United States Patent [19]

Godes

[11] **3,863,872**

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[54] **READOUT PANEL**

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[73] Assignee: **Daktronics, Inc.**, Brookings, S. Dak.

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[52] **U.S. Cl.** **248/27**, 16/171

[51] **Int. Cl.** **G12b 9/00**

[58] **Field of Search** ..... 248/27, 345, 429, 307, 248/294; 312/257 A, 257 SM; 49/381, 399; 220/3.8, 30, 38, 24.2, 24.3; 340/338; 240/11.2; 292/109, 300, 301; 16/171, 172; 40/130 E, 132 D

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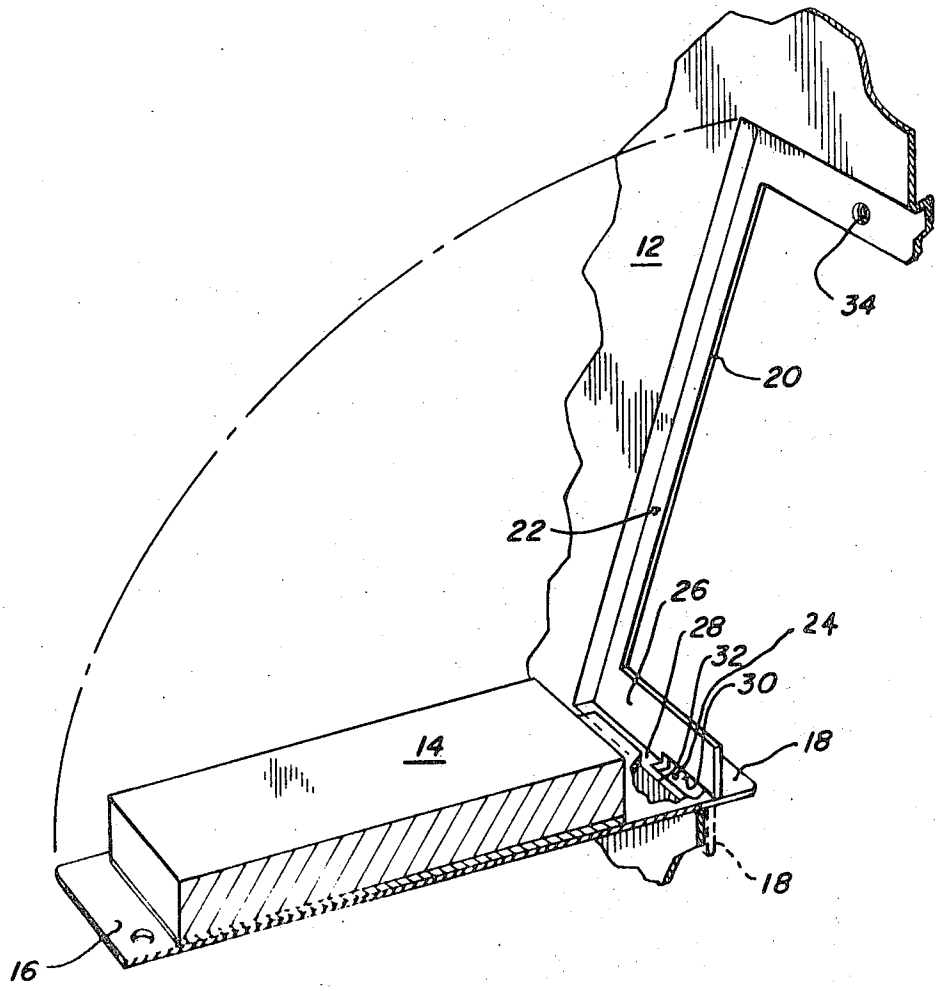
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[57] **ABSTRACT**

A readout panel comprising a mounting plate and readout assembly non-interlockingly connected to provide easy removal and access to the assembly for repair or replacement.

