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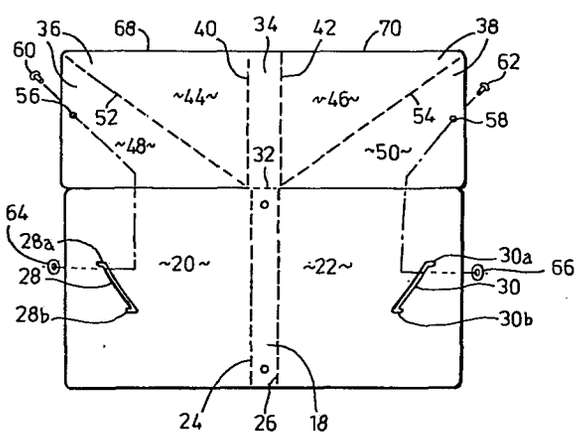
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(54) Improvements in collapsible binders and the like.

(57) A collapsible binder or the like, which is self-sustaining in a predetermined configuration when unfolded and extended to sit upon a flat surface, comprises an elongate central panel (18) flanked by a pair of generally quadrilateral flanking side panels (20, 22) with a rearwardly located collapsible support having an upstanding elongate rear central panel (34) flanked by a first pair of upstanding rear-side panels (44, 46) of substantially right-angled triangular configuration the latter side panels terminating along their respective hypotenuses remote from said upstanding rear central panel in a second pair respectively of flanking side panels (48, 50) extending in coplanar relation behind the flanking side panels of said binder, and slidingly fixed thereto; and with all panels being so hingedly connected together that the structure may upon being unfolded extend into its self-sustaining predetermined configuration and may be compactly folded up when collapsed for storage or for carrying.



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"Improvements in Collapsible Binders and the like"

This invention relates to improvements in lightweight collapsible support structures and more particularly to those structures that include book covers or ring binders and the like as integral parts thereof for displaying the contents thereof or serving as an easel or other similar purpose.

Lightweight collapsible structures useful for a variety of purposes have been disclosed in a number of United States patents and Canadian patents exemplified by the following:

U.S.P 433,635 issued August 1890;
U.S.P.844,066 issued February 1907;
U.S.P.1,875,460 issued September 1932;
U.S.P reissue patent 21,371 issued February 1940;
U.S.P 2,587,316 issued February 1952;
Can. Pat. 312,291 issued June 1931;
Can. Pat. 315,615 issued September 29, 1931;
Can. Pat. 641,733 issued May 1962.

This invention relates to improvements in such collapsible structures but particularly of the nature disclosed in my United States patent No.3,990,669 which issued November 9, 1976 and the Canadian counterpart, Canadian patent No.1,010,008 issued May 10, 1977.

The principal object of this invention is to provide an improved self-sustaining lightweight collapsible support structure for a book cover or binder which is integrally associated therewith so that it is adapted, if desired, upon the book cover or binder being extended from a closed or folded position to a substantially fully extended open position to be supported upon a suitable surface in inclined erect stable configuration in order that its contents can be readily displayed or the cover used as an inclined working surface or easel.

More particularly, it is an object of this invention to provide a collapsible support structure which will fold compactly with the book cover or binder either for carrying same or for storage and upon opening of the book cover or binder move automatically with the book cover or binder to assume an independently erect stable configuration when the cover or binder has reached the fully open position.

Another important object is to provide a collapsible support structure of relative simplicity easily manipulated from its folded or compact state into the independently erect stable configuration.

Still another object is to provide a collapsible support structure which in the fully extended position can be releasably locked in place to preserve its stability.

Still another important object is to provide a cover or binder with support structure disposed therebelow thereby providing for ready viewing of the contents thereof or presenting a clear work surface and avoiding interference with enclosed pages or work sheets or the like when folded up.

Still another very important object is to provide a support structure capable of being fabricated from low cost lightweight material using basic manufacturing steps and available apparatus requiring low labour content so as to ensure efficiency of production and reduce costs of manufacture.

