Sept 10, 1957 E. L. STEIN 2,805,504

DEMOUNTABLE DISPLAY PANEL AND EASEL COMBINATION

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Fig. 1.

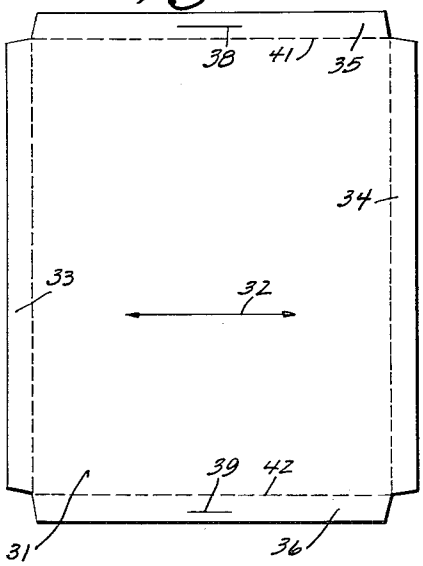


Fig. 2

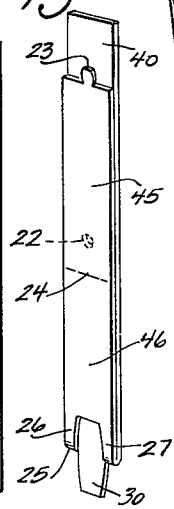
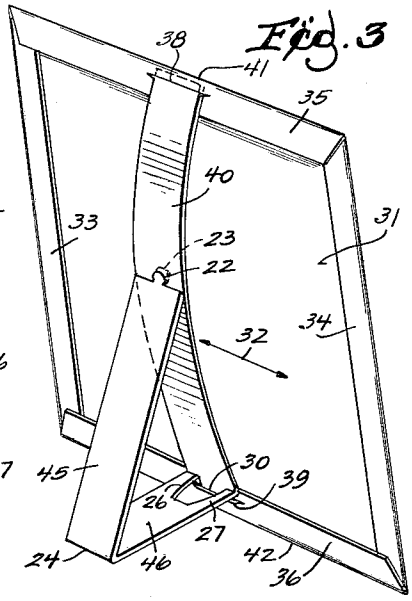


Fig. 3



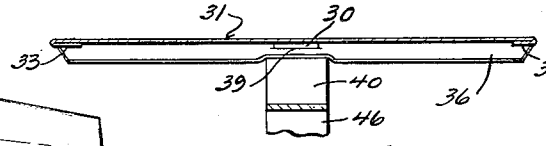
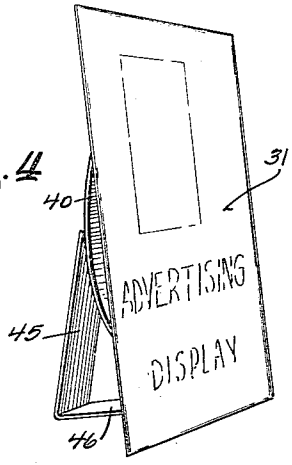


Fig. 6

Fig. 4



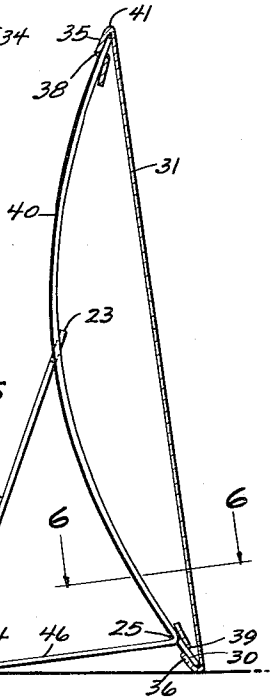
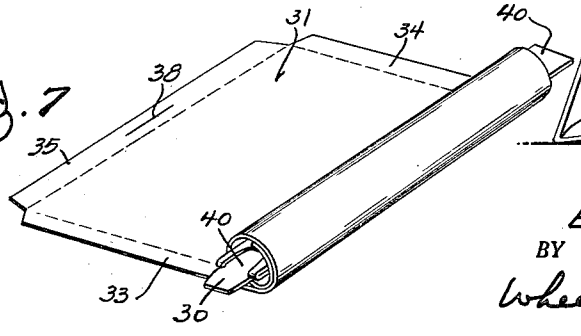


