

Aug. 9, 1966

H. W. BECKWITH
DISPLAY BOARD HAVING CONCENTRIC CYLINDER
INDICATING ELEMENTS

3,266,019

Filed Aug. 24, 1962

3 Sheets-Sheet 1

Fig. 1.

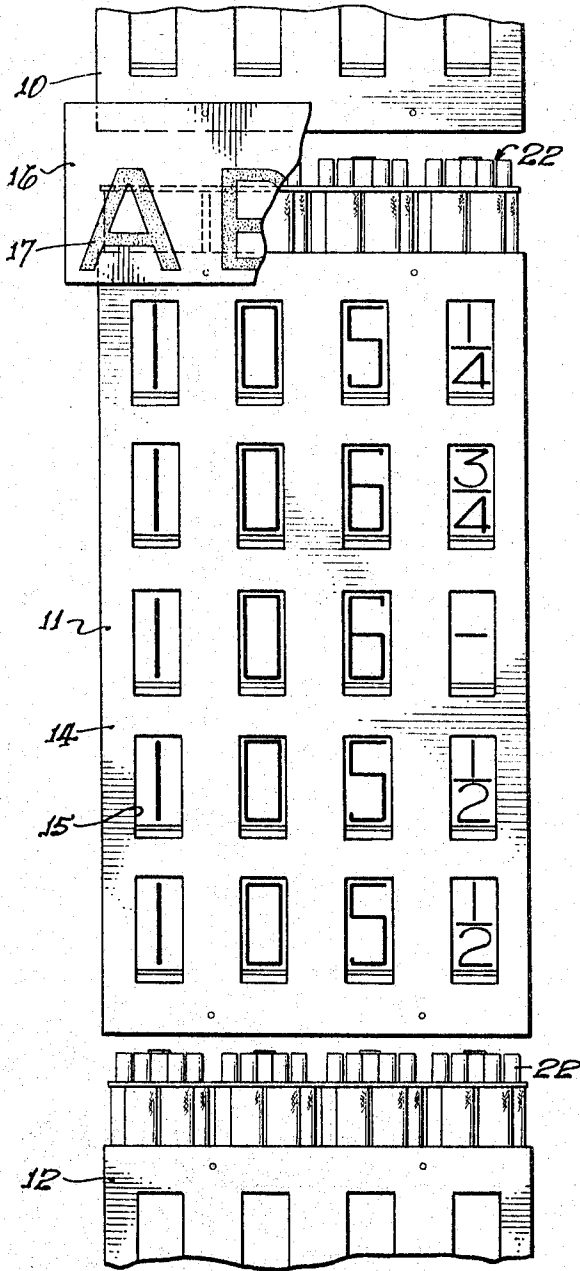
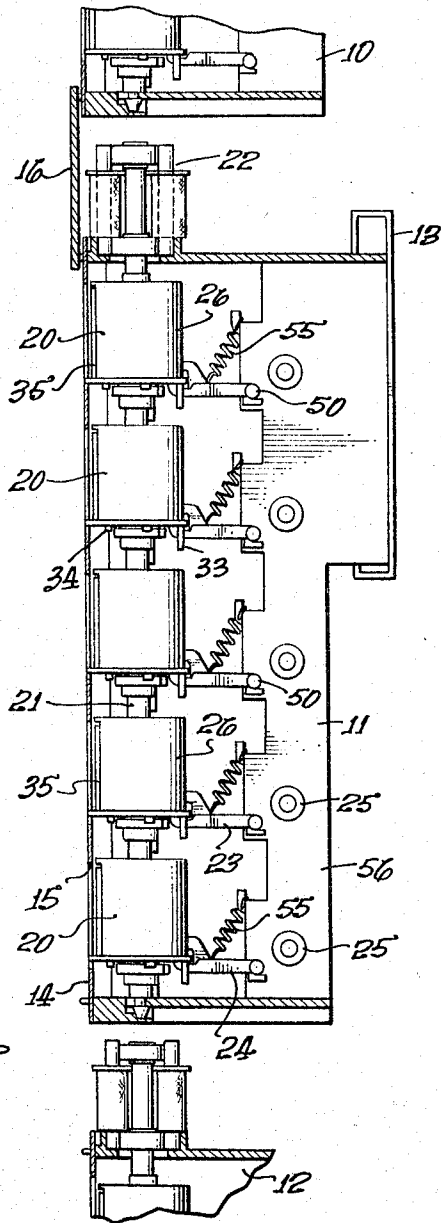


Fig. 2.



