Oct. 3, 1961 C. N. CROSS 3,002,720

HINGE JOINTS FOR DISPLAY MOUNT ELEMENTS

Filed March 30, 1959

Fig. 1.

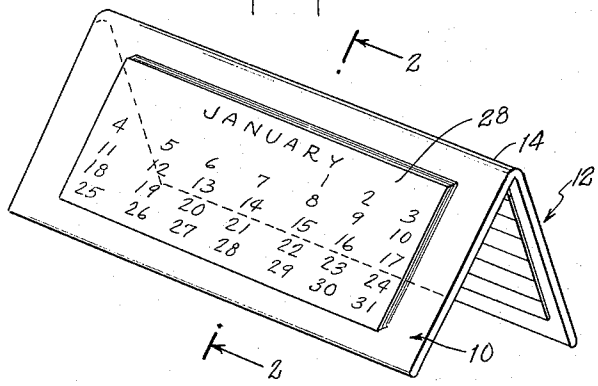


Fig. 2.

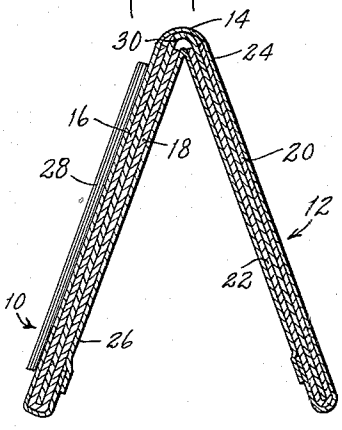


Fig. 3.

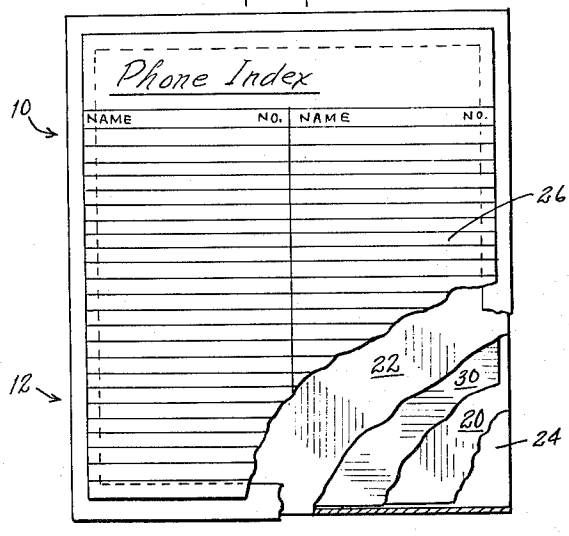
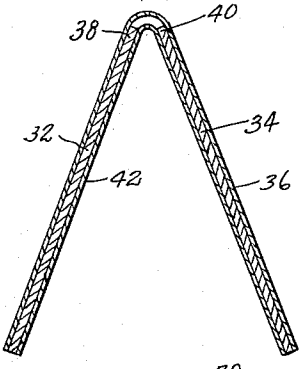


Fig. 4.



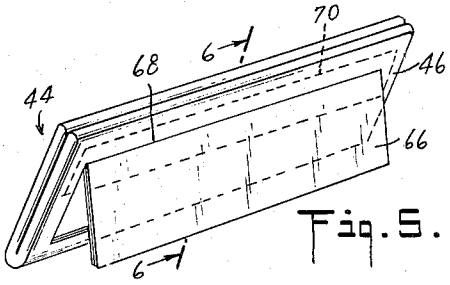


Fig. 5.

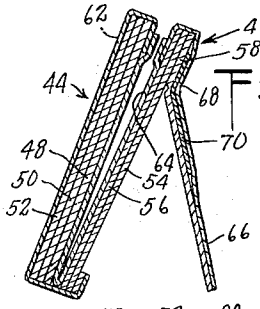
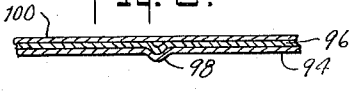


Fig. 6.

Fig. 8.



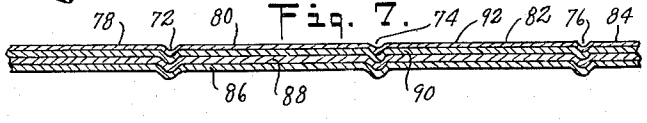


Fig. 7.