Fig. 5

Fig. 7



INVENTOR.
ELMER L. STEIN
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

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Fig. 8

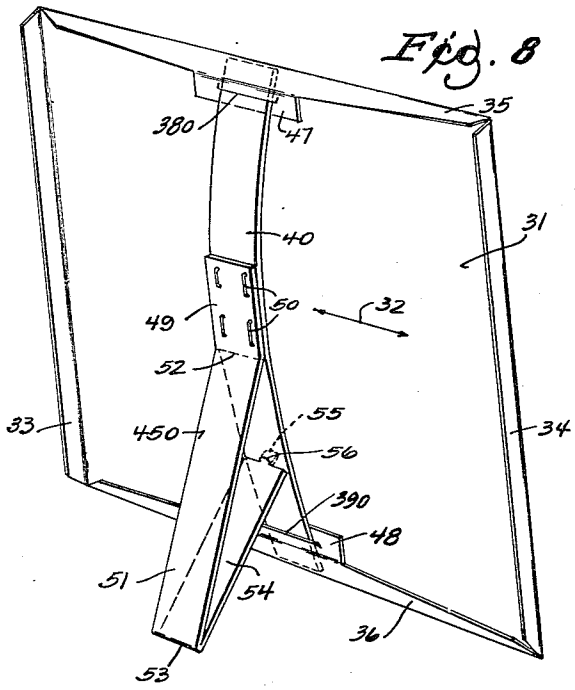


Fig. 9

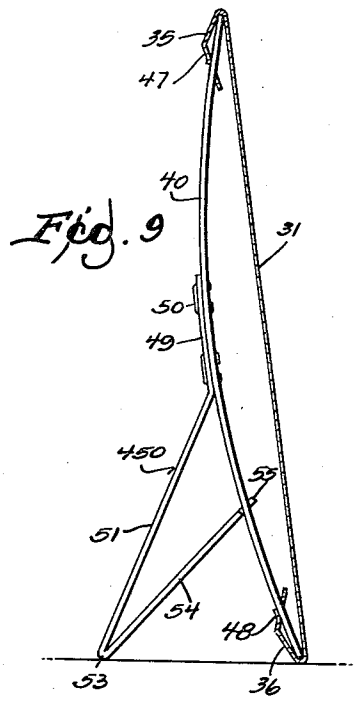


Fig. 10

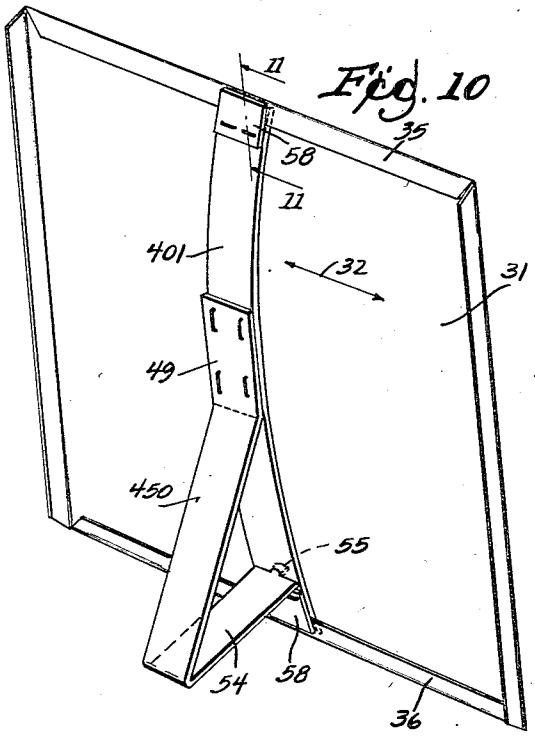
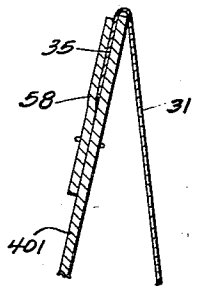


