Oct. 27, 1964 N. WALTER 3,153,872

VISUAL DISPLAY APPARATUS

Filed Sept. 24, 1962

Fig. 1.

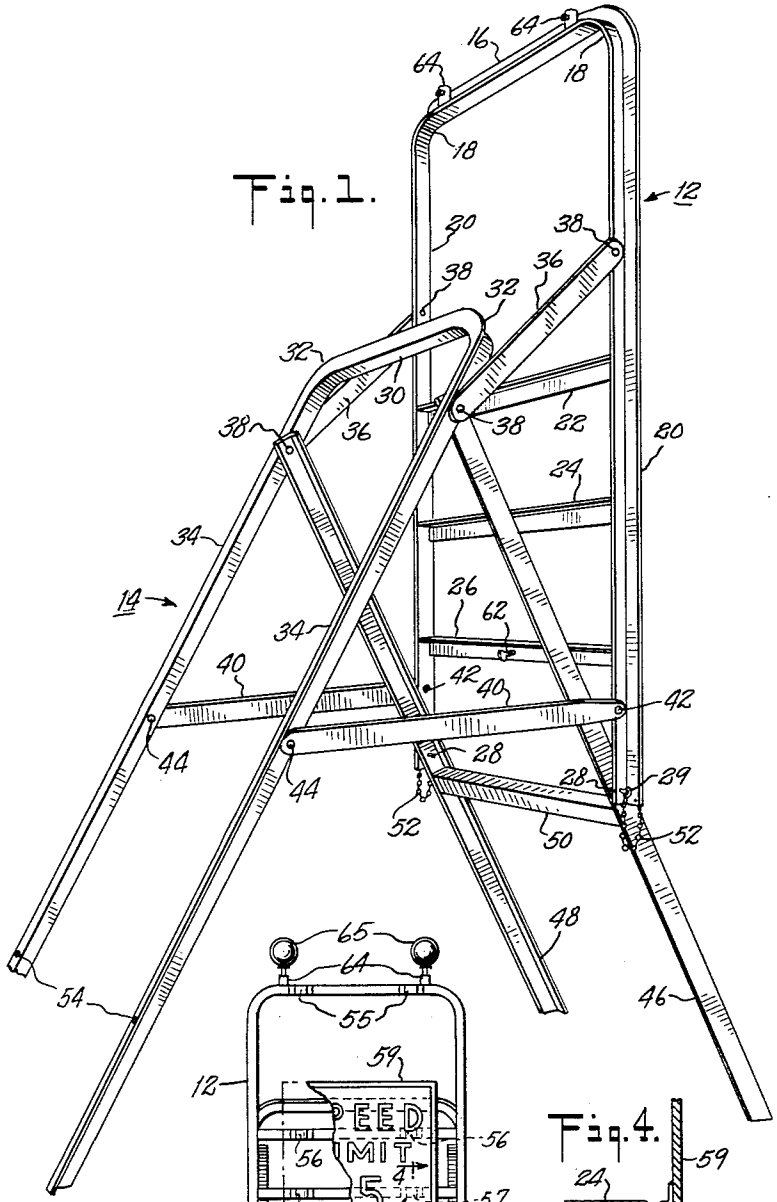


Fig. 2.

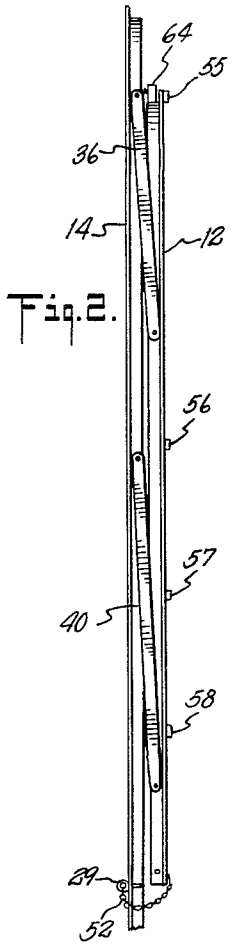


Fig. 3.