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United States Patent Office 3,002,720 Patented Oct. 3, 1961

3,002,720

HINGE JOINTS FOR DISPLAY MOUNT ELEMENTS

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Filed Mar. 30, 1959, Ser. No. 802,914
4 Claims. (Cl. 248—35)

This invention relates to display mounts. More particularly, the invention relates to hinge structures for display mounts constructed of paper stock for support in a generally upright display position on a flat surface such as a desk, for example.

Mounts having a facial display material supporting panel are usually provided with a leg, prop or an easel-like structure which is ordinarily folded flat against the display panel assembly, but which can be rotated about a hinge line into angular relation to the display panel assembly such that a support is provided for holding the display panel assembly in an appropriate, generally upright, display position. All such display mounts heretofore have required a latch, ribbon or a locking tongue to maintain the leg, prop or easel-like element in a more or less fixed angular position in respect to the display panel assembly.

Display mounts of the type described, require special fabricating and assembling operations for the formation and installation of leg, prop or easel-controlling latches, ribbons or locking tongues; they largely lack means for adjusting the angle of repose at which the display panel can be supported; and latches, ribbons and locking tongues mutilate, obscure and render inaccessible and restrict the use of surface areas of the mount which might otherwise be used to great advantage for the display of printed matter or written information.

Paper stock, such as cardboard and leatherette materials ordinarily used in the construction of display mounts, has a resilience, particularly when new, which causes it to recoil to an original state when released from bending stresses. These same materials lose their self-sustaining elastic properties when subjected to repeated flexing and bending. Therefore, these materials are not well adapted per se to serve as hinge elements in mount structures unless their position is controlled by devices such as referred to above.

It is, therefore, the primary object of this invention to provide improved hinge joints for display mounts and particularly in mounts formed of paper stock materials.

It is a further object of the invention to simplify display mount structures by eliminating all prop latches, ribbons, locking tongues and like structures, heretofore used to limit the movement of supporting legs, props and the like, and thereby render mounts easier and cheaper to manufacture and also preserve a greater amount of their surface area for printed or written intelligence.

It is still a further object of the invention to provide hinge structures for display mounts which permit hinged mount components to be reposed in a wide range of angular adjustments in respect to each other.

Furthermore, it is an additional objective to provide such hinge structures which can be operated a great number of times without showing evidence of fatigue.

The objectives of the invention are secured herein by constructing hinge joints in mount structures of flexible but substantially non-resilient materials which, under bending stress, develop no potential energy which would cause them to recoil or collapse upon release of the stress.

Specifically, it is contemplated to incorporate into the hinge line of display mount elements a thin sheet of flexible ductile material which is tractable and displays a mechanical hysteresis to change of form or position after bending. Hinge joints so constructed permit the

mount elements so hinged to each other to be angularly disposed to each other through a wide range of positions without any tendency to change from the adjusted position.

Other objects and advantages of the invention will be stated in the following detailed description or will be apparent therefrom, which description is to be read in conjunction with the drawing forming a part of this application, in which drawing like reference numerals indicate like parts, and in which:

FIG. 1 is a perspective view of a currently popular desk calendar mount consisting of a face panel assembly and a back panel assembly hinged to each other along a hinge line incorporating the invention herein;

FIG. 2 is a sectional view along line 2—2 of FIG. 1;

FIG. 3 is a view showing the inturned faces of the mount of FIG. 1;

FIG. 4 is a mount similar to that shown in FIG. 1 showing, however, a simplified and modified structure;

FIG. 5 is a perspective view of a modified mount structure showing the invention embodied in a mount supporting leg hinge which is formed in a back panel of the mount;

FIG. 6 is a sectional view on line 6—6 of FIG. 5;

FIG. 7 is a fragmentary view of press-scored hinge joint structures in which the invention hereof is embodied; and

FIG. 8 is a fragmentary view of a modified press-scored hinge joint structure in which the invention hereof is embodied.

The drawing illustrates a plurality of different types of mounts in which the invention is embodied. These several forms are merely suggestive of the wide variety of mount forms in which the invention can be utilized to good effect.

FIGS. 1 through 3, and also to some extent FIG. 4, illustrate a mount of the general class shown in my Patent 2,825,516, granted March 4, 1958. In that patent, as in the figures named, is disclosed a display mount having a face panel assembly **10** and a substantially coextensive back panel assembly **12** hinged thereto along a horizontal axis **14**, the back panel assembly **12** constituting a supporting leg when the panel assemblies **10** and **12** are swung apart. The present invention is designed specifically to eliminate the latching tongue extending between the face panel assembly and the back panel assembly of the above-identified patent.