Fig. 11



INVENTOR.
ELMER L. STEIN
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

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DEMOUNTABLE DISPLAY PANEL AND EASEL COMBINATION

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Fig. 12

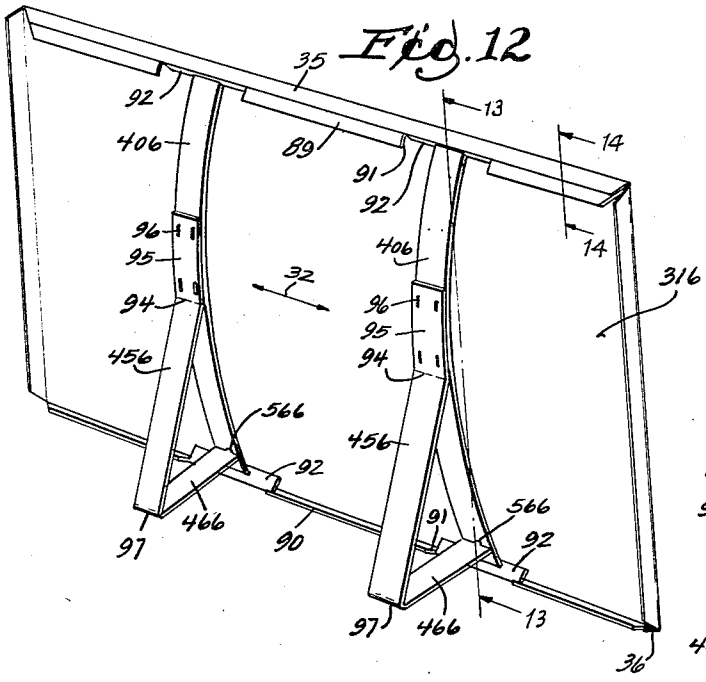
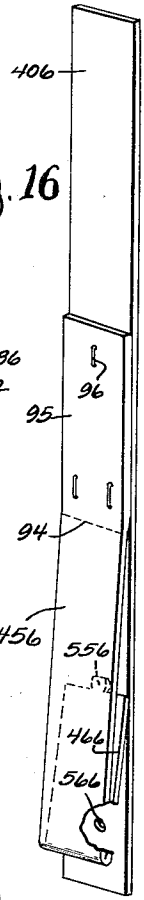


