assembled into a shelf a soft material will present a uniform unbroken appearance continuous throughout the extent of the shelf. An available form of facing, of interest, is such as will afford a reflecting action, as a mirror overlying each disk or constituting a structural part thereof. To prevent the edges or the disks being noticeable they may be suitably surfaced, as by painting.

Instead of mounting the movable link and associated parts merely at the underside of a one-piece disk without a complementary plate-like member therebelow, or with merely a skeletonized structure below the top portion of the disk, it is preferable to construct the disk as a duplex member, that is, as a two-part disk, with spaced-apart upper and under sections, half-disks or circular plates, with an upper section 38 and an under section 39, whose spacing provides an interspace 40. This between-section space is shown as a flat and shallow working compartment, occupied by the interior linkage, the latter preferably serving as the spacing means to hold apart the upper and under sections. Of course, in the case of a reversible shelf the upper portion or section may become the under section by inversion.

The principal member between the disk sections is what may be termed a connector device 41, bridging interiorly across from one disk to the next, being thus interconnected with both disks of any adjacent pair, and serving to articulate the successive disks of the shelf, while holding the disks stiffly in a single plane. The interconnecting spacer or link 41 is itself thin for lightness and compactness and rigid to promote the general rigidity, strength and alignment of the series of successive disks.

The character of the interior member 41 in one form is best shown in Fig. 3, as composed of a shaped plate, whose portion which overlaps the first of an adjacent pair of disks is shown as a forked body portion or extension 42 which spans a substantial area of the first of these disks and is rigid with, for example, secured to or integral with said disk, preferably at both the underside of the upper section and the upper side of the under section of the disk. For securing the link body 42 rigidly to one or both disk sections a strong adhesive 43 may be used, indicated by stippled dots, or welding, or integrality; or a form of mechanical fastening 44 such as a flush headed double bolt, Fig. 5. The connector link second extension or arm 45 extends

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across the arcuate recess of the first disk and beyond to the center of the second disk, where it has a pivotal or rotating connection with the center of the second disk, this pivot being provided by the eyelet member 21, shown in detail in Fig. 4, which serves not merely as a center as just described but as a securing means holding together the parts or sections of the second disk, the eyelet ends being clinched, and this member 21 serving also, sometimes, as a mounting socket when the shelf is placed upon one or more standards in the manner of Fig. 2. The two-extension link member thus overlaps both disks, being rigid with the first and rotatable with the second.

Reviewing the disk construction of Figs. 1-3, each flat connecting link 42 is assembled between the two sections 38 and 39 of its disk 31 and there applied rigidly to the disk by mounting it upon one or both of the sections, as by two of the bolt fasteners 44, which give a secure mounting. The forked or concave shape of the link body 43 allows clearance for the bearing or center eyelet 21. Each link is shown triangular with its sides between the two bolts of one disk respectively and the eyelet of the next succeeding disk, being of concave or reentrant form, giving clearance for the relative swing of either of the bolts 44 toward the otherwise obstructing arm 45 of the link member.

A predetermined point on the first disk link 42, marked with a star 46 (*) may be so located, as shown, as to serve as a limiting stop to the rotation of the next disk and the swing of its bolts 44. This swing path is marked with a motion line 47 on Fig. 3, and when the limit is reached, in the position shown in Fig. 7, the bolt will have met the link at 46 and prevented further swing, avoiding the impacting of the crescent horn of one disk upon the periphery of the second disk beyond.

A modified connector link 41A is shown in Fig. 6, with the spread or branched body 42A rigid on one disk and the arm extensions 45A, now taking the form of an enlarged circle or head extending over the second disk and beyond to overlap also the third disk, giving thereby an enhanced stiffening of the disk series; sufficient clearance being allowed between links and disk sections to permit the shape-changing manipulation of the disks without jamming. In this form the link body 42A is re-shaped and recessed to accommodate the enlarged head of the pivoted arm 45A. While bolts 44 may be used, and a stop point 46A provided as before, the link may instead be made a rigid part of the disk by a strong adhesive 43 attaching the link facewise to one or both of the sections of the disk.

Each disk 31 and its link 41 may be unitarily pre-combined as of banjo or frying pan shape, generally speaking, and a series of these units assembled and secured into the structure of any of those illustrated. The bent wire links 41B of Fig. 11 afford a more loosely assembled shelf, but one more simple and cheaply made, the wire structure providing the body 42B and the arm 45B extending to the pivot 21.