In FIG. 1, the face panel assembly **10** and the back panel assembly **12** are each composed of a pair of cardboard panels preferably of substantially equal size folded upon each other. Thus, by reference to FIG. 2, it can be seen that the face panel assembly includes a cardboard face panel **16** and a similar cardboard back panel **18**. The back panel assembly **12** includes a face panel **20** and a back panel **22**. The face panel assembly **10** and the back panel assembly **12** are disposed with two of their longitudinal edges in spaced parallel relation and are then bound together by adhesively attaching to the faces thereof a decorative binding material **24** which spans the space between the adjacent parallel edges of the assemblies. The decorative binding material **24** is brought about the edges of the assemblies and terminates on the rear face thereof where a flexible liner **26** is adhesively applied to cover the rear face of the assemblies and the terminal edges of the binding material **24**.

In the form of mount shown in FIGS. 1 through 3, a month-to-month calendar pad **28** is fixed to the outer surface of the face panel assembly **10**, while the liner on the rear face of the panel assemblies is suitably printed, as shown in FIG. 3, for the receipt of notations, such as telephone numbers, requiring recurring reference.

As thus far described, the mount of FIGS. 1 through 3

would require a latching tongue or the like, to maintain the structure in the position illustrated in FIGS. 1 and 2 against collapse. By resort to the present invention, however, such latching arrangements are eliminated and ready reference to the entire inner face of the assembly structure is possible.

In the structure of FIGS. 1 through 3, and as more particularly shown in FIG. 2, a thin flexible sheet of substantially non-resilient material 30 is incorporated in the mount structure such as to span the hinge line 14 about which the face panel assembly and the back panel assembly are adapted to rotate. As shown in FIG. 2, the flexible, ductile sheet is located between the panel boards of which the face panel assembly and the back panel assembly are formed. Thus, the sheet 30 extends downwardly between the cardboard panels 16 and 18 comprising the face panel assembly 10 and also downwardly between the cardboard panels 20 and 22 constituting the back panel 12.

As stated, the ductile sheet 30 is tractable and displays a mechanical hysteresis to change of form or position after bending. Any number of such materials are available to those skilled in the art. Ductile metal sheets and foils have been employed to good advantage. In one specific application of the structure, a soft ductile aluminum sheet has demonstrated the efficiency of the invention. It is contemplated that the thickness of the sheet will be chosen according to the requirements of any particular mount form and as such, it is contemplated that a sheet between .003 to .020 of an inch in thickness will be sufficient for most purposes. A soft aluminum sheet, or foil, lends itself ideally to the purposes of the invention, but similar soft, thin, flexible sheets of other metals, such as tin, zinc, copper or lead are equally useful.

When the mount of FIGS. 1 through 3 is placed upon a surface such as a desk, the face panel assembly 10 and the back panel assembly 20 may be adjusted into a desired angular relationship to each other such as to present the calendar 28 on the face panel assembly at the proper angle for comfortable viewing from either a seated or standing position. Furthermore, the mount can be opened such that free visual access to the data printed or written on the liner sheet 26 is quickly available.

It can be seen that when reference to the intelligence on the liner sheet 26 is frequent, that the hinge line in which the ductile sheet 30 is incorporated, will be subject to repeated flexing. Experience has shown that when a thin, flexible metal sheet, such as above described, is used that the number of times the hinge structure is operated has little effect on the amount of fatigue that is shown by the joint. This is particularly true when the thin flexible material is a soft metal sheet or foil. These soft varieties of metal appear to show little or no fatigue after repeated flexing.

FIG. 4 shows a modification of the mount structure of FIGS. 1 through 3. In FIG. 4 a pair of panels have a thin metal foil facing material which forms the hinge line between the panels. Thus, a face panel 32 of suitable material, cardboard for example, and a back panel 34, suitably of the same material, are connected together by means of a thin ductile metal facing material 36. This material can suitably be an aluminum foil, as above described, because aluminum is readily available in brilliant and attractive colors and lends itself readily to embossing such that the foil or sheet facial surfaces of the mount can be suitably embossed. The metal foil 36 in FIG. 4 is attached to the face of the face panel 32 and also to the face of the back panel 34 such that it spans the parallel facing edges 38 and 40 of the panels 32 and 34, respectively. A lining material 42 is attached to the rear face of the panels 32 and 34 such that it covers the inner faces of the panels 34 and 32. The lining material 42 may be suitably printed or prepared for the receipt of information which requires repeated reference, and may include mounted printed sheets or a small booklet.