9 Claims, 3 Drawing Figures



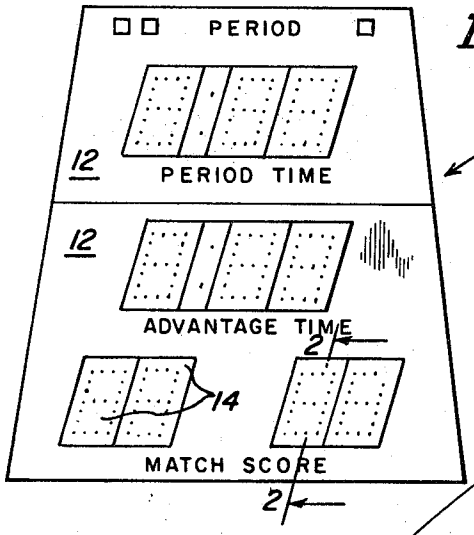


FIG. 1.

FIG. 2.

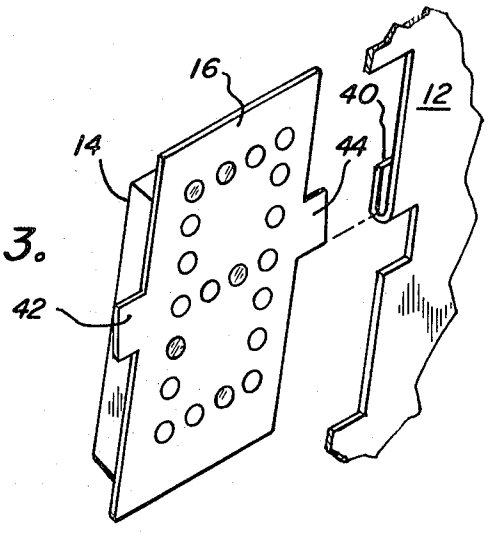


FIG. 3.

READOUT PANEL

RELATED APPLICATIONS

The subject matter of this application is related to that of copending application Ser. No. 226,458 for READOUT, filed in the names of Messrs. Aelred J. Kurtenbach, James B. Morgan, and Paul A. Espeset, and assigned to the same assignee as the present invention, and now U.S. Pat. No. 3,768,188.

BACKGROUND AND FIELD OF THE INVENTION

This invention relates in general to readout panels and in particular to readout panels of the type which include one or more digital readout assemblies secured to a mounting plate.

Innumeral devices include readout panels. Usually, a readout panel comprises a mounting plate, one or more readout assemblies, and means for mounting each assembly to the plate. Each assembly when activated displays one or more symbols of information, each symbol usually comprising a numerical digit or alphabetical character. Readout panels are included in both indoor and outdoor devices; such devices including voting systems, digital clocks, time and temperature signs, weight and number indicators, scoreboards, and various electronic instruments including those for monitoring spacecraft launch and control systems.

It is safe to say that most, if not all, readout assemblies require maintenance at some time or another. Obviously, it is desirable that such maintenance be done as quickly as possible, if for no other reason than minimization of maintenance cost. The complete range of factors bearing upon the speed with which maintenance should be accomplished includes such things as delays of events associated with data displayed by the readout, e.g., sports events, launching of a spacecraft, etc., and also includes irretrievable loss of data.

It is equally obvious that such maintenance must be done reliably. One factor of considerable importance to reliable performance of maintenance is free and open access to the readout assembly; this is particularly true for "miniaturized" assemblies and for assemblies the maintenance of which may require employment of tools, soldering irons for example.

Numerous inventions have improved the accessibility, and hence maintainability, of readout assemblies. See, for example, the invention disclosed in U.S. Pat. No. 2,673,976 which issued on Mar. 30, 1954 in the names of Charles M. Williams and Luke G. Williams, hereinafter the Williams invention. According to the Williams invention, the maintainability of a readout panel is improved by dividing a plurality of readout assemblies ("light panel units") into separate, independent assemblies. Each such assembly is independently hinged to pivot away from its mounting to provide access to the readout assembly for maintenance and similar purposes. The Williams invention provides adequate physical access to an assembly from the rearward side for minor maintenance of the assembly without removal of the defective assembly from the readout panel. The nature of some defects and the criticalness of the data provided by a readout, however, make it desirable and even essential to immediately replace a defective readout with an operable one to provide essentially uninterrupted operation of the readout device.

