SCANNING BRAILLE PRESENTATION

INCORPORATION BY REFERENCE

Applicant(s) hereby incorporate herein by reference, any and all U.S. patents, U.S. patent applications, and other documents and printed matter cited or referred to in this application.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to Braille displays and more particularly to such a display providing a scanning carriage of Braille character units adapted for programming using electrical circuits.

2. Description of Related Art

The following art defines the present state of this field:

Newell, U.S. Pat. No. 909,444 describes a stipple member comprising a body portion provided with a plurality of closely spaced transverse holes, and a plurality of stipples therefor each provided with a head having a conical reduction at the rear portion and a reduced stem portion.

Janecek, U.S. Pat. No. 1,049,240 describes a display apparatus comprising a board formed with a plurality of inclined openings, pistons slidably arranged in the inclined openings, pneumatic means for individually sliding the pistons toward the free outer end of the openings, said means including sliding valves, means for holding the valves in open position; and means in the inclined openings for limiting the outward movement of the sliding pistons.

Abendroth, U.S. Pat. No. 3,109,168 describes a changeable indicator for a character display unit comprising, a frame, a ball indicator mounted for rotary movement on said frame, said indicator having a first distinctive identity on one hemisphere and a second distinctive identity on a second hemisphere, an electromagnetic structure having first and second coil windings with central core openings and a movable core member located therein, a gear sector operatively connected to said core member, a pinion gear mounted on said frame in intermeshed relationship with said gear sector operatively connected to said ball indicator, a pair of stop pins mounted on said frame for determining the terminal positions of movement of said gear sector, energizing means for selectively energizing said first and second coil windings of said electromagnetic structure and a spring biased toggle device operated by said gear sector in response to the movement of said core member toward said one selectively energized coil windings to retain said ball indicator in its last operated position as determined by the movement of said gear sector into registry with one of said stop pins when said one selected first and second coil windings is deenergized.

Schwartz, U.S. Pat. No. 3,199,098 describes a variable display system comprising a multiplicity of rods fixed in seriatim in an endless loop that includes a viewing plane; a number of spherical elements mounted on each rod, having hemispheres of contrasting colors, each element having a write gear; means for transporting said rods and elements in such endless loop; and means for engaging the write gears selectively to present the desired hemispheres for display in the viewing plane.

McGuire et al., U.S. Pat. No. 3,267,455 describes a reflective display member comprising, a displaceable element having oppositely disposed portions with different reflective characteristics and including a magnetized element having poles of opposite magnetic polarity each respectively positioned centrally of a respective different reflective portion, a fixed magnetic member positioned contiguous to said displaceable element, said fixed magnetic member coacting with one of the poles of said magnetized element for maintaining said displaceable element in a first stable state wherein one reflective characteristic is visible and coacting with the other pole of said magnetized element for maintaining said displaceable element in a second stable state wherein only the other reflective characteristic is visible, first selectively operable means for establishing a first unidirectional magnetic field to interact with the magnetic field of said magnetized element to cause said displaceable element to be displaced to a transient position intermediate to said first and second states wherein neither of the poles of said magnetized element is closely adjacent to said fixed magnetic member, and second selectively operable means for establishing a second unidirectional magnetic field to interact with the field of said magnetized element to displace said displaceable element to one or the other of its stable states wherein one or the other of the poles of said magnetized element is closely adjacent said fixed magnetic member.

Caritato, U.S. Pat. No. 3,949,392 describes a display apparatus having a display surface formed by an array of contiguous elements which are rotatable about vertical shafts to display a surface of contrasting appearance to the background appearance of the display surface thereby forming a mosaic displaying information. A column of solenoid operated actuator devices is driven along the back of the display surface and selected devices operate to rotate selected ones of the elements in each vertical shaft. The elements have a generally cubic overall shape with their vertical surfaces being cylindrically concave to allow rotation of an element without causing movement of a contiguous element. The bottom surfaces of the elements are grooved and arranged so as to co-operate with fixed horizontal members to provide an indexing arrangement. In addition, vertically extending channels communicate with the bore of each element to allow rain water to flow freely down the display surface. To assist the flow the top of the elements can have a frusto-conical recess.

Romney, U.S. Pat. No. 4,006,476 describes a changeable display apparatus and method which is made up of a group of similar individual character modules, disposed in a substantially continuous viewing surface, each module comprising support panel or base and a set of identical and changeable elements so it can represent any desired one of a character group, e.g., any letter of the alphabet. Each display element comprises a molded two-piece housing body designed to pivotally support a rotatable magnetic display piece having a relatively visible light-showing or light-reflective face and a dark or non-visible face which can be moved selectively to a viewing position. Solenoid means individual for rotating each element show a desired face selectively, so that selected elements in any module as desired may be shifted either in unison, or preferably sequentially, to show individual display characters or symbols, such as a letter of the alphabet or an arabic numeral, etc. The light-showing face, per se, is designed preferably to operate essentially without electrical or other energy consumption. Access to mounting means for the elements on the base panel is provided by slightly truncating the corners of each housing body.

Bradshaw, U.S. Pat. No. 4,021,946 describes a sign display comprising a plurality of triangular display elements each having three display surfaces. The display elements are