lating layer placed above the top electrode **14**. An additional electrode protection layer may also be provided above the electrode **14**.

[**0021**] Alternatively, single color OLED elements, for example white, may be used to provide a single color display. Also, color filters (not shown) may be located above the single color OLED elements to provide a colored display. The light emitting layers, electrodes, color filters, and manufacturing processes to create a passive-matrix OLED display device are all known in the art.

[**0022**] Referring to **FIG. 3, a** passive-matrix prior-art display device includes a plurality of electrodes **16** and **14** that are individually energized through column **34** and row **36** connectors. Light-emissive OLED materials (not shown) are located between the electrodes **16** and **14** where they overlap. When an OLED element is energized through one column signal **37** and one row signal **38**, the OLED element at the column and row intersection is energized and light is emitted. With this design, an entire row or column of OLED elements may be energized simultaneously, but only one row or column may be operated at one time.

[**0023**] In conventional practice, the materials used in an OLED device are deposited on a planar substrate using a source of heated material that is evaporated and exposed through a mask onto a substrate. Referring to **FIG. 4, a** substrate **20** is exposed through a mask **76** for the deposition of material **75** evaporated from a linear source **69** including a container **70** having a slit opening **71** and a baffle heater **72** heating the contents **74** of the container. The heated material **74** evaporates, rises up from the boat around the heater **72** and through the slit **71** to condense on the mask **76** and substrate **20**. After adequate material is deposited, the mask **76** is removed leaving a patterned layer of material deposited on the substrate. In a continuous exposure process, the container **70** is moved at a carefully controlled rate from one side of the substrate **20** to the other side to deposit material across the entire surface. This process is described in detail in "Linear Source Deposition of Organic Layers for Full-Color OLED" by Van Slyke et al., SID 02 Digest, Vol. 33, No. 2, pp. 886-889, 2002.

[**0024**] Referring to **FIG. 5**, one embodiment of an OLED device according to the present invention includes a curved, rigid substrate **50** having an electrode **16** deposited upon it. An OLED element **12** is deposited upon the electrode **16** and a second electrode **14** is deposited on the OLED element **12**. The electrodes are arranged in orthogonal arrays and are connected to column and row drivers as shown in **FIG. 3**. In operation, the electrodes are energized conventionally and light is emitted from the OLED elements **12**.

[**0025**] Referring to **FIG. 6**, according to one embodiment of the present invention, the curved surface of the substrate defines a circular cylinder and OLED materials are deposited through a mask **76** held on the inside surface of the curved substrate to form the OLED elements by rotating a linear source **69** about the cylindrical axis of the curved substrate. This source is otherwise conventional and incorporates a container, heater, baffle, etc., as described above with the additional feature that the linear source **69**, is mounted on a rotating platform **80**.

[**0026**] The rotating platform **80** is located so that the point **81** about which the linear source **69** rotates is the center of curvature of the substrate **50**. As the source is rotated, material is evaporated and emitted through the source slit and deposited through the mask. It is important to over-scan the source, that is, deposit material beyond the mask edge to ensure that each mask opening is properly exposed for the same amount of time. The rate of rotation is determined by the amount of material to be deposited. It is also possible to hold the linear source steady and to rotate the substrate about the center of curvature.

[**0027**] This process employs a curved mask **76** held in close contact with the substrate **50** during deposition of the OLED materials. Tests performed by the applicant have demonstrated that conventional planar masks 10 to 500 microns in thickness may be conformed to substrates having a radius of curvature as small as 1 to 5 cm. The thickness of the mask required depends on the radius of curvature of the substrate, with smaller radii requiring thinner masks. Typically, masks of 50 microns are suitable for conventional computer monitor displays and are composed of conventional materials, such as Invar, with suitably small coefficients of thermal expansion. The curved mask **76** may be held in position with clips **84** at the edges of the curved surface during material deposition. The mask is typically held in compression against the substrate to provide a firm, rugged contact.

[**0028**] As shown in **FIG. 7**, an OLED element may also be deposited upon the outside surface of the substrate. In this case, the substrate is more readily rotated about its center of curvature and the linear source placed on the outside of a circle defined by the rotation of the substrate. The curved rigid substrate **50** is held by a fixture **82** that is rotated about a point **81** located at the center of curvature of the curved rigid substrate **50**. The linear source **69** is located on the outside of the substrate **50** and does not move as evaporated material **75** is deposited over the surface of the curved substrate **50**. The mask **76** is held in tension against the surface of the substrate **50**.

[**0029**] Alternatively, the OLED materials can be deposited onto the curved surface of the substrate using a compressed fluid deposition technique as described in copending U.S. Ser. No. 10/201,506 filed Jul. 23, 2002 by Cok, which is incorporated herein by reference. According to this embodiment, the fluid applicator emits a linear stream of fluid and replaces the linear source **69**.

[**0030**] According to a further alternative, the OLED materials may be deposited by thermal sublimation from a donor as disclosed in U.S. Pat. No. 5,688,551, issued Nov. 18, 1997 to Littman et al. According to this embodiment, the donor is a sheet that is held in linear contact with the substrate and is heated, for example with a laser beam or thermal head along a moving line of contact. The thermal sublimation apparatus transfers successive lines of OLED material and replaces the linear source **69**.

[**0031**] According to a further alternative, the OLED materials can be deposited by a linear inkjet type head. The linear inkjet head emits a linear stream of fluid OLED material and replaces the linear source **69**.

[**0032**] With the sequential, repeated use of the deposition mechanisms described above, a series of layers of OLED materials may be built up on the substrate to create OLED elements. The OLED elements may be powered through the connections affixed to the conductors as shown in **FIG. 3**.