HOWARD W. BECKWITH,
INVENTOR.

BY HIS ATTORNEYS.

HARRIS, KUECH, RUSSELL & KERN.

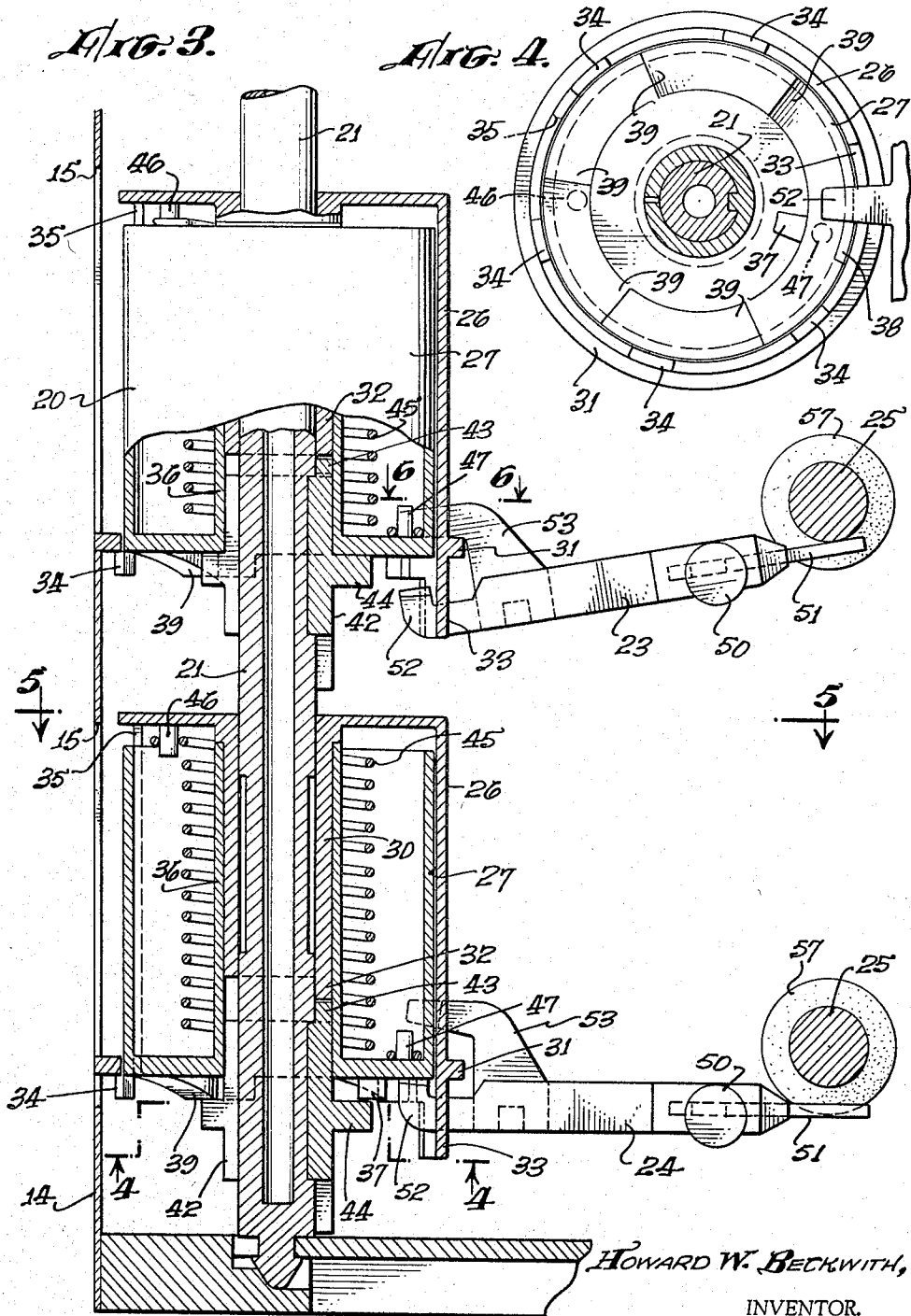
Aug. 9, 1966

H. W. BECKWITH
DISPLAY BOARD HAVING CONCENTRIC CYLINDER
INDICATING ELEMENTS

3,266,019

Filed Aug. 24, 1962

3 Sheets-Sheet 2



HOWARD W. BECKWITH,
INVENTOR.