One feature of the invention resides in providing in combination with a cover, suitable as a book cover or as a binder or the like, which includes a stiff central panel portion or spine of generally uniform quadrilateral perimetral configuration arranged so as to present upper, lower and side edges and a pair of stiff side panel portions flanking the central panel portion and hingedly connected thereto along opposite side edges for swinging movement from a fully closed position to a fully open position with the panel portions in extended side-by-side coplanar relation and

reversely, of a collapsible structure for supporting the fully opened cover from below and in inclined relation upon a suitable surface including a central strut located rearwardly and hingedly connected adjacent its upper edge to the central panel portion of the cover to swing from a position thereagainst to a substantially upright position therebelow, the central strut carrying shiftable side strut formations extending to and supporting each of the side panel portions of the cover formation and adapted to move with the central strut and central and side panel portions of the cover from the closed to the fully opened position and reversely with the shiftable side strut formations releasably anchorable against displacement with the cover formation in at least the fully opened position to stabilize the structure.

It is to be understood that with such arrangement, the collapsible structure through manipulation closely embraces the cover when closed and automatically assumes an extended erect stable configuration locked against collapse when the cover is fully opened.

Another feature resides in providing shiftable side struts that include reinforcing panel portions hingedly connected along fold axes lying substantially in the plane of the respective side panel portions of the cover so as to slidingly abut therebelow over the range of movement of the central strut and associated panel portions of the cover from the folded position to the substantially fully extended position and reversely. Thus it will be appreciated that not only may a book or binder include an integral collapsible supporting structure but one of substantial strength so as to better resist deformation or collapse in the fully erect disposition.

More particularly, it is another feature of this invention that each flanking side panel of the

cover formation include an elongated slot formation of selected configuration so as to present a channel formation with corresponding locking pockets at the remote ends thereof to guide follower members presented by respective shiftable side strut formations throughout the range of relative movement of the components with the locking pockets and cooperating follower members being adapted to secure the components against dislodgment not only in the fully extended position but in the fully folded position so as to ensure uniform displacement and avoid distortion in use.

Still another feature resides in providing support structures which can be derived from substantially rigid sheetlike panels having a reproducible perimetral configuration so that they can be struck from flattened sheets of material in a conventional die cutting or stamping operation and in which fold axes can be simultaneously impressed or scored to define the several hinge connections.

These and other objects and features are revealed in the following description which is to be read in conjunction with the sheets of drawings in which:

Figure 1 is a plan view of a preferred one piece layout or blank from which structures embodying the invention can be derived;

Figure 2 is a perspective view taken from the rear of a combined cover formation and collapsible support structure derived from the layout of Figure 1;

Figure 3 is a perspective view of the structure of Figure 2 with the cover formation and collapsible support structure in the fully extended position;

Figure 4 is a perspective view of the embodiment of Figure 3 taken from the front; and

Figure 5 is a side elevational view of the

embodiment of Figures 3 and 4 taken from the left in Figure 3 and from the right in Figure 4.

The preferred embodiment of the invention as illustrated in Figures 2 to 5 inclusive of the drawings takes the form of a ring binder formation 12 provided with a collapsible support structure indicated generally at 14, the components of same preferably being integral and derived from a blank or layout 16 illustrated in Figure 1.

The blank or layout 16 is struck from a suitable sheet of stiff plastic, for example, polyethelyne of a selected thickness so as to ensure stability of the structure. The layout 16 includes a first central panel portion 18 separated from flanking side panel portions 20, 22 by fold axes indicated by broken lines 24, 26 which are provided either by compressing the plastic sheet linearly during the die cutting operation or by inscribing the layout with suitable knife edges in another step.

Elongated slots 28, 30 extend through side panel portions 20, 22 in a somewhat diagonal direction slots 28, 30 having in the preferred embodiment opposite symmetry and each terminating at their remote ends in anchoring pockets 28a, 28b and 30a, 30b respectively for a purpose to be explained.