Fig. 16



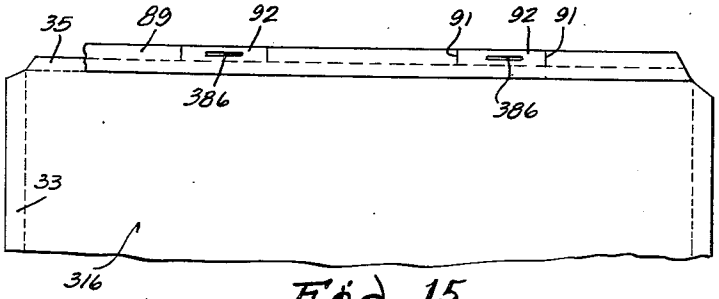


Fig. 15

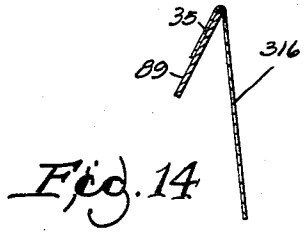


Fig. 14

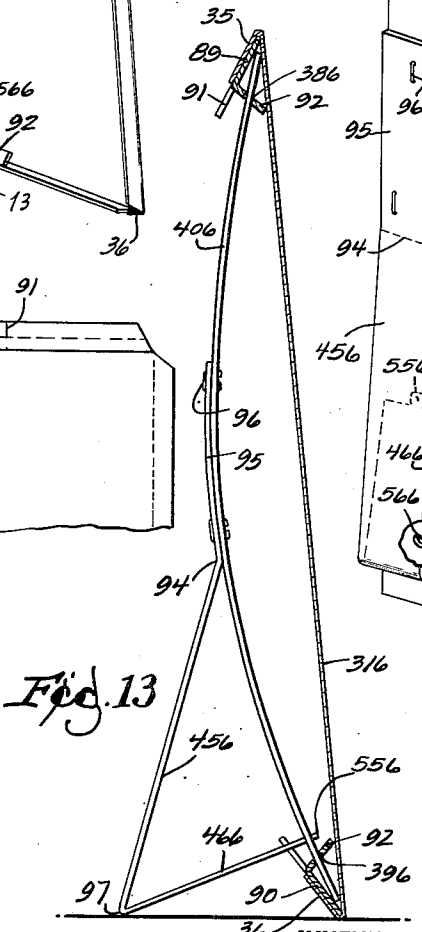


Fig. 13

INVENTOR.
ELMER L. STEIN

BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

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2,805,504

DEMOUNTABLE DISPLAY PANEL AND EASEL COMBINATION

Elmer L. Stein, Milwaukee, Wis., assignor to Eye-Beam Displays, Inc., Milwaukee, Wis., a corporation of Wisconsin

Application July 13, 1955, Serial No. 521,760

17 Claims. (Cl. 40—125)

This invention relates to a demountable display panel and easel combination.

Display panels, and especially those of large size, have heretofore been made almost exclusively of heavy board. This is not only expensive but has inevitably resulted in warpage, since heavy board is subject to bending in response to moisture which it picks up from the atmosphere. Moreover, such panels are relatively heavy and expensive to store and to ship.

The present invention represents the culmination of a series of experiments seeking to provide a light and inexpensive display panel which can be rolled for compact storage and shipment and can be erected or collapsed in a moment's time, and which, in use, will provide a perfectly flat display surface.

These objectives are achieved through the use of ordinary paper marginally stiffened by folding back integral flanges and held in its erect display position by an easel connected to the top and bottom of the panel and including a resiliently flexible member which must be bowed to engage its ends with the display panel, whereby the resilience of such member maintains the panel under tension.

The connections between the bowed easel element and the top and bottom of the display panel are of various types, all of which are calculated to facilitate easy erection and dismounting. The various easels disclosed also include several specifically different constructions, all of which fold flat to provide a core upon which the paper sheet comprising the display panel can readily be rolled when its reenforcing side flanges are folded back into the plane of the sheet.

Desirably, the ends of the bowed strut portion of the one or more easels used to support a given panel are engaged either directly with the top and bottom flanges of the panel or with slotted tabs connected with such flanges. In an organization of this type, the bow of the easel strut performs a function in addition to the tensioning of the panel. Because it extends outwardly from its terminal points of panel connection, it tends to maintain in rearward projection the re-enforcing flanges at the top and bottom of the panel which, if the strut were parallel to the panel, would also be forced into parallelism and would lose their re-enforcing value.

In an assembly of the type herein described, it is important that the grain of the panel stock be horizontal so that the tension of the easel strut is exerted in a direction which is transverse respecting the grain of the paper. It is also important that the brace portion of the easel shall, if deflection is required, be provided with a transverse score line to release tension which might otherwise destroy the resilient pressure exerted by the strut portion of the easel to maintain the panel taut.

In the drawings:

Fig. 1 is a view in rear elevation of a display panel prepared for use in an organization embodying the invention.

Fig. 2 is a view in perspective of one type of easel which may be used with the display panel of Fig. 1.

Fig. 3 is a view in three-quarter rear perspective showing the assembled easel end panel.

Fig. 4 is a three-quarter front view of the assembled easel and panel.

Fig. 5 is a view taken in vertical section through the assembly of easel and panel.

Fig. 6 is a view taken in front section on the line 6—6 of Fig. 5.

Fig. 7 is a perspective view showing the dismounted easel and panel in the process of being rolled up for storage or transportation.

Fig. 8 is a three-quarter rear perspective view of a modified easel and panel structure embodying the invention.

Fig. 9 is a view in longitudinal vertical section through the device of Fig. 8.