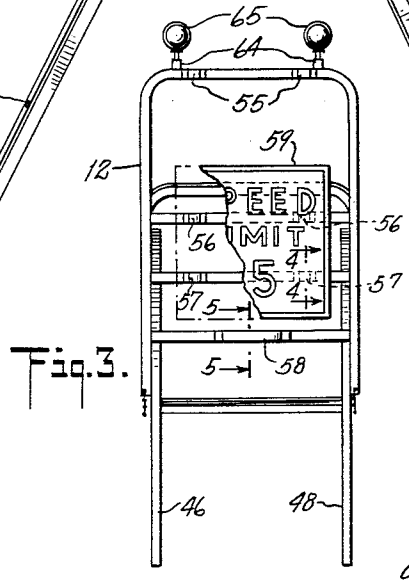


Fig. 4.

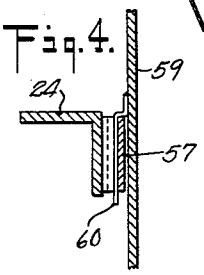
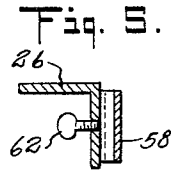


Fig. 5.



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VISUAL DISPLAY APPARATUS

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This invention relates to visual display apparatus and more particularly it concerns an improved collapsible sign bearing device.

In the construction industry, a need exists for easily portable yet readily apparent display means to appraise passersby of the temporary yet dangerous conditions which may exist and to advise them of necessary precautions to be observed. Because of the fact that the environmental situation created by construction work is of a temporary nature, the visual display means must be of a type which can easily be moved from location to location. This becomes particularly important in the construction and repair of roadways where, because of the proximity of high-speed traffic, a great number of signs must be spread out over great distances from the actual construction work. Also, since in most roadway construction men and equipment must be continuously moved, the various warning signs should be light in weight and capable of storage with relative ease. On the other hand, proper visual display requires that such signs be large in size and sturdy enough to withstand various adverse environmental conditions.

A feature of the present invention lies in the provision of a collapsible sign support upon which various visual displays or signs can be mounted and which may be folded and carried with relative ease by a single individual. The sign support, while light in weight, is nevertheless large enough to support a readily apparent visual display to passing motorists, and yet is sturdy enough to withstand the wind and other weather conditions occurring along open roadways. According to the present invention, high strength and large size are obtained in a lightweight collapsible support structure by providing a pair of generally arch-shaped members connected to each other by means of upper and lower pairs of connecting links or bars. The upper connecting bars are shorter than the lower bars but are spaced at each arch-shaped member at points which permit the members to be positioned flat against each other in the collapsed condition. In the extended condition, one of the arch-shaped members is vertical with respect to the ground when the other is slanted. The vertical member serves as the mounting frame for the detachable sign or other visual display. The slanted member provides structural rigidity and further serves as the rear legs of the supporting structure. A front pair of legs may be provided simply by pivoting a pair of structural members near the top of the slanted arch-shaped member so that they swing outwardly when the sign support is opened to its extended condition.

A further feature of the invention lies in an unusual application of the structural efficiency provided by arch-shaped structures. While such structures are known to withstand large stresses when directed parallel to their legs, they offer relatively small resistance to stresses applied from directions not in their plane. Accordingly in the case of supporting structures for use with signs or other visual display means, it is generally required to provide additional bracing such as X-braces and trusses in order to prevent bending under conditions of wind or should the display means be knocked over. According to the present invention, the structural advantages of an arch-shaped member are obtained by the use of such members in conjunction with a special linkage arrangement whereby stresses out of the plane of one arch are absorbed by means of the other arch.

It is an object of this invention to provide an improved visual display device.

It is another object to provide a large-size, high-strength collapsible sign holder of simple and lightweight construction.

A still further object of the invention is to provide an improved collapsible sign holding device wherein the structural advantages inherent in arch-shaped members are fully realized.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a perspective view of a sign support embodying the principles of the present invention, the support being shown in its extended or open condition;

FIG. 2 is a side view of the embodiment of the sign support of FIG. 1 shown in its collapsed condition;

FIG. 3 is a front elevation of the sign support bearing a typical visual display;

FIG. 4 is a fragmentary view taken through 4—4 of FIG. 3; and

FIG. 5 is a fragmentary view taken through the section 5—5 of FIG. 3.

