

RETRACTABLE FLEXIBLE DIGITAL DISPLAY APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of priority of Provisional U.S. Pat. Application Nos. 60/494,237 filed Aug. 11, 2003, 60/501,483 filed Sep. 9, 2003, 60/504,133 filed Sep. 19, 2003, 60/513,854 filed Oct. 23, 2003 and 60/573,534 filed May 21, 2004, all of which are herein incorporated by reference.

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention relates to viewing devices and, more particularly, to a flexible digital display retractable into a portable weatherproof and shock-resistant housing for transport.

BACKGROUND OF THE INVENTION

[0003] Architectural, engineering and/or construction (AEC) firms currently use paper as a primary method for displaying job site data that is used in the design, engineering and construction of a structure or location. These drawings and specifications are produced and manipulated in a digital format during architectural design and mechanical engineering. However, these same drawings are subsequently printed onto paper for bidding, permitting and job site use. Printed reproductions of original drawings and documents are also required by all original and ongoing parties involved in a project. When changes are made to a drawing for a given job, the printed changes must be reproduced and sent to all original and ongoing parties involved with the project.

[0004] Accordingly, today's AEC print documents are inefficient, present transport problems, are subject to wear, require vast storage space and produce significant waste. In addition, replication of engineering and architectural drawings requires highly specialized and costly printing equipment.

[0005] Under the present invention, printed drawings and documents substantially remain in the digital format using a portable retractable digital display throughout the job cycle. Maintaining the drawings and documents in a digital format reduces the costs and wastes associated with the printed documents. A digital format also allows the user instant access to any drawing or document for any job that the user is responsible for. Portable digital format drawings and documents also allows for updates to any job to be received electronically through any number of available industry standard network (both wired and wireless) technologies or more simply by shipping additional lightweight memory modules.

[0006] Digital drawings and documents displayed by the viewing device of the invention also allows the expiration of an drawing or document within a timeframe specified by the firm responsible for creation of said intellectual property. For example, in a bidding process of a job with multiple vendors but only limited awards, drawings and documents are seldom returned to the intellectual property owner. Under the present invention, drawings and documents can expire at the end of a bid process.

[0007] The digital format of the drawings and documents displayed by the viewing device also allows for a lowered weight factor in the device. The digital format of the drawings and documents further allows for an increase in storage, handling, processing and displaying of many more drawings.

[0008] U.S. Pat. No. 6,680,724, incorporated herein by reference, suggests the use of thin, flexible screen technologies in conjunction with electronic image viewing; however such a device is bulky and non-retractable. The portability and storage of such device is highly restrictive and not easily used at multiple locations and busy environments, such as on-site and off-site use and transfer in connection with a construction project.

[0009] Accordingly, the present invention answers specific needs associated with drawings in the construction and architectural fields, but also provides advantageous portability options to thin-screen viewing devices in all markets.

SUMMARY OF THE INVENTION

[0010] The invention provides a portable, retractable viewing device. In embodiments of the invention the viewing device is connected to a network.

[0011] In one embodiment of the invention, the device is comprised of a flexible display which is retracted into a protective housing during transport and for storage. In embodiments of the invention, the electronics responsible for processing drawings and documents for display on the flexible display are held within the protective housing. The housing also contains a retractable reel for retracting the flexible display. In an embodiment, the flexible display comprises a weather resistant cover surface and a backing surface oppositely disposed relative to the first surface and the flexible display located between the first and second surface. The protective housing also contains, in various embodiments, electronics such as a processing unit, memory units, network connectivity components, external power supply and internal battery unit.

[0012] Although one embodiment of the present invention is described relating to the architectural, engineering and construction fields, the present invention may be utilized in Field Force Automation, surveying (PLATS), air and sea charting and navigation, maps, GPS-based mapping, project planning (including where a large screen enables several viewers and displays simultaneously), military applications, personal computing, visual entertainment, including viewing of video and graphical files, electronic publication of books, magazines and the like, electronic video games, electronic sports playbooks, and like display uses. It will be appreciated that these examples are merely by illustration and the present invention may be implemented in connection with virtually any other application or need for which two and three dimensional text, multimedia objects, graphics and images, especially large images, are advantageously viewed portably.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a perspective view from above of a portable retractable flexible digital display device in an embodiment of the invention.