Fig. 10 is a view similar to Fig. 8 showing a further modified embodiment of the invention.

Fig. 11 is a detail view on an enlarged scale taken in section on the line 11—11 of Fig. 10.

Fig. 12 is a view in perspective showing a modified panel having a reenforced upper and lower margin.

Fig. 13 is an enlarged view taken in section in the plane indicated at 13—13 in Fig. 12.

Fig. 14 is a fragmentary detail view taken in section on the line 14—14 of Fig. 12.

Fig. 15 is a fragmentary detail view in plan showing the panel with its flange folded outwardly in preparation for shipment.

Fig. 16 is a detail view in perspective of the easel shown on an enlarged scale as it appears when folded for shipment.

As already indicated, the panel 31 comprises a sheet of ordinary paper with its grain running transversely as indicated by the arrows 32 in Fig. 1 and other views. The sheet of paper comprising panel 31 is cut to provide marginal flanges 33, 34, 35 and 36 along its top, side, and bottom edges. It will be observed that the ends of these flanges are not cut at right angles. In practice, they are bent in somewhat beyond positions at right angles to the plane of the display panel 31, as clearly appears in Figs. 3 and 6.

Flanges 35 and 36 are provided with slits 38 and 39 to receive the ends of the strut portion 40 of the easel shown in Fig. 2. The length of this strut portion exceeds the overall height of panel 31 between the flanges 35 and 36. With the several flanges turned rearwardly and inwardly as shown in Fig. 3, the upper end of the strut is inserted into slit 38 at the top side of panel 35 to engage in the bight or fold 41 between flange 35 and the panel. The tongue 30 at the lower end of the strut portion 40 of the easel is similarly inserted into the slit 39 to engage in the bight or fold 42. Because of the relative dimensions of the parts, the cardboard strip comprising strut 40 is bent into an arc as shown in Figs. 3 and 5 in which its inherent resilience is exerted transversely of the grain of panel 31 to maintain the panel stretched taut in a vertical direction.

Because of the marginal flanges 33, 34, 35, and 36, the side margins of panel 31 are stiffened and kept perfectly flat, notwithstanding that the tension of the easel strut 40 is exerted only at the center of the panel.

If the panel is to be propped against some other support, no easel brace will be required. However, if the panel is to be maintained erect solely through means provided by the easel, the easel will desirably have a unitary brace or leg 45 which lies flat against the strut portion in the folded position of the easel shown in Fig. 2. The brace or leg 45 is integrally connected with strut 40 by a linking portion 46 from which tongue 30 is cut. The leg portions 26 and 27 at each side of tongue 30 have

fold line connections at **25** with the strut. Another fold or score line at **24** enables the brace **45** and linking portion **46** to be relatively hingedly movable from the aligned position of Fig. 2 to the angular relationship as shown in Figs. 3 and 5. The free end of the brace **45** has a tongue at **23** which, in the erected position of the easel, is received into an opening provided at **22** in strut portion **40**. With the easel in use as shown in Fig. 3, the brace or leg **45** projects at a tangent to the arc of the strut and is of such a length as to engage a shelf or table surface to hold the easel nearly erect as best indicated in Figs. 4 and 5.

Regardless of any ordinary weather conditions, the organization described will maintain its stiffness and rigidity during use and it gives a better appearance to advertising matter on the face of the easel than as if such matter were printed on the face of a mounting board such as has frequently been deemed necessary.

Yet it is but the work of a moment to flex the strut portion **40** of the easel and withdraw its ends from the slits **38** and **39**; to fold outwardly into the plane of the panel its several flanges **33**, **34**, **35** and **36** and to wrap the panel sheet in a roll about the easel in the manner clearly shown in Fig. 7.

For many purposes, and particularly where the display panel is to have large dimensions, the construction shown in Figs. 8 and 9 may be preferred to that shown in Figs. 1 to 7. The display panel **31** remains substantially unchanged, being provided with the flanges **33**, **34**, **35** and **36** as already described. However, instead of providing the easel strut slits directly in the flanges **35** and **36**, the embodiment here under consideration includes tabs **47**, **48** projecting from the flanges and provided with the strut-receiving slits at **380** ad **390**. It is found that the use of the tabs at **47** and **48** permits the flanges **35** and **36** to extend outwardly at a greater angle to the plane of the panel **31** than is the case when the strut **40** is engaged directly with the flanges in the manner shown in Figs. 1, 3, 5 and 6.

