billboard having a different matrix configuration than that of another area of the billboard inside of the frame area.

Rods **3** are movably disposed in the holes **2**, such that the rods **3** can extend out of the plane of the framework **1** by specified distances. The movement of the rods **2** is restricted in any other direction than the board depth. In the embodiment illustrated in FIG. **2**, the diameter of the outer rod-end **3***a* is larger than that of the hole **2** and the shaft of the rod **3** passing through the hole **2**. This creates a stop which prevents the rod-end **3***a* from being drawn into the interior of the frame **1**, helping to keep the rods **3** properly aligned. The opposite inner rod-end **3***b* of the embodiment illustrated in FIG. **2** also is enlarged to create a stop when the rod is moving in the outward direction. The inner rod-end **3***b* abuts the rear side of the framework **1** when the rod is in its outermost position, as shown by rod **3**' in FIG. **2**.

Alternatively, in the embodiment illustrated in FIG. **1**, the diameter of the outer rod-end **3***a* is the same as that of the shaft of the rod **3** passing through the hole **2**. This allows the outer rod-end **3***a* to be moved to a position flush with the plane of the frame **1**, or to be withdrawn into the hole **2**.

Depending upon the application and the desired appearance, the diameter of the rods **3** and the corresponding diameter of the holes **2** may be the same over the entire surface of the billboard, or may be varied if desired, for example, to achieve a frame area at the outer periphery of the billboard having a different appearance than an area interior thereof.

The rods **3** can be hollow or solid, and may have any desired cross-section (e.g., circular, square, hexagonal, etc.). Each outer rod-end **3***a* may be considered to be equivalent to a pixel on a TV or computer screen. The rod ends **3***a* can be transparent or opaque and can be painted with a color of choice. Each of the rod ends **3***a* can be equipped with one or more lamps **12** to achieve a lighted display, as shown at rod **3**" in FIG. **2**. The lamps may be colored to yield a color pixel. The assembly of the framework **1** with the rods **3** can be housed in enclosures **4** and **5**. Enclosure **4** must be transparent to display the three-dimensional surface of the outer rod-ends, while enclosure **5** can be either transparent or opaque. The entire enclosure then can be supported on a support structure **6** to provide the required height for the three-dimensional billboard.

Depending upon the size of the billboard planned and depending upon the resolution required, the number of rods required and spacing between the rods can be determined. Depending on the maximum depth of the three-dimensional figure, lengths of the rods can be determined.

Movement of rods can be achieved in at least the following three different ways:

(1) Moving the individual rods manually.

(2) Moving the rods using a three-dimensional object. For instance, a three-dimensional figure such as a human face, can first be made with foam (plastic) or any other material (e.g., plaster, clay, or sheet metal). Then the foam object can be pressed against the array of rods such that rods move and the three-dimensional object will protrude from the billboard.

(3) Moving the rods automatically via actuators (e.g., mechanical, electromechanical, electromagnetic, electrostatic, thermo-mechanical, phase-change materials, pneumatic, hydraulic, etc.). This method can be used for generating the billboard advertisements remotely.

The first two methods are fairly easy and are less expensive to develop. However, operating costs will be much higher to effect the changes in rod position. The third method, however, will require higher initial costs, but much lower operating costs. The third method can be totally computerized. The third method is described in further detail in the following.

A personal computer (PC) can be used to draw the three-dimensional image that needs to be displayed on the billboard. The dimensions (or coordinates) of each pixel (for each rod) will be known from the three-dimensional drawing. If the computer is equipped with an I/O (Input/Output) control, appropriate control signals can be generated by the computer and input to the actuators. The actuators then move the rods according to the signal they receive. The color of each rod can also be set by the computer. This method can be used not only for changing the billboard display as frequently as possible, but also for display animation. An example of an animation event may be that the three-dimensional human face moves in and out of the screen slowly. Or, the three-dimensional car image moves across the billboard. If the response time of the actuators is small, faster animation of the display is possible. Remote operation can be achieved through a telephone modem line, radiowave/microwave communication or digital satellite linking.

FIG. **2** shows a sectional side view of a three-dimensional billboard taken along a vertical plane X—X in FIG. **1**. The rods **3** are coupled to respective actuators **7**, which operate to move the rods to their programmed respective positions relative to their reference which is the surface of the board **1**. When the actuators return to their reference position, the rods return to their normal position due to a spring return mechanism **6**'. The actuators are controlled via a controller **8**. The controller **8** may be a general purpose processor programmed with instructions that cause the processor to control the actuators, specific hardware components that contain hard-wired logic for controlling the actuators, or any other combination of general purpose computer components and custom hardware components. For example, the controller **8** may be a programmable logic controller (PLC), a microprocessor, or a computer. The program in the processor can be accessed and modified remotely via a telephone line and a modem. As mentioned above, the controller **8** may be a personal computer, which can be located remotely from the actuators.

It is desirable for the rods **3** to be continuously variable between an outermost position (as shown at rod **3**' in FIG. **2**) and an innermost position (as shown at rod **3**" in FIG. **2**), in order to provide the best resolution and visual effect. However, depending upon the type of controller **8** and/or actuator **7** that is used, it may not be possible to continuously vary the movement of the rods **3**. Continuous variability of the position of the rods **3** is not necessary, as long as there are several step-wise incremental positions between the outermost position and the innermost position. In another embodiment, a single actuator can move the rods one at a time in a programmed sequence. In this method, animated three-dimensional display is not possible. In yet another embodiment using a single actuator, the actuator can move a three-dimensional object which will in turn push multiple rods simultaneously. In this approach, animated display can be achieved.

FIG. **3** shows another embodiment for constructing the framework or board **1** that houses the rods. It can be constructed using two thin plates **9** (e.g., plastic, foam, metal or plywood) that are separated by the required distance that prevents the movement of the rods in any other direction than the depth of the board. The plates **9** can be held together by appropriate fastening members **10**.