The preference has been explained of filling out the last crescent disk 31 into a full circle by adding a lenticular disk 32, which may be built up analogously with upper and under sections with a spacer between. See Figs. 1, 2, 3, 11 and others. It may be applied to the final crescent disk in various ways, e. g. by having a projecting tongue 49 and attaching it to or with the spacer, as by bolts, so as to protrude flatwise from the disk 32. This tongue may be thrust into the interspace 40 of the final disk 31, there to hold frictionally or by a supplemental holding clip or screw, the tongue being forked or shaped to escape interference with the eyelet 21 or link arm 45 of the crescent disk. An analogous tongue 49B is shown in Fig. 11 made of wire. The previously mentioned attachment of special disk 34 in Fig. 9 may be of the same character, it having a plate or tongue 49A protruding from the disk 34 interspace and shoved into the disk 31 interspace, where it is held by friction or a fastener.

There has thus been described a display shelf embodying the principles and attaining the objects of the present invention; but since various matters of construction, combination and detail may be variously modified without departing from the invention it is not intended to limit the invention thereto except to the extent set forth in the appended claims.

What is claimed is:

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1. A display shelf of changeable shape comprising an interconnected or linked series of at least three flat and rigid disks of generally circular form and functional similarity, and of equal given radii, each one of a succession of three or more of such disks in series being of crescent-like shape by reason of having a peripheral recess or cutaway area of arcuate form drawn to the said given radius, and accommodating with working fit a substantial extent of circumferential arc and segment of the next succeeding disk in line, said recess being of substantial depth but extending somewhat short of the center of the first mentioned disk; and a concealed interconnector member or device bridging and linking the two disks of each adjacent pair by having a first extension or body rigid or integral with or anchored non-rotatively to the first of such two disks, and having a second extension or radial arm extended and pivotally connected to the center of the second of such disks, by reason of which the first disk of each pair may be bodily swung or the second disk rotated adjustably about the center of the latter to selected positions of the two disks relatively to each other; whereby for any setting or adjustment of the disk series, and during adjusting thereof, the articulated disks of such series are maintained in mutual working contact within such recesses, rendering unitary the changeable shelf comprising the same, while the interconnector devices overlapping the disk pairs confer rigidity on the shelf; the said shelf structure being further characterized in that each disk has a socket hole of the character of a central eyelet, for mounting the shelf on top of one or more standards each having an upstanding pin to receive such central eyelets.

2. A display shelf of changeable shape comprising an interconnected or linked series of several flat and rigid disks of generally circular form and functional similarity, and of equal given radii; each one of a succession of several of such disks in series being of crescent-like shape by reason of having a peripheral recess or cutaway area of arcuate form drawn to the said given radius, and accommodating with working fit a substantial extent of circumferential arc and segment of the next succeeding disk in line, said recess being of substantial depth but extending somewhat short of the center of the first mentioned disk; and a mechanical means interconnecting the two disks of each adjacent pair in a manner by reason of which the first disk of each pair may be bodily swung or the second disk rotated, adjustably about the center of the latter to selected positions of the two disks relatively to each other; whereby for any setting or adjustment of the disk series, and during adjusting thereof, the articulated disks of such series are maintained in mutual working contact within such recesses, rendering unitary the changeable shelf comprising the same; the said shelf structure being further characterized in that each disk has a socket hole of the character of a central eyelet, for mounting the shelf on top of one or more standards each having an upstanding pin to receive such central eyelets.

3. A stationary shelf adjustable to selected shapes of shelf and comprising a rigidly interlinked series of pairs of flat and stiff smooth-topped first and second successive circular disks of equal radii extending from end to end of the shelf; each given disk being of a generally circular shape with a peripheral arcuate recess, of said radius, adapted to accommodate a peripheral arcuate portion of the next succeeding disk, such recess being of substantial depth but extending short of the center of the first such successive disk; an interconnecting link bridging such two successive disks by having a body extension unitary with said first disk and a radial arm extension reaching and pivotally connected to the center of the second disk; whereby the first disk of each pair may be adjustably bodily swung about the central pivot of the second disk and the second disk may be adjustably rotated about such pivot, in the arranging and installing of the fixed and unitary shelf in its place of stationary use; the second disk carrying at each side a projecting stud adapted to strike and to be limited by the link when the first disk is swung or the second disk is rotated to excess; and the disks of said series being mutually self supporting between exterior points of support.

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