Hinged by an impressed or an inscribed fold axis 32 to the upper edge of central panel portion 18 is an elongated strut or panel portion 34 which is adapted to abut up against the rear surface of central panel portion 18 in the manner revealed by Figure 2.

Two side strut formations 36, 38 flank central strut 34 and are separated therefrom by impressed or inscribed fold axes 40, 42 which are parallel and in the preferred embodiment illustrated in the drawings slightly more widely separated than parallel fold axes 24, 26 separating side panel portions 20, 22 from central panel portion 18.

Strut formations 36, 38 include gusset panel portions 44, 46 respectively which prevent reinforcing panel portions 48, 50 being separated from gusset panel portions 44, 46 by impressed or inscribed fold axes 52, 54.

It is to be appreciated that the fold axes 52, 54 extend diagonally from the intersection of respective fold axes 40, 42 and fold axis 32 whereby as best seen in Figure 3 reinforcing panel portions 48, 50 can abut the rear surfaces of side panel portions 20, 22 in the disposition illustrated.

Reinforcing panel portions 48, 50 are each provided with openings therethrough as at 56, 58 respectively in which follower pins 60, 62 are adapted to be anchored, as illustrated in Figures 2 to 5 inclusive.

Follower pins 60, 62 include head portions 60a, 62a respectively and suitably dimensioned shank portions 60b and 62b respectively which shank portions are adapted to be disposed within elongated slots 28, 30 for sliding movement therealong and secured against withdrawal therefrom by means of locking washers 64, 66 respectively fitted over and suitably secured to the ends of shank portions 60b, 62b remote from the head portions 60a, 62a in a manner so as to closely draw washers 64, 66 against the forward surfaces of side panel portions 20, 22.

It will be understood that follower pins 60, 62 register within anchoring pockets 28a, 30a respectively of slots 28, 30 when the supporting structure 14 is collapsed against the rear surfaces of central and flanking panel portions 18, 20, 22 of ring binder 12 as shown in Figure 2.

Further, it will be understood that follower pins 60, 62 register within locking pockets 28b, 30b respectively of slots 28, 30 when the supporting structure 14 is in the fully erect extended position and depends rearwardly below the inclined central and

flanking panel portions 18, 20, 22 of ring binder 12 as revealed particularly by Figure 3 and Figure 5 of the drawings.

It will be observed in Figure 2 that the ring binder formation 12 is disposed so that the central and flanking side panel portions 18, 20, 22 are not fully extended. In such disposition the collapsible support structure 14 tends to lie next adjacent the rearward surfaces thereof suspended from fold axis 32 hinging elongated strut or panel portion 34 to the upper edge of central panel portion 18.

Additionally, the flanking side panel portions 20, 22 and flanking side strut formations 36, 38 are held against separation by the follower pins 60, 62 registered within upper locating pockets 28a, 30a of elongated slots 28, 30.

It will be understood that the fold axes 24, 26 of ring binder formation 12 and the fold axes 40, 42 of collapsible support structure 14 are substantially coterminous in the disposition shown in Figure 2 so that the composite article moves as a unit towards the fully closed or folded position. Thus, it is readily apparent that the composite folded article can be treated simply as a binder and handled in the usual manner.

Supporting structure 14 illustrated in Figure 3 is shown fully extended having been displaced rearwardly by opening wide ring binder 12 to bring flanking side panel portions 20, 22 into side-by-side coplanar relation with central panel portion 18.

Follower pins 60, 62 carried by the shiftable strut formations 36, 38 and registered in upper anchoring pockets 28a, 30a as shown in Figure 2 by slight shifting inwardly of respective panel portions 20, 22 are released therefrom and are guided by the narrow channels presented by elongated slots 28, 30 under displacement downwardly in a somewhat diagonal direction towards lowermost anchoring pockets 28b, 30b.

Such movement swings central strut 34 rearwardly downwardly about fold axis 32 to present its lowermost edge 66 to a supporting surface 68 as revealed by Figure 5 and draws associated flanking side strut formations 36, 38 with it likewise presenting their lowermost edges 68, 70 respectively to surface 80.