The easel shown in Figs. 8 and 9 differs slightly from that shown in Figs. 2, 3 and 5, but the differences in the easel have nothing to do with the tabs **47** and **48**, since the easel shown in Figs. 2 and 3 could also be used with the panel organization of Figs. 8 and 9. In Figs. 8 and 9, the strut **40** is unchanged. The brace **450** has its portion **49** which is held by staples **50** to the strut portion **40** of the easel. It has another portion **51** connected with portion **49** at a score line or the like **52**, the purpose of which is to weaken the fiber of the brace **51** sufficiently so that the brace will not exert on the strut **40** a tension counter to that relied upon to make the panel taut.

The brace **51** has a further transverse score line at **53** from which a portion **54** extends upwardly to connect the lower end of brace portion **51** with an intermediate part of strut **40**. The connection may be made by forming a tongue at **55** on the end of the linking portion **54** of the brace and engaging it in an aperture **56** in strut **40**. The fold line **53** rests on the table or shelf to support the organization in a nearly erect position.

In the construction shown in Figs. 10 and 11, the upper and lower ends of the strut portion **401** of the easel are engaged with the upper and lower flanges **35** and **36** of the panel by means of a clamping arrangement. Stapled to each end of the strut **401** is a ply **58** of cardboard or the like which is free at its end so that the margin of the flange may be inserted as shown in Fig. 11. Otherwise the easel may be similar to any of the other easels herein illustrated. In this particular embodiment, the easel is shown to conform in respects other than the clamping engagement aforesaid to the easel illustrated in Figs. 8 and 9 .

The construction shown in Figs. 12 to 16 is believed to be the most desirable of those disclosed when the panel is extremely large, as is panel **316**. In this construction, the upper panel flange **35** and the lower panel flange **36** are both reenforced by strips of cardboard or the like

as shown at **89** and **90**, respectively. These open out perfectly flat for purposes of shipment as shown in Fig. 15. Wherever easels are to be used (any number can be applied, depending on the size of the panel), the cardboard reenforcing strips are slit at **91** inwardly from their margins for substantially less than the width of the flange to form tabs **92** which are foldable inwardly and slotted at **386** and **396** to receive respectively the upper and lower ends of the strut member **406**. The flanges are wide enough so that the slitting to form tabs **92** does not impair their panel-stiffening function.

The strut member is engaged in the slots to seat in the angle and to hold the reenforcing cardboard strips **89** and **90** and their associated panel flanges **35** and **36** at acute angles to provide pockets in which the ends of the strut are closely confined as best shown in Fig. 13. In this embodiment, the leg or brace member happens to comprise a separate strip of cardboard **456** scored transversely at **94** and having its upper end portion **95** fastened in any appropriate manner, as by staples **96** to an intermediate portion of the strut **406**. At the lower end of the leg or brace **456**, the cardboard is transversely folded at **97** and the free end portion provides the link **466**, the terminal tongue **556** of which is received into an opening **566** in the strut to complete the assembly.

In actual commercial practice, it has been demonstrated that the several panels herein disclosed are much less expensive to produce and ship and much more satisfactory in service than panels previously known. While they are not equivalent in all respects, and some of them are greatly to be preferred for certain uses, they all have the quality of being tensioned across their grain by portions of the easel and being provided with marginal flanges with which easel portions cooperate to the end that the edges of the panel are stiffened and the panel as a whole is maintained perfectly flat, regardless of its size, a result never heretofore achieved with a paper or paperboard product.