An object of the present invention is a readout panel providing quick and easy removal and replacement of

readout assemblies so that the device incorporating the unit is rapidly returned to service to minimize delay of associated events or loss of data.

Yet another object of the present invention is a readout panel providing free and open access to a readout assembly to facilitate reliable repair of an assembly which has malfunctioned.

An additional object of the invention is a readout panel which is easily assembled.

BRIEF DESCRIPTION OF THE INVENTION

Briefly, the invention comprises simply a mounting plate and a readout assembly non-interlockingly connected. So interconnected, a readout assembly can be immediately separated from the mounting plate for replacement and maintenance of the assembly. According to a preferred embodiment of the invention, the mounting plate is the exterior skin of a device incorporating the readout panel. The skin includes an opening for accepting each readout assembly and includes an aperture beneath the lower edge of the opening. Each readout assembly includes a faceplate which has a tab for insertion into an aperture. Each aperture is in a counter-embossment formed into the exterior skin along the upper periphery of the aperture in a direction towards the rearwide side of the exterior skin. Such a counter-embossment and aperture configuration permit pivotal movement of each readout assembly in a directin forward of the exterior skin thereby facilitating access to each assembly from the forward side of the exterior skin. The mounting plate and readout assembly may be quickly and easily separated by simply withdrawing the faceplate tab from the aperture. Total removal of an assembly merely involves the additional step of disconnecting the electronic connections from the readout assembly, again a simple and easy matter if a friction contact type of connector is employed such as either of the male-female connector types mentioned in the previously referred to application Ser. No. 226,458.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a front view showing a device incorporating a plurality of readout panels according to the present invention;

FIG. 2 is a sectional view in perspective taken along line 2—2 of FIG. 1 illustrating non-interlocking connection of a readout assembly and mounting plate of a readout panel;

FIG. 3 is a fragmentary, perspective view illustrating an alternative non-interlocking connection of a readout assembly according to the present invention.

DETAILED DESCRIPTION OF DRAWINGS

In FIG. 1 a device shown generally as **10**, a wrestling scoreboard, incorporates a plurality of readout panels. The scoreboard includes an exterior skin **12** which serves as the mounting plate of a readout panel for each of the readout assemblies **14**, there being a total of 12 such readout assemblies, four each in the Period Time, Match Score, and Advantage Time sections of the scoreboard. The specific scoreboard of FIG. 1 is manufactured in a variety of configurations, including a three-sided version having the general shape of a truncated pyramid. For such an embodiment, it is desirable to gain access to the readout assembly from the forward (exterior) side of the skin **12**. The manner in

which access is gained to the readout assemblies shall be readily apparent upon consideration of FIG. 2, a sectional view in perspective taken along line 2—2 of FIG. 1.

In FIG. 2, the readout assembly 14 is shown pivoted to an open position about 90° removed from the closed position. The readout assembly 14 includes a faceplate 16 which has a tab-like extension along its lower edge forming a tab 18. The exterior skin 12 includes an opening 20 for accepting the readout assembly structure. A counter-embossment 22 surrounds opening 20 and includes the upper periphery of aperture 24. Conveniently, the opening 20, counter-embossment 22, and aperture 24 can be formed simultaneously by the well known process of die forming. For the illustrated embodiment of FIG. 2, the exterior skin 12 is 0.04 inch vinyl clad steel and the counter-embossment depth is 0.06 inches; the readout assembly faceplate 16 is also 0.04 inch vinyl clad steel. The tab 18 has dimensions of about 0.80 inch long by 1.20 inches wide and the aperture 24, before the counter-embossment is formed, has dimensions of about 0.10 inches by 1.32 inches. Details concerning the construction of readout assembly 14 are set forth in the aforementioned application Ser. No. 226,458. The tab 18 is partially cutaway to show certain details of the aperture 24 including its position relative to counter-embossment 22. As shown, along the lower edge of opening 20, the counter-embossment 22 surface parallel to exterior skin 12, surface 26, extends to the lower periphery of aperture 24. The other counter-embossment surface, the surface normal to exterior skin 12, surface 28, is in the plane containing the lower periphery of aperture 24. With the readout assembly pivoted to the open position shown in FIG. 2, tab 18 strikes surfaces 30 and 32 which respectively define the upper and lower peripheries of aperture 24 to hold the readout assembly in a position of free and open access for performance of minor maintenance. When the readout is pivoted to a closed position, tab 18 abuts exterior skin 12 as illustrated by means of phantom lines. If desired, the readout may be further secured to the mounting plate by any of a variety of conventional means, including a bolt into a captive nut, at any of a variety of locations, including the top such as indicated at 34. Of course where speed of replacement is most critical, such an additional fastener can be finger operable and can be entirely eliminated according to other variations of the invention as will become apparent upon consideration of a further example of the invention as illustrated in FIG. 3.

