A flat sheet of material is formed with parallel longitudinal score lines to provide a front panel and integral wing sections; the wing sections are notched at their corners, and when folded to be essentially parallel, and perpendicular to the front section, are maintained in position by a rubber band hooked into the notches, and resiliently pulling the wings against a spacer or spreader member. From a flat, foldable sheet, the structure can be erected by putting the rubber bands in the notches and letting the wings snap together against the spacer member. The spacer member may be a flap cut from the front panel, connected thereto by a score line and extending between the wing sections.

The present invention relates to a foldable support structure, and more particularly to a support structure which can be made of cardboard or other suitable materials such as plastic sheets, especially useful as a support for advertising material, announcements, signs, cards, or for samples or goods and the like.

To support advertising signs, announcement cards in large sheet form, or to act as a back-up for goods which are not self-supporting, support elements are needed which hold these signs and the like in position and provide the necessary stiffness and strength therefor.

Panel-type structures, as signs or the like, have previously been assembled by means of joining, or screwing together a plurality of smaller single panels. This enables comparatively inexpensive storage and shipment of even large panel material. Presenting such panels for visual inspection, caused difficulties if they could not be supported against a wall. Additionally, assembly and erection of such panels was often complicated and required skilled handling and labor.

Cardboard displays and foldable visual aid material having their own support structures have been proposed. For example, similar to the well known cardboard picture frames, the rear surface of a sign panel may be formed with a swingable support wing, held in position by a locking tab or flap. Such structures are entirely suitable for small size. When the size exceeds, however, a format of more than about 15 inches, the stiffness of the support material becomes insufficient and erection of displays becomes more complicated and time-consuming. Additionally, the support wings are often weakened by punching-out the locking tabs therefrom. This requires additional stiffening members, or oversize support sections, further increasing the difficulties of erection and requiring larger floor space in use to provide sufficient stability when erected. Provision of such reinforcements, or separate elements and support sections increases the cost of manufacture of such display panels.

It is an object of the present invention to provide a foldable support structure, particularly for use with cardboard material, which takes up little space when folded flat and can be erected to provide a secure and stiff support for a display, without requiring skilled labor or complicated erection procedures.

SUBJECT MATTER OF THE PRESENT INVENTION

Briefly, in accordance with the present invention, a flat sheet, forming a panel, has at least one, and preferably two score lines parallel to a major edge inscribed thereon, from which one, or a pair of wing sections can be folded essentially transversely with respect to the front panel, to provide a channel-like, free-standing, self-supporting unit. The wing sections are held in position with respect to the front panel by a spacer member which, preferably, is a flap punched from the front panel along the score line and at least one transverse line, and connected to the front panel by an additional transverse score line. The wing section is held against the spacer by a rubber band, hooked into a notch in the wing section and spanning, in the region of the spacer, and at the back of the front panel, across the width of the front panel of the entire structure, to resiliently hold the wings in frictional engagement with the ends of the spacer member.

The structure, organization, and operation of the invention will now be described more specifically with reference to the accompanying drawings, wherein:

FIG. 1 is a front view of the support structure, before folding;

FIG. 2 is a rear-perspective view of the folded, erected support structure;

FIGS. 3, 4, 6, 7a, 8 and 9 are rear-perspective views of various modifications of the structure in accordance with the present invention;

FIG. 5 is an illustration, in perspective, of the structure of FIG. 4, when folded; and

FIG. 7b is a schematic plan view of the modification of FIG. 7a, the broken lines indicating the erection of folding of the front frame.

A panel, on which a sign or display may be mounted, is subdivided by a pair of longitudinal parallel score marks into a central section and a pair of wing sections. The wing sections, which form stiffening and support elements, can be folded along the score marks. Notches 16, 16' are formed at opposite edges of the wing sections. A flap 18 is punched out of the central panel along a line transverse to the parallel score marks, along the score marks, and a score 20 transversely interconnects the longitudinal score marks, so that the flap 18 can be folded out of the plane of the panel, that is in FIG. 1, out of the plane of the sheet of the drawing. A resilient connection, formed by a rubber ring 17, is looped around the portions remaining after the notches 16, 16' have been punched. One half of the loop of the rubber band 17 is passed in front of the flap 18, the other half remaining on the rear, as best seen in FIG. 1. Upon release of the panel from its flat position, rubber ring 17 will pull wing sections 12 and 14 along their score marks together and, at the same time, snap the flap 18 upwardly, so that the entire structure will appear as seen in FIG. 2. Bearing faces 22, 22' will bear against the end portions of the spacer or stiffening flap 18, the rubber band 17 resiliently holding the entire assembly in position.