Follow pins 60, 62 at the lowermost extent of their travel within slots 28, 30 are presented to anchoring pockets 28b, 30b and by slightly shifting panel portions 20, 22 are urged into interlocking relation therewith so that central and side panel portions 18, 20, 22 respectively are held against dislodgment in substantially fully extended side-by-side coplanar relation.

The extended configuration exhibited by the preferred embodiment of the composite article of Figures 3, 4 and 5 of the drawings likewise place the lowermost edges 70, 72, 74 of coplanar panel portions 18, 20, 22 in contact with surface 80 and with follower pins 60, 62 located within anchoring pockets 28b, 30b the entire structure is rigidified and assumes a substantial measure of stability.

So extended, the composite article illustrated exposes the contents of the ring binder 12 for examination or for viewing in the style of an easel or presents a work or display surface for any suitable purpose.

The conventional three-ring structure 76 of binder 12 in the several Figures 2 to 5 inclusive is optional but desirable where the structure is used as a notebook, since the pages when turned tend to lie flat against the inclined surfaces presented by the coplanar panel portions 18, 20, 22.

Removal of the three-ring structure 76 provides an extended flat surface for the mounting of drawings or for the displaying of products and the like.

It will be observed that the outermost panel portions 48, 50 of collapsible support structure 14 are constrained by respective slots 29, 30 and follower pins 60, 62 and associated components in sliding abutment against the rearward surfaces of flanking side panel portions 20, 22 throughout the range of movement from the disposition or attitude of Figure 2 to that of Figures 3 and 4.

This arrangement dictates controlled movement of the components so that whether the support structure 14 is seized and moved either into the collapsed or extended position the associated binder formation 12 is correspondingly displaced. Likewise, if the binder formation 12 is displaced the support structure 14 is correspondingly altered.

The positioning of slots 28, 30 is selected in the preferred embodiment so that they are as widely separated as possible which tends to afford maximum resistance of the erected article to deformation or collapse. Moreover, the strength of the composite article can be enhanced through the selection of more rigid or thicker sheet material for the integral panel portions.

It is also to be understood that the several panel portions derived from an integral sheet as revealed by Figure 1 can be separate and appropriately hinged together in any suitable manner but that a one-piece blank or layout as revealed by Figure 1 is preferred in that it minimizes costs.

The inclination of the binder panel portions 18, 20, 22 in the fully extended disposition of Figures 3, 4 and 5 can be altered by adjusting the relative dimensions of the respective front panel portions 18, 20, 22 of binder formation 12 and central strut 34 of the support structure 14 as by extending central strut 34 and associated flanking side strut formations 36, 38 for example, to achieve a more upright disposition and vice versa.

CLAIMS:

1. A collapsible support structure characterised by a combination of a cover formation including a stiff central panel portion (18) of generally uniform quadrilateral perimetral configuration arranged so as to present upper, lower and side edges and a pair of stiff side panel portions (20,22) flanking said central panel portion and hingedly connected thereto along opposite side edges for swinging movement from a closed position with side panel portions in opposed relation to a substantially fully extended open position in side-by-side coplanar relation with said stiff central panel portion and reversely; and means for supporting said cover formation in inclined relation from below with said aforementioned panel portions (20,22) disposed in said substantially fully extended open position, said supporting means including stiff central strut (34) having upper, lower and side edges hingedly interconnected adjacent its upper edge (32) to said central panel portion (18) to swing from a position thereagainst to a substantially upright position therebelow and shiftable stiff side struts (36,38) extending between each said side panel portions of said cover and said central strut and means for releasably anchoring said shiftable side strut means against relative displacement with said side panel portions, when said side panel portions are disposed in substantially coplanar side-by-side inclined relation with said stiff central panel portions.

2. A collapsible support structure as claimed in Claim 1, characterised in that each said shiftable side strut includes a panel portion (48,50) hingedly supported along a fold axis lying substantially in the plane of its respective side panel portion of the cover and remote from said first mentioned central strut means so as to slidingly

abut its respective side panel portion from below over the range of movement of said central strut from a folded position against said central panel portion and with said cover formation in the closed position to said substantially upright position therebelow and with said cover formation in the fully open position, with said anchoring means being presented by and extending between said hingedly supported panel portions (48,50) and said respective side panel portions (20,22).