In FIG. 1, the sign support in its extended condition is seen to comprise first and second generally arch-shaped members 12 and 14, both integrally formed of structural members having L-shaped cross-sections. The first arch-shaped member 12 is designated herein as the display mounting member and includes a main transverse portion 16 which blends through radii 18 at either end thereof into parallel downwardly extending leg portions 20. First, second and third display mounting bars, 22, 24 and 26, also of L-shaped cross-section, are mounted transversely between corresponding points on the parallel legs 20 of the display mounting member 12. A pair of mounting holes 28 are also provided in the vicinity of the lower extremities of the legs 20 of the display mounting member 12. These holes receive removable pins 29 which lock the mounting member in position in a manner to be described.

The second arch-shaped structure 14, referred to herein as the rear support member, likewise comprises a transverse portion 30, which blends through radii 32 at the ends thereof into parallel and generally downwardly extending legs 34. The rear support member is preferably of the same overall width as the display mounting member.

A pair of upper connecting bars 36 are pinned or otherwise pivotally mounted at one end to corresponding upper connecting points 38 on each of the legs 20 of the display mounting member 12, and are similarly mounted at their other end to corresponding upper connecting points 38 on each of the legs 34 of the rear support member 14. A pair of lower connecting bars 40 are also pivotally mounted in similar manner to lower connecting points 42 and

44 further down the legs of each of the arch-shaped members 12 and 14, respectively.

An H-shaped member referred to herein as the front support member, comprises a pair of parallelly extending front legs 46 and 48 joined at their mid-points by a transverse member 50. The front legs and transverse member also are preferably of L-shaped cross-section. The upper ends of each of the front legs 46 and 48 are pivotally connected to the rear support member 14 at its upper connecting points 38. The front legs 46 and 48 are also provided with holes near their mid-points. In the extended or opened condition of the sign support as shown in FIG. 1, these holes are maintained in alignment with the mounting holes 28 in the display mounting member 12 by means of the removable pins 29. These pins may be permanently attached to the sign support by means of chains 52. If desired, further holes such as at 54 may be provided in the legs of the rear support member 14 so that in the collapsed or closed condition of the sign support as shown in FIG. 2, the pins 29 may be inserted thus causing the chains 52 to act as binding means to hold the support structure in its collapsed condition.

The sign support structure is collapsible merely by withdrawing the mounting pins 29 which in turn permits the front legs 46 and 48 to swing into the plane of the rear supporting member 14. This also allows the upper end lower connecting bars 36 and 40 to pivot at their respective connecting points so that the display mounting member 12 becomes positioned flat against the support member 14, as shown in FIG. 2. The removable pins then may be inserted into the holes 54 in the legs of the rear support member 14, as shown in FIG. 2, to secure the structure. It is important to note that in order to permit the two arch-shaped members 12 and 14 to be folded flat against each other, the distance between the upper and lower connecting points on each must be related to the length of the upper and lower connecting bars 36 and 40 in such a manner that the distance between the upper and lower connecting points on the rear support member 14, when added to the length of a lower connecting bar 40, is equal to the distance between the upper and lower connecting points on the display mounting structure 12, when added to the length of an upper connecting bar 36. While there are many combinations of connecting bar lengths and connecting point distances which fullifill these requirements, it is important also that the upper connecting bars be substantially shorter than the lower connecting bars. This is necessary so that in the extended condition of the support structure, the upper connecting bars serve to transmit forces perpendicular to the plane of the mounting member 12 downwardly and into the plane of the support member 14. With this arrangement, stresses not in the plane of the upper support member which tend to bend or warp its display mounting surface, are transmitted into the plane of the supporting arch-shaped structure 14. In this manner, the structural rigidity of the arch-shaped rear supporting member 14 may be utilized to its full capacity in absorbing these warpage producing forces.

Referring now to FIGS. 3–5, the manner in which various interchangeable visual displays are used in connection with the collapsible support structure may be seen. Strap-shaped hanger elements 55–53 are welded or similarly attached to each of the transverse elements of the display mounting structure 12. These hanger elements extend outwardly forming slots into which tongue elements on the display means extend. In FIG. 3, a typical display means 59 is shown in its mounted condition on the support structure. The display means, as shown in FIG. 4, has tongue elements 60 attached to its back surface and spaced to fit into various slots formed by the hanger elements on the mounting structure. It will be understood that by standardizing the size and displacement of the hanger and tongue elements, any of several different sizes

of visual display means may be interchangeably used in connection with a single support structure.