The tension of the rubber ring 17 acts, immediately upon release, so that the wing sections 12, 14 will snap against spacer 18. The entire support structure is then ready for use, and provides a stiff and strong element to support signs, displays and the like.

A modified form of the structure is seen in FIG. 3. A single wing section 24 is connected with the front section, again, by a single score line. The spacer element is now a triangular section 28, again punched from the front panel (although it may be punched from the side panel) and connected to the front panel by a score line. The spacer 28 is formed with a notch 26. A pair of notches
define a small tongue 30 in the wing section 24. Rubber ring 17 is hooked over the tongue 30, looped around the spacer 28 and hooked into notch 26. The structures of FIGS. 1, 2 and 3 may be shipped flat or folded along the longitudinal score lines. As soon as the rubber band 17 is hooked into the notches formed in the wing (or wings, FIGS. 1 and 2) the structure will snap into erected position.

FIG. 4 illustrates a support element of substantial height. In order to enable ready transportation of this element, it can be folded along horizontal score marks 32, 32', 32'', as best seen in FIG. 5. Horizontal spacer flaps 18 are lopped between the score lines 32, 32', 32''. For additional stiffness, a similar flap can be arranged at the bottom. Each one of the spacer flaps 18 is held in position by a rubber band 17.

The entire assembly presents substantial stiffness, in spite of the transverse score lines 32, 32', 32'' due to the channel-type construction after erection. For additional stability, the ends of the wing sections may have support extensions 58, 58' glued thereto. The support extensions, for transport, will fold flat as seen in FIG. 5. Upon erection, the support extensions snap into position together with the wing section of the structure.

FIG. 6 illustrates a support structure similar to the embodiment of FIG. 4 having signs arranged on the front panel unitary therewith. The front panel is subdivided into elements 34, 34', 34'', separated by gaps 36, 36' to provide for folding, analogous to the embodiment illustrated in FIG. 5. A support structure with a single sign secured thereto is illustrated in FIG. 7a. A frame 42, having lateral vertical score lines is secured to the wing sections to provide for additional stiffness. The location of the vertical score lines will be clearly apparent from the top view seen in FIG. 7b, which are arranged to provide for flat folding of the entire assembly. A top plate 40, illustrated in dashed lines to enable illustration of the frame 42 in FIG. 7a, may be secured to the front panel of the support structure to provide for a covering of the frame and as a base for further displays. The panel 40 may, again, be secured to the front panel of the entire structure and connected thereto by a score line.

Erection of the structure of FIGS. 7a, 7b is similar to that of the others. Upon placement of the rubber band in the channel defined by the notches, the frame 42 will snap into the full line position (FIG. 7b) when the wing sections assume their channel-like position with respect to the front panel upon opening of the spacer flap.

The spacer flap need not be integral with the front panel, or cut therefrom. A flat, tubular element 44 (FIG. 8) and enclosing rubber band 17 may be used. The rubber band is, in this embodiment of the invention, carried through holes 46', 46'' in the wing sections.

In the foregoing embodiments, the wing sections have been held in position by a resilient, endless rubber loop or band. The wing sections may also, resiliently, be held together by a non-resilient cord 48, or the like. Cord 48 is carried through holes 50', 50'' in the wing sections, passes along the bottom of the spacer flap, and, after looping around, may be carried upwardly through a hole 52 in the spacer flap. Upon pulling on cord 48, and after erection, the cord may be secured in position by tying it around notches 54 in the spacer flap.