3. A collapsible support structure as claimed in Claim 2, characterised in that each said shiftable side strut means includes a gusset panel portion (44, 46) hingedly interconnecting said hingedly supported panel portion (48, 50) to said central strut (34).

4. A collapsible support structure as claimed in Claim 3 characterised in that said anchoring means comprises a contoured slot (28, 30) and a slot follower (60, 62) for engaging in said contoured slot and following same under relative displacement, said contoured slot having an extent and configuration such that with relative movement of said central and shiftable side struts of said supporting means the same are displaced uniformly under swinging movement into and out of said substantially fully extended open position.

5. A collapsible support structure as claimed in Claim 4 characterised in that each of said side panel portions (20,22) presents a contoured slot (28,30) and each of said hingedly supported panel portions (48, 50) presents said slot follower (60,62).

6. A collapsible support structure as claimed in Claim 4 or 5, characterised in that each of said contoured slots (28, 30) is provided with anchoring pockets (28a, 28b, 30a, 30b) at its remote ends and offset in relation to the general direction of said slots whereby said slot followers (60,62) are

anchorable in said pockets when said cover formation is closed and when said cover formation is fully opened.

7. A collapsible support structure as claimed in any preceding c laim, characterised in that said stiff central strut (34) is hingedly interconnected to the upper edge (32) of said first mentioned stiff central panel portion (18).

8. A collapsible support structure as claimed in any preceding claim, characterised in that said cover formation and associated supporting means comprise a one-piece layout derived from suitable sheet material.

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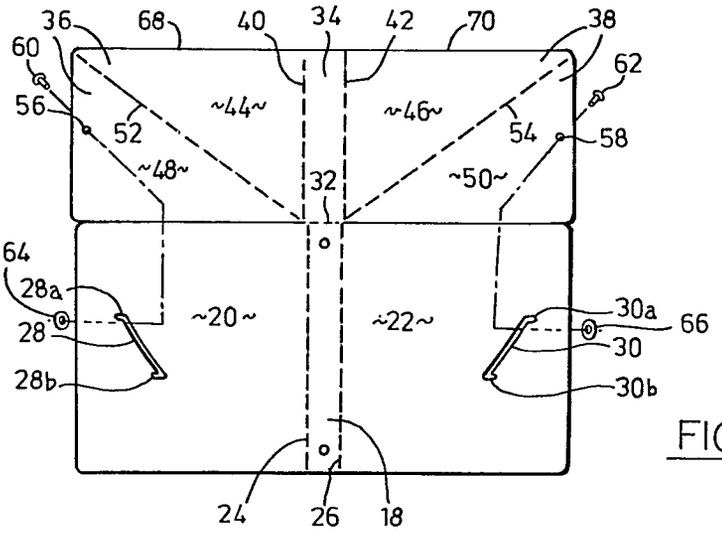