I claim:

1. The combination with a flexible panel having top and bottom flanges disposed at acute angles thereto and also having side flanges projecting angularly from the plane of the panel, of an arcuately bowed resiliently flexible strut having ends extending into the angles between the panel and the said top and bottom flanges, means terminally connecting the strut with said top and bottom flanges and holding said top and bottom flanges at acute angles to the panel, said strut being biased in a direction tending to be elongated whereby to stretch the panel between the flanges with which the strut is connected, said panel having a definite grain extending transversely of the direction in which the strut extends between said means, whereby strut thrust is exerted on said panel across the grain thereof.

2. A display panel of light flexible sheet material having angularly disposed marginal reenforcing flanges at its upper and lower margins provided with slotted portions at the rear of the panel, and an arcuately bowed resiliently flexible strut having sufficient strength to tension the panel and having its ends extending through the slots into the angles between the panel and the slotted portion of the reenforcing flanges and seating in said angle, the resilience of the strut subjecting the panel to tension between its said flanges and the inter-engagement of the strut and slotted portions of said flanges maintaining the slotted portions of the flanges disposed at acute angles respecting the panel.

3. The device of claim 2 in which a piece of cardboard comprising an apertured reenforcing strip extends along a flange, the aperture of the reenforcing strip providing the slot in which a strut end is engaged.

4. The combination with a flexible sheet having at its opposite ends marginal reenforcing flanges, an arcuately bowed resiliently flexible cardboard strut, means connecting said strut at one of its ends to one end of the sheet at one of the flanges, the flange at the other end of the

sheet being provided with a slot into which the other end of the strut extends from the outside of the flange inwardly into the angle between the flange and the sheet, the strut being of such length as to be maintained arcuately bowed when its end is engaged in the slot and having sufficient resilience to maintain the sheet under tension, the said strut end engaged in the slot of the last mentioned reenforcing flange serving to hold said flange at an acute angle to reenforce the sheet and to pocket the said strut end.

5. The device of claim 4 in which the slotted reenforcing flange comprises a reenforcing cardboard strip connected with said sheet and having at least a portion at said acute angle and provided with said slot through which the last mentioned end of the strut extends.

6. A display panel comprising a thin flexible sheet having angularly folded marginal flanges provided with slots in combination with a relatively stiff and resiliently flexible strut having terminal means engaged in respective slots from the outside of the flanges into the angle between the flanges and the panel and of such length as to be confined between the respective panel flanges under compressive pressure and in an arcuately bowed form whereby the panel is tensioned and the respective flanges are held by the strut at a panel-reenforcing angle.

7. The device of claim 6 in further combination with brace means connected with the strut and constituting therewith a support for the panel.

8. The device of claim 7 in which the brace and panel have a connecting link holding the brace outwardly from the strut as a leg to constitute the strut and brace and link as an easel.

9. The combination with a flexible panel having opposite marginal flanges disposed at acute angles thereto and also having flanges extending along its other margins and projecting at an angle to the panel, of an arcuately bowed resiliently flexible strut having ends extending into the angles between the panel and the flanges at opposite margins of the panel, means terminally connecting the strut with said first mentioned flanges at opposite margins of the panel and holding said flanges at acute angles to the panel, said strut being biased in a direction tending to be elongated whereby to stretch the panel between the flanges with which the strut is connected.

10. The combination with a flexible panel having flanges disposed at acute angles to opposite margins and also having angularly disposed flanges along its other sides, of an arcuately bowed resiliently flexible strut having ends extending into the angles between the panel and the flanges at opposite margins of the panel, means terminally connecting the strut with said flanges at opposite margins of the panel, and holding said flanges at acute angles to the panel, said strut being biased in a direction tending to be elongated whereby to stretch the panel between the flanges with which the strut is connected, the connection between the panel and strut comprising a flange clamping means at least at one end of the strut, the clamping means including strut portions on one side of the flange and a substantially parallel clamp member connected with the strut and disposed at the other side of the flange.

11. The combination with a flexible panel having opposite marginal flanges disposed at acute angles thereto and also having flanges extending along its other margins and projecting at an angle to the panel, of an arcuately bowed resiliently flexible strut having ends extending into the angles between the panel and the first mentioned flanges at opposite margins of the panel, means terminally connecting the strut with said flanges at opposite margins of the panel, and holding said flanges at acute angles to the panel, said strut being biased in a direction tending to be elongated whereby to stretch the panel between the flanges with which the strut is connected, the means terminally connecting the strut with one of the first mentioned panel flanges comprising a flange portion having a slot through which the end of the strut projects, the said strut end being confined between the panel and the last mentioned flange.