BY HIS ATTORNEYS.

HARRIS, KNECH, RUSSELL & KERN

Aug. 9, 1966

H. W. BECKWITH
DISPLAY BOARD HAVING CONCENTRIC CYLINDER
INDICATING ELEMENTS

3,266,019

Filed Aug. 24, 1962

3 Sheets-Sheet 3

Fig. 7.

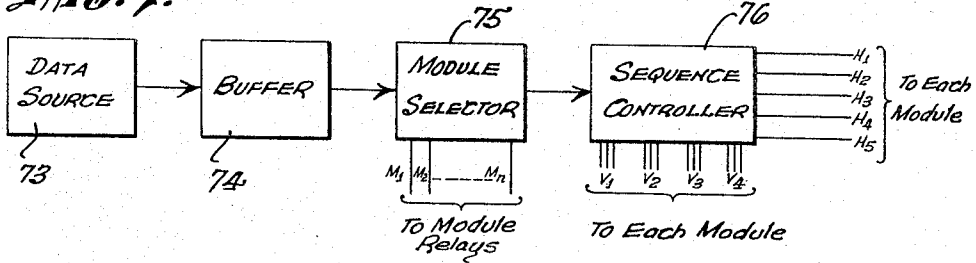


Fig. 8.

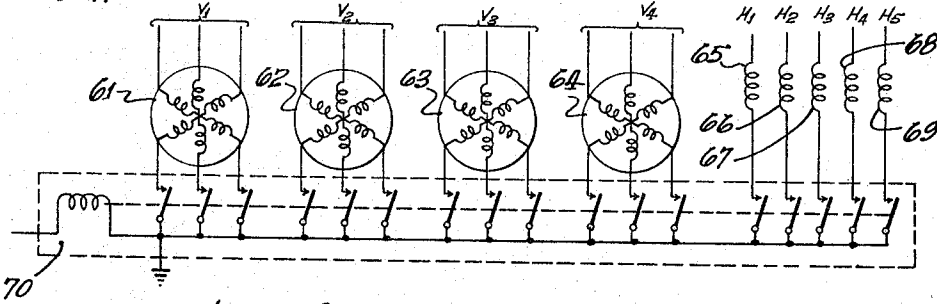


Fig. 5.

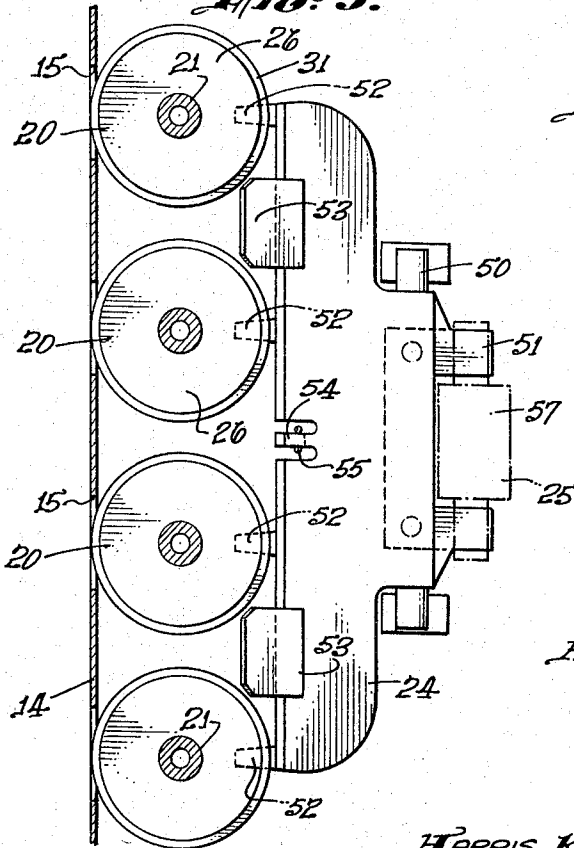
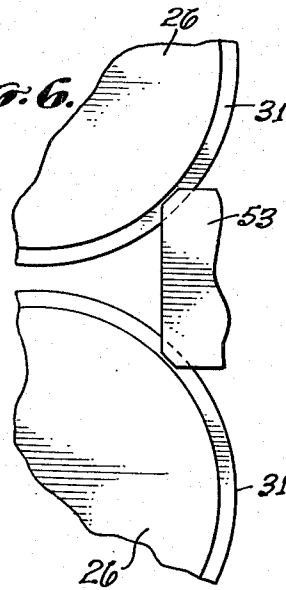


Fig. 6.