FIG. 1

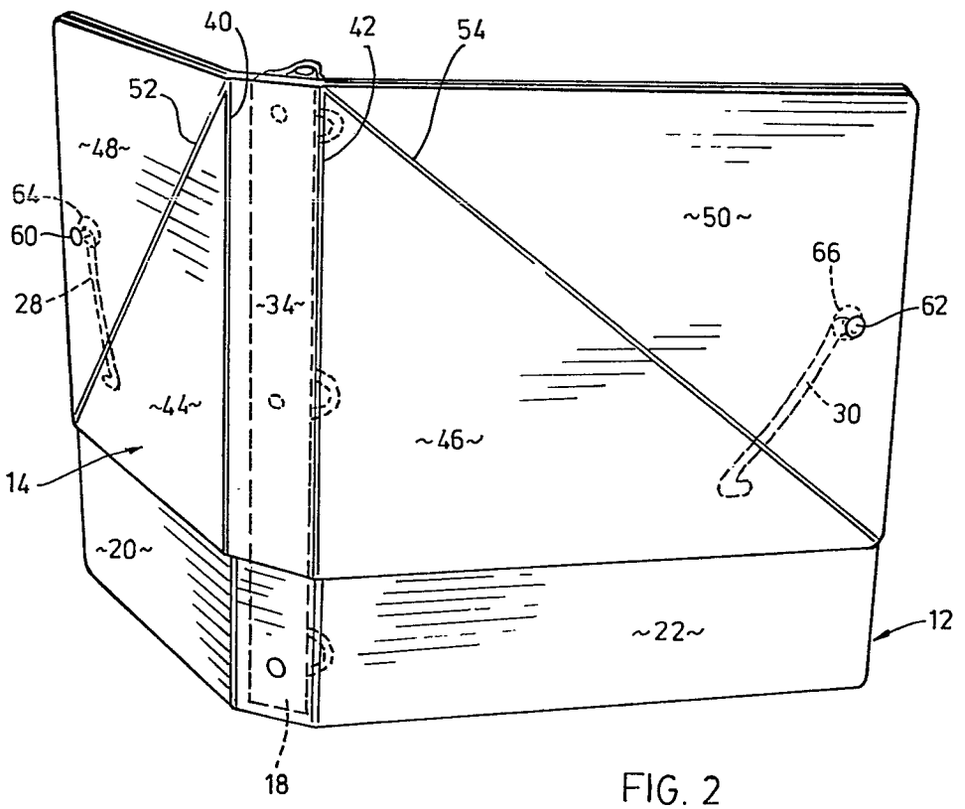


FIG. 2

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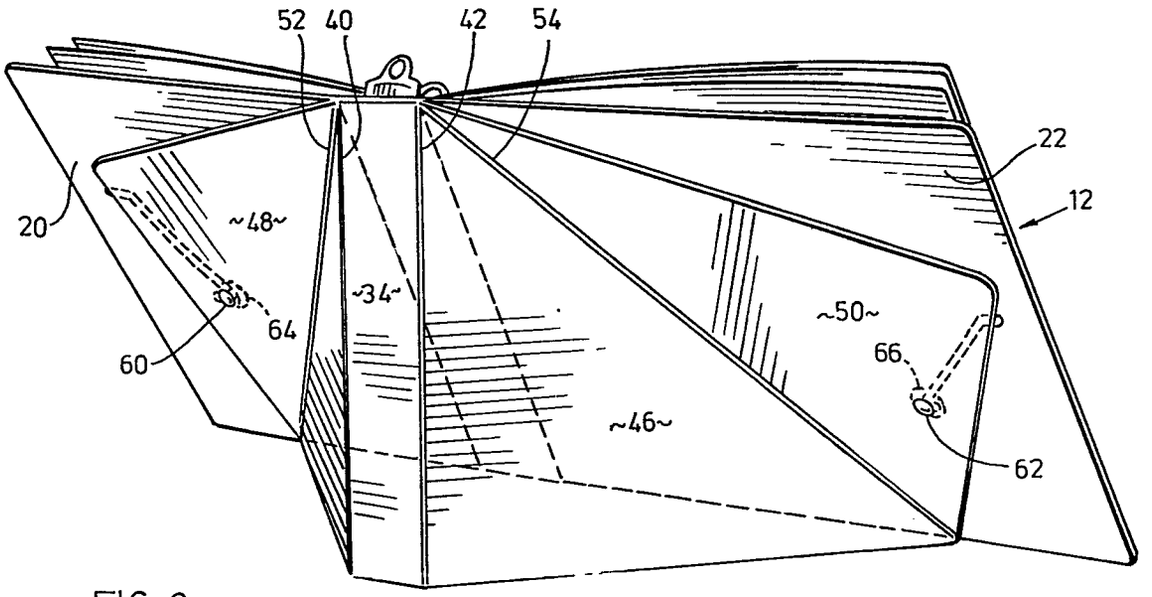