In the structure of FIG. 4 the metallic facing is not bound about the bottom edges of the panels 32 and 34, as in the case of the facial binding material 24 in FIG. 2, but both the facing 36 and the liner 42 terminate at the bottom edges of the panels 32 and 34, and also by preference at the lateral edges of the panels in the area of the hinge joint. If desired the mount of FIG. 4 may eliminate all binding of bottom and lateral edges which adapts the same to the simultaneous cutting of multiple mount structures from large pre-lined and pre-faced sheets of mount stock.

It should be particularly noted in respect to the externally applied metal foil sheet as in FIG. 4 that there is a substantial difference between the material herein utilized and the metal which is ordinarily employed for the formation of the conventional metal desk calendar or display mount. In the latter structures, the metal is substantially rigid, in most cases quite resilient and heavy. All of this results in a mount structure which is apt to scratch surfaces on which it is reposed, which is costly to mail by reason of its weight, and which frequently cuts through mailing envelopes by reason of sharp metal edges. In contrast to the foregoing, the thin, flexible ductile sheet or foil on the face of a mount structure does not add substantially to the weight, it possesses no sharp edges or corners, even though the metallic facing is turned about supporting edges of the mount, which are apt to scratch a supporting surface, and it shows no tendency to break or cut through mailing envelopes. The desirable hinge effect of the flexible ductile sheet or foil is not present in rigid, self-sustaining metals and such metals, therefore, lend no enhancement to the hinge operation. When the ductile metal is facially applied as shown in FIG. 4, and does not extend about the supporting edges of the mount, the mount, when erected, will rest on the cardboard panel edges which are so soft as to do no injury to even the most delicate surfaces.

The forms of the invention hereinabove described suggest the use of metal sheets and foils which are substantially coextensive in size with the panels or panel assemblies joined together by such sheets and foils. It is not to be implied, however, that this is necessarily the case. All that is necessary is that the ductile material be effective in the area of the hinged joint. Thus, in those forms shown in FIGS. 1 through 4, the hinge material may be considerably shorter or it may be of less width.

The facing sheet 36 of FIG. 4 is most effective if it covers the entire outer surface of the face panel 32, but this is not essential nor need it extend over the entire face of the back panel 34. In such case, decorative leatherette binding material may be employed to cover the cardboard panel or panels in areas where the metal sheet or foil does not extend.

The concept of using a patch of flexible ductile metal is embodied in FIGS. 5 and 6. These figures represent a mount of the general class disclosed in my Patent 2,355,706, issued August 5, 1944, which mounts are characterized by a supporting prop formed in the back panel assembly.

In FIGS. 5 and 6, a face panel assembly 44 and a back panel assembly 46 are constructed of a plurality of substantially coextensive cardboard panels such that a display window may be formed in the face panel assembly and a mount supporting prop such as described in my aforesaid Patent 2,355,706 may be formed in the back panel assembly. Accordingly, the face panel assembly is composed of a plurality of like cardboard elements 48, 50 and 52, while the back panel assembly is composed of a plurality of similar cardboard elements 54, 56 and 58. The face panel assembly 44 and the back panel as-

sembly **46** are suitably joined together by a decorative flexible binding material **62** which is attached to and covers the facial surfaces of the assemblies. The binding material **62** extends about the edges of the panel assemblies and terminates on the rear face thereof.

It is contemplated that a lining sheet **64** be attached to the rear face of the panel assembly such that it covers the terminal edges of the decorative binding material **62** and provides a surface for data requiring recurring reference. Visual access is afforded to the data on the lining sheet **64** by forward rotation of the face panel assembly **44** about the hinge line at the bottom of the structure where the two assemblies are connected by the decorative facing material **62** and the liner sheet **64**.