12. The combination with a flexible panel having opposite marginal flanges disposed at acute angles thereto and having flanges along its other sides at an angle to the panel, of an arcuately bowed resiliently flexible strut having ends extending into the angles between the panel and the flanges at opposite margins of the panel, means terminally connecting the strut with said flanges at opposite margins of the panel, and holding said flanges at acute angles to the panel, said strut being biased in a direction tending to be elongated whereby to stretch the panel between the flanges with which the strut is connected, the said means terminally connecting the strut with one of the panel flanges comprising a cardboard extension of said last mentioned flange.

13. In a display device, the combination with a flexible sheet comprising a planiform panel portion having rearwardly bent angularly related flanges extending along the stop, side and bottom margins of said panel, of an arcuately bowed resiliently flexible cardboard strut having its ends engaged with opposite ends of said sheet at the flanges of said ends and intermediate the sides of the sheet, said strut exerting tension on said sheet between the flanges with which it is connected, the side flanges of said sheet maintaining the panel portion of the sheet flat and unwrinkled notwithstanding the localized pressure exerted by the strut.

14. In a display device, the combination with a flexible sheet comprising a planiform panel portion having rearwardly bent flanges extending along the top, side and bottom margins of said panel, of an arcuately bowed resiliently flexible cardboard strut having its ends engaged with opposite ends of said sheet at the flanges of said ends and intermediate the sides of the sheet, said strut exerting tension on said sheet between the flanges with which it is engaged, the side flanges of said sheet maintaining the panel portion of the sheet flat and unwrinkled notwithstanding the localized pressure exerted by the strut, the flanges of the sheet at the ends engaged by the strut end having slots through which the ends of the strut extend into the bight between the respective flanges and the panel portion of the sheet, whereby to maintain said last mentioned flanges folded inwardly and to maintain a pocket in which the ends of the strut are anchored and from which they are readily releasable upon the further flexing of the strut.

15. In a display device, the combination with a flexible sheet having a planiform panel portion provided with reenforcing means extending along two opposite margins and having side flanges extending along the other two margins and comprising integral portions of said sheet extending rearwardly from said planiform panel at an angle thereto, of a flexible strut of greater length than the length of said panel portion between the said reenforced margins of said sheet, said strut being fastened to the reenforced margins of the sheet intermediate the side flanges thereof, whereby the strut exerts tension on the panel portion of the sheet between the reenforced margins with which it is connected, the side flanges maintaining the panel portion of the sheet flat and unwrinkled notwithstanding the localized pressure exerted by the strut.

16. In a display device, the combination with a flexible sheet having a planiform panel portion provided with reenforcing means along two opposed margins and with flanges along its intervening side margins which extend rearwardly at an angle to the panel portion, of means exerting a tensioning bias upon the reenforced margins of said sheet tending to stretch said panel portion, the said side marginal flanges extending in the general direction in which said bias is exerted and maintaining the panel portion of the sheet flat and unwrinkled notwithstanding the localized pressure exerted by the tensioning means.

17. The device of claim 15 in which the sheet has its grain extending transversely with respect to the strut, the flanges at the sides of the sheet extending in the general direction of the strut and being joined to the panel portion of the sheet upon fold lines which are transverse respecting the grain.

References Cited in the file of this patent

UNITED STATES PATENTS

1,485,846	Griffin	Mar. 4, 1924
1,570,656	Wertz	Jan. 26, 1926
1,603,622	Marsh	Oct. 19, 1926
1,699,735	Dabrohua	Jan. 22, 1929
1,737,729	Petigor	Dec. 3, 1929
2,160,724	Fletcher	May 30, 1939
2,355,625	Moore	July 11, 1944
2,376,180	Paige	May 15, 1945
2,614,353	Goldman	Oct. 21, 1952