FIG. 3 is an illustration of a mounting plate and readout assembly which are interlockingly joined together by means of arms and cradles. In this embodiment cradles are provided on either side of opening 20, only one of which is shown as cradle 40 in FIG. 3. The readout assembly 14 faceplate 16 is provided with arms 42 and 44 of a size and positioned for engagement with the mounting plate cradles to non-interlockingly join a readout assembly and mounting plate.

One of ordinary skill in the art will readily appreciate that the foregoing specific embodiments described with reference to FIGS. 2 and 3 are merely illustrative of the broad concept of the instant invention and that the invention encompasses numerous modifications and variations of those specific embodiments. For example, the embodiment of FIG. 2 could be adapted to provide access from the rearward side merely by substituting a true embossment for the counter-embossment 22; and, the embodiment of FIG. 3 could be made pivotal simply by employing arms 42 and 44 of a geometry which will function as an axle, the cradle 40 and its unshown counterpart then serving as bearings. These and other modifications are considered within the scope of the invention, the limits of which are set forth in the appended claims:

What is claimed:

1. A readout panel comprising a mounting plate and a readout assembly wherein one of said plate and assembly includes an aperture and an embossment formed by a first and second surface which first and second surfaces adjoin and are substantially normal to each other, said aperture being at the juncture of said first and second surfaces, and one of said plate and said assembly includes a tab, said tab being inserted into the aperture to physically interconnect the plate and assembly while permitting pivotal movement of the plate and assembly to an open position to afford free and open access to the assembly for minor maintenance and permitting ready separation of the plate and assembly by withdrawal of the tab from the aperture to facilitate removal of an assembly for major maintenance and for minor maintenance under conditions which require immediate return to service of a display device incorporating the readout panel.

2. A readout panel according to claim 1 wherein the plate includes said aperture and the assembly includes said tab.

3. A readout panel according to claim 2 wherein the mounting plate is the exterior skin of a device and said skin includes an opening for admitting the readout assembly and has a forward and a rearward side.

4. A readout panel according to claim 3 wherein said readout assembly includes a faceplate having a tab-like extension from its lower edge to form said tab and wherein said aperture is located beneath the lower edge of said opening.

5. A readout panel according to claim 4 wherein said embossment is a counter-embossment along the upper periphery of the aperture in a direction towards the rearward side of the exterior skin to provide pivotal movement of the readout assembly forward of the exterior skin thereby facilitating access to the assembly from the forward side of the exterior skin.

6. A readout panel according to claim 4 wherein said embossment is along the upper periphery of the aperture but in a direction towards the forward side of the exterior skin to facilitate access to the assembly from the rearward side of the exterior skin.

7. A readout panel according to claim 5 further comprising fastening means for securing the mounting plate and readout assembly at a point other than the point of said non-interlocking connection.

8. A readout panel according to claim 4 wherein said embossment first surface and second surface are respectively substantially normal and substantially parallel to said mounting plate.

9. A readout panel according to claim 8 wherein said embossment is continuous about the entire periphery of said opening and said first surface dimension between said mounting plate and second surface is approximately equal to the thickness of said faceplate.

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