HOWARD W. BECKWITH,
INVENTOR.

BY HIS ATTORNEYS.

HARRIS, KIECH, RUSSELL & KERN.

1

3,266,019

DISPLAY BOARD HAVING CONCENTRIC
CYLINDER INDICATING ELEMENTS

Howard W. Beckwith, Malibu, Calif., assignor to Scantlin
Electronics, Inc., Los Angeles, Calif., a corporation of
Delaware

Filed Aug. 24, 1962, Ser. No. 219,260
15 Claims. (Cl. 340—154)

This invention relates to symbol display systems which provide for display of a large number of symbols and for quick and automatic changing of any symbol in response to randomly received input data. The invention will be described herein as embodied in a stock price display board for use at a stock brokerage office but the apparatus is equally suitable for use in displaying many other types of data.

It is an object of the invention to provide a symbol display board which can handle a large number of items such as stocks, and provide various data on each item such as the previous close price, the open price, the daily high, the daily low, and the last price. A further object is to provide such a display board which permits rapid changing of any price in random order as received to provide a minimum time lag between transmission of the price data and display thereof. Another object is to provide such a device which requires a minimum complexity of equipment.

It is an object of the invention to provide a symbol display board which is quiet in operation, economical to install and operate, durable and reliable, and adapted to module construction permitting rapid servicing by substitution of plug-in modules.

It is a particular object of the invention to provide a symbol display board having a substantial increase in symbol size for a given wall area over that of conventional display boards. A particular object is to provide such an apparatus in which a set of symbols is carried on a pair of concentric cylinders with a portion of the set displayed by rotation of the outer cylinder and the remainder of the set displayed by rotation of the inner cylinder, the inner cylinder being viewed through an aperture in the outer cylinder. Another object is to provide such an apparatus including means for independently rotating the concentric cylinders to position each of the symbols at a viewing position with the aperture of the outer cylinder at the viewing position when the symbol carried by the inner cylinder is to be viewed.

It is a particular object of the invention to provide a symbol display unit including a pair of concentrically positioned cylinders and means for rotating the outer cylinder through substantially a revolution in one direction for positioning each of the symbols thereon at a viewing position and means for rotating the inner cylinder through substantially one revolution in the opposite direction for positioning each of the symbols thereon at the viewing position.

It is an object of the invention to provide a board for displaying a plurality of symbols in a matrix of rows and columns including a plurality of symbol units each comprising a pair of concentric cylinders, means for mounting the symbol units in a plurality of rows and columns, column means for selectively rotating the inner cylinder and the outer cylinder of the units of a column, and row means for selecting one symbol unit of a column for actuation by the column means.

It is an object of the invention to provide such a display board including a plurality of shafts arranged in a row with each shaft carrying a plurality of symbol units in a column and having a plurality of inner and outer cylinder driving members for engaging corresponding

2

driving members of the cylinders carried thereon, with each symbol unit independently axially movable on its shaft between a locking position and a driving member engaging position. A further object is to provide such a display board including means for rotating each of the shafts thereof in either direction through a predetermined angle for moving selected cylinders to the desired indications. An additional object is to provide such a display board including symbol unit selection means for moving the cylinders of a symbol unit from the locking position to the shaft engaging position and return with the selection means including locking means for engaging detent members of the cylinders when moved to the locking position for maintaining the cylinders in the set indications produced by shaft rotation, and with the selection means including homing means for engaging the cylinder homing members when the cylinders are moved to the shaft engaging position for positioning the cylinders in an initial indication, with each of the symbol units including means urging the cylinders thereof contrarotatingly to the initial indication when moved from the locking position.