It should be noted that the hanger element 58 on the lowermost mounting bar 26 is considerably wider than the other elements 55, 56 and 57 and as shown in FIG. 5, the transverse mounting bar is provided with a setscrew 62 extending into the slot formed by the hanger element. With this arrangement, display alignment is provided by means of the rather closely fitting upper tongue and slots while the setscrew may be used to tighten the rather loosely fitting lower tongue and slot. This ensures good alignment and secure fastening of the visual display means with a minimum of time and effort.

Referring again to FIGS. 1 and 3, a pair of hollow socket type mounting members 64 is seen to be provided along the transverse portion 16 of the display mounting structure 12. Illuminating means such as lanterns 65 or similar visualization aid devices, may be mounted in the socket members as shown in FIG. 3. These socket members may be keyed or splined in the usual way in order to maintain proper alignment of the illuminating elements. Because of the inherent resistance to warpage type influences, the alignment of the illuminating elements is maintained so that maximum visibility of the display means is always insured.

It should be noted that this visual display support construction is also particularly suited for use with reflector-type signs which require the maintenance of a certain angular relationship between the sign face and the headlights of traveling vehicles as in the case of roadway construction signs. In such case, it is important that the headlight beams strike these signs at the proper angle to achieve maximum visibility. Any warpage or movement of the support, of course, will severely distort and reduce the desired presentation. With the present arrangement, however, optimum visibility is insured and maintained even while different signs are exchanged on the same support structure.

Having thus described my invention with particular reference to the preferred form thereof, it will be obvious to those skilled in the art to which the invention pertains, after understanding my invention, that various changes and modifications may be made therein without departing from the spirit and scope of my invention, as defined by the claims appended thereto.

What is claimed as new and desired to be secured by Letters Patent is:

1. An improved sign support comprising a display mounting element formed of an elongated member having an L-shaped cross section and bent longitudinally into a generally arch-shaped form, means associated with said display mounting element for detachably connecting visual display means, a pair of upper connecting bars of equal length pivotally connected at one end to corresponding upper mounting points on either side of said display mounting element, a pair of lower connecting bars also of equal length but longer than said upper connecting bars and pivotally connected at one end to corresponding lower mounting points nearer the ends of said display mounting element, a rear support element formed of an elongated member having an L-shaped cross section and bent longitudinally into a generally arch-shaped form of substantially the same width as said display mounting element, means pivotally connecting the opposite ends of said upper connecting bars to corresponding upper mounting points on either side of said rear support element, means pivotally connecting the opposite ends of said lower connecting bars to corresponding lower mounting points of said rear support element below said corresponding upper mounting points, the distance between the upper and lower mounting points on said display mounting element plus the length of the upper connecting bars being equal to the distance between the upper and lower mounting points on the rear support element plus the length of the lower connecting bars, a pair of elongated front

leg members pivotally connected at one end to said rear support element in the vicinity of its upper mounting points said front leg members being adapted to swing outwardly from said rear support element when said display mounting element is swung outwardly from said rear support element and to intersect the plane of said display mounting element, and removable pin holding means adapted to temporarily secure said front legs to said display mounting element at their points of intersection.

2. A portable visual display supporting structure for use alongside of roadways, said structure comprising first and second arch-shaped members, each of said members being of a single piece of rigid elongated material formed at its central portion into arch-shaped configuration and having depending leg portions extending in parallel fashion from each side thereof, a first pair of rigid identical length connecting bars each pivotally conected at one end approximately midway along respective leg portions of said first arch-shaped member and pivotally connected at their opposite other ends to the respective leg portions of the second arch-shaped member at points near their tips, a second pair of rigid identical length connecting bars, shorter than said first pair, each of the bars of said second pair being pivotally connected at one end to points on the leg portions of said first arch-shaped member near its said central portion and pivotally connected at their opposite end to upper points on the respective leg portions of said second arch-shaped member toward its central portion, the lengths of said connecting bars and the distance between the points of their connection to the

various leg portions of said arch-shaped members being such as to permit said arch-shaped members to be placed flat against each other and to be moved away from each other to a non-parallel attitude, a pair of rigid elongated front support members each pivotally connected at one end to points on the upper leg portions of said first arch-shaped member and releasable connecting means for securing the tips of the leg portions of said second arch-shaped member to said front support members when said second arch-shaped member is placed in its said position of non-parallel attitude relative to said first arch-shaped member whereby stresses against said second arch-shaped member from out of its plane are transmitted into the plane of said first arch-shaped member via said second pair of connecting bars.

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