FIG. 3

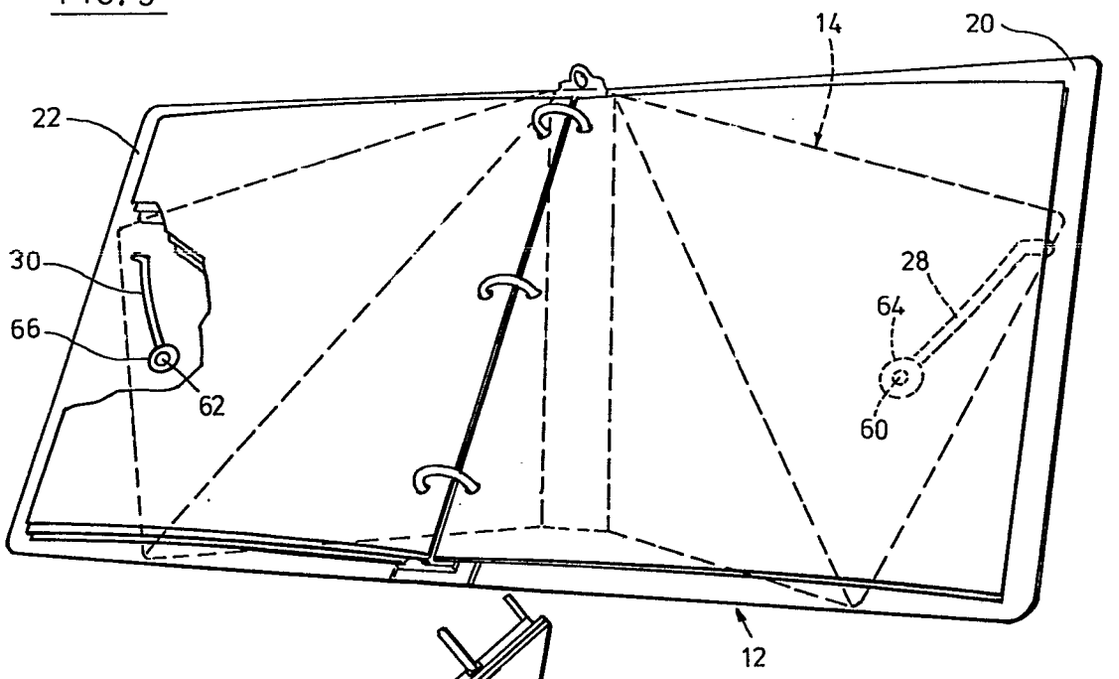


FIG. 4

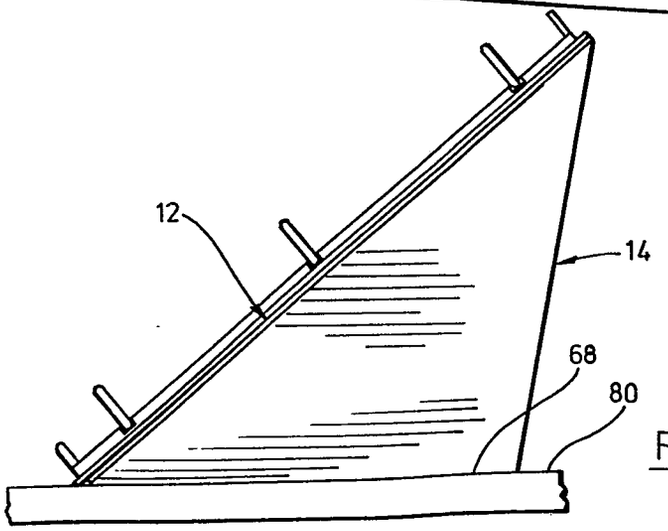


FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application number
0020166
EP 80 30 1815

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
D	US - A - 3 990 669 (on applicants' name) * Column 8, lines 12-50; figures 9-11 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 42 F 13/40

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 42 D
B 42 F
A 47 B
B 65 D
A 47 G
G 09 F

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05.09.1980	LONCKE

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