A consideration of the views illustrated in the drawings immediately reveals that the spacer elements are not punched out from the supporting wings, so that the supporting wings are not weakened in any way, providing for substantial stiffness of the entire structure when erected. On the other hand, however, no material is wasted, there is no overlap, and no gluing operations are necessary in the manufacture—simple scoring of the blank cardboard sheet being all that is required. Nevertheless, however, the entire structure can be shipped with a minimum of space requirements. For erection of the folded element, it is only necessary to loop the rubber band 17 into its notches, whereupon the support wings 12, 14, 24, respectively (FIG. 3) will snap in position and simultaneously bear against the folded-out spacer surface 18, bearing against the regions 22, 22'. It is thus possible to provide a large-area support for large signs, or for display objects which can be easily erected without requiring skilled labor and yet can be folded into flat and readily handled size. The front panel itself may, of course, provide the display, or the announcement sign to be used, or can be secured thereto permanently or semi-permanently as seen for example in connection with FIG. 8 which presents an uninterrupted front panel, having a separate spacer member.

I claim:

1. Self-supporting foldable support structure adapted to be vertically free-standing having a flat sheet of material forming a flat panel surface and having a substantially rectangular outline, the longer dimension of which is adapted to be, when erected, extending in a vertical direction, said panel having at least one vertical score line dividing said panel into a front section (10, 26) and at least one wing section (12, 14, 24), characterized in that said panel has at least one horizontal score line (32, 32', 32'') parallel to the shorter dimension of the panel to permit said panel to be folded together;

and a spacer flap (18, 28) cut into the front section of said panel and connected to said panel along a substantially horizontal score line and extendable into a plane intersecting said front and said wing sections, said spacer flap having an end portion bearing against said wing section and maintaining said wing section angled away from said front section in a predetermined relationship, in combination with resilient connection means (17) connected to the wing section and holding said wing section against the end of the spacer means.

2. Support structure according to claim 1, wherein said panel is formed with a pair of essentially parallel vertical score lines to define a pair of parallel wing sections and a front section to form a channel structure;

said spacer flap being foldably secured to the channel side of the front section and having a pair of end portions adapted to bear against the inside of the wing sections and maintaining the relationship of said sections with respect to each other;

and said wing sections being formed with notches in the region of engagement of said spacer flap thereto;

and said resilient means is a rubber band hooked into said notches interconnecting said sections in the region of said spacer means and behind the front section.

3. Support structure according to claim 1, wherein said resilient connection means is a rubber band, said spacer means and said section against which said spacer means is bearing, each are formed with a notch;

and said rubber band is secured in said notches.

4. Foldable, erectable, self-supporting structure comprising a flat sheet of material forming a panel having a longer, vertical and a shorter, horizontal dimension; at least one score line extending in a horizontal direction;

a pair of vertical score lines formed on said panel to divide said panel into a front section and a pair of wing sections;

elongated spacer flaps cut into said front panel and linged thereto, said spacer flaps extending horizontally in a region of said structure, adapted to be foldable to extend into a plane intersecting with the plane of the front panel, said spacer flap bearing with its end portions against said wing sections;

notches cut into edge portions of the wing sections in the region of said spacer flaps;
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5. Structure according to claim 4, wherein a plurality of horizontal score lines are provided extending transversely of said panel;
a plurality of spacer flaps are cut into the front panel and located between said horizontal score lines, and notches are formed at the wing sections opposite all said spacer flaps;
and said tension means are resilient means interconnecting opposite wing sections and hooked into said notches, said horizontal score lines permitting accordion-like folding of the structure when collapsed, while not interfering with the vertical stiffness of the structure when erected due to the angular relationship of the wing sections with respect to the front section after erection.

6. Structure according to claim 5, wherein said tension means is an endless rubber band.

7. Structure according to claim 4, wherein said tension means comprises a pull cord looped around said spacer means and said notches for resiliently pulling said wing sections together.

8. Structure according to claim 4, including support extensions secured to the lower ends of said wing portions.

9. Structure according to claim 4, including a frame structure secured to said wing sections and extending transversely therefrom when in erected position, said frame being formed as a unitary strip of material provided with score lines transverse to the longitudinal extent of said strip to permit folding of said strip flap against said front section.

10. Structure according to claim 9, including a spacer flap located in the region of said frame, and a resilient tension means interconnecting said wing sections in the region of said spacer flap, whereby the spacer flap will extend in a frame-like shape and be held in position by the tension means located in the region of said flap, the wing sections forming fulcrum points for said frame-like strip.

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