By reference to FIGS. 5 and 6, it can be seen that a supporting leg **66** generally similar to that shown in my Patent 2,355,706 is formed in the back panel assembly **46** by cutting through the backboard and overlying binding material, such that the leg **66** can swing rearwardly about a hinge line **68**. In order to impart the characteristics of the invention to the hinge line **68**, there is incorporated into the back panel assembly a patch of thin, flexible, ductile metal sheet or foil **70** which extends across the hinge line **68**, the patch **70** being secured between the panel **58** and the overlying binding material **62** so that the patch will be retained in position throughout the life of the mount.

The face panel assembly **44** may be recessed to receive a flat sheet-like display object. The utility of the invention is particularly marked when the mount is used to support a mirror, in which case adjustment of the angular inclination of the display surface must be frequent to accommodate the needs of many individuals and environments.

Reference has been made to the several hinge structures employed in the mount forms of FIGS. 1 through 4. It would be noted that these hinge connections are formed at the abutment of two physically separate panel structures. Frequently it is desirable to hinge an element in a mount structure, such as for example the supporting leg **66** of the mount form of FIGS. 5 and 6, which does not involve physically separated panels, but instead involves a scored or partially precut hinge line upon which the hinged members can rotate.

FIG. 7 illustrates a laminated structure including a flexible sheet of ductile metal in which are formed a plurality of score lines **72**, **74**, and **76** about which the respective sections **78**, **80**, **82** and **84** may rotate in respect to each other. The lamination of FIG. 7, by way of example, is composed of a leatherette facial binding material **86**, a cardboard base panel **88**, a thin, flexible ductile metal sheet or foil **90** and a paper lining sheet **92**. When a laminated structure of the kind shown in FIG. 7 is bent about the several score lines, it will maintain its position by reason of the ductile foil or sheet component despite the fact that the leatherette binding material, the cardboard base panel and the paper liner possess substantial resilience and, therefore, tend to return to the original plane of FIG. 7.

The score lines **72**, **74** and **76** of FIG. 7 are of the press-scored variety, i.e., they are formed by pressing in between suitable dies which tend to break down and deform the fibers of the material of the components of which the laminae is formed. In the formation of such score lines, it is particularly important that a soft ductile metal sheet or foil be employed for the reason that the pressure that must be applied has little or no cutting effect on the soft foils and sheets, whereas the harder sheets and foils may be damaged by the pressure that is necessary to form an adequate score.

Certain metals may be adversely affected by the pressure necessary to form a press-scored hinge line, and in such cases resort may be had to the hinge line forming procedure illustrated in FIG. 8. In the case of FIG. 8, one or more mount elements **94** and **96** have a hinge line **98** formed therein by press-scoring, slotting or routing prior to assembly with the ductile metal sheet **100**. In structures according to FIG. 8 it has been found that when the elements are rotated about the hinge line **98**, the metal sheet or foil will crease along the preformed hinge line such that a single crease line will be formed in the metal and will be maintained therein throughout the life of the mount.

While the fundamentally novel features of the invention have been illustrated and described in connection with specific embodiments of the invention, it is believed that these embodiments will enable others skilled in the art to apply the principles of the invention in forms departing from the exemplary embodiments herein, and such departures are contemplated by the claims.

I claim:

1. In a display mount constructed of paper stock, said mount having a facial panel for holding display material and a prop for maintaining said panel in a display position, a hinge line along which said prop is adapted to rotate into angular relation to said display panel, and a hinge element consisting of a flexible sheet of ductile material extending across said hinge line, said ductile material hinge element being the sole means for maintaining said panel and said prop in angular relation to each other.

2. In a display mount constructed of paper stock, said mount having a facial panel for holding display material and a prop for maintaining said panel in a display position, a hinge line along an edge of said mount on which said prop is adapted to rotate into angular relation to said displany panel, and a hinge element consisting of a flexible sheet of ductile material extending across said hinge line, said ductile material hinge element being the sole means for maintaining said panel and said prop in angular relation to each other.

3. The invention of claim 2 in which said sheet of ductile material has a ductility of a sheet of aluminum having a thickness between .003 and .020 of an inch.

4. The invention of claim 2 in which said prop is a second panel substantially co-extensive in width with said facial panel and in which said ductile material sheet extends across spaced parallel edges of said panels and is fixed to a surface of each thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

408,041	Orr	July 30, 1889
1,261,195	Venable	Apr. 2, 1918
2,798,322	Nichols	July 9, 1957
2,825,516	Cross	Mar. 4, 1958
2,831,285	Cross	Apr. 22, 1958
2,902,785	Nichols	Sept. 8, 1959