It is an object of the invention to provide such a display board comprising a plurality of modules each having a group of symbol units and a control switch for setting the shaft and row driving members in an active condition and in an inactive condition, a module selector unit which receives the incoming signals and actuates a particular control switch to place a particular module in the active condition, and a row and column control unit for receiving the incoming signal and actuating particular row and column driving members of each module.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. The drawings merely show and the description merely describes preferred embodiments of the present invention which are given by way of illustration or example.

In the drawings:

FIG. 1 is a front view of a display board incorporating the preferred embodiment of the invention;

FIG. 2 is a side view of the board of FIG. 1 shown partly in section;

FIG. 3 is an enlarged vertical sectional view of a portion of FIG. 2;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is a reduced sectional view taken along the line 5—5 of FIG. 3;

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 3; and

FIGS. 7 and 8 are diagrams illustrating the electrical connections of the board.

The display board of FIGS. 1 and 2 includes a large number of identical modules of which three 10, 11, 12 are shown. The modules plug into a frame 13 which provides a mechanical support for each module and electric circuit connections thereto. Each module includes a face plate 14 having a plurality of apertures 15 therein at which the symbols are positioned for viewing. A plate 16 may be affixed to the face plates of adjacent modules for closing any gaps therebetween and for carrying movable letters 17 identifying the data presented by a module.

Each module includes twenty symbol units 20 arranged in five horizontal rows and four vertical columns with a symbol unit positioned at each aperture of the face plate 14. For the stock price display board illustrated herein, the rows reading from top to bottom display the previous closing price, the opening price, the high price, the low price, and the last price for a particular stock. Of course, any combination and orientation of rows and columns of

symbol units can be utilized to present the particular data being displayed.

Each column of symbol units is carried on a shaft, such as the shaft 21, the shaft being driven by a stepping motor 22. Each row of symbol units is controlled by a selector lever, such as the levers 23, 24, with each lever actuated by an electromagnet 25. Each of the symbol units 20 comprises a pair of concentric cylinders 26, 27, as best seen in FIGS. 3 and 4. The symbols for displaying are carried on the outer surfaces of the two cylinders and preferably are equally spaced around the peripheries of the cylinders except for an aperture or transparent zone in the outer cylinder which provides for viewing of the inner cylinder therethrough. The cylinders may be arranged to carry any number of symbols, with eleven being a typical arrangement, comprising the digits zero through nine and a blank. For eleven symbols, each symbol may occupy one sixth of the periphery of the cylinder with six symbols on the inner cylinder and five symbols on the outer cylinder. The outer cylinder 26 has an inner sleeve 30 riding on the shaft 21, an outer flange 31 which may be the same color as the symbols to provide a baseline for the display, a driving member 32 on the sleeve 30, a homing member 33 for engaging the selector lever, and five detent members 34, with the homing member 33 serving as a sixth detent member. A sixty degree aperture or transparent zone 35 in the wall of the outer cylinder permits viewing of the inner cylinder therethrough. The inner cylinder has an inner sleeve 36 riding on the sleeve 30 of the outer cylinder, a driving member 37, a homing member 38, and five detent members 39, with the homing member 38 serving as a sixth detent member.

A collar 42 is carried on the shaft 21 for rotation therewith and includes an outer cylinder driving boss 43 and an inner cylinder driving boss 44. A spring 45 is positioned within the cylinders engaging a boss 46 on the outer cylinder and a boss 47 on the inner cylinder, urging the outer cylinder clockwise and the inner cylinder counterclockwise as viewed from the bottom and as shown in FIG. 4.

Each of the row selector levers, such as the levers 23, 24, includes a pivot shaft 50, an armature 51, four detent fingers 52, two flange engaging plates 53, and a spring boss 54. A tension spring 55 is positioned between the spring boss 54 and the module frame 56 for urging the selector lever upward. Energization of coil 57 of the magnet 25 attracts the armature 51 of the lever, moving the lever from the upward position shown in the lower portion of FIG. 3 to the downward position shown in the upper portion of FIG. 3.

The lower symbol unit of FIG. 3 is in the normal position. The row selector lever 24 is in its upward setting with the detent finger 52 engaging the inner and outer cylinders and raising the cylinders out of engagement with the collar 42 of the shaft. A change in setting of the symbol unit is carried out as follows. The magnet 25 is energized for the row in which is located the symbol unit to be changed, moving the corresponding row selector lever downward. The cylinders normally move downward on the shaft under the influence of gravity, coming to rest on the collar 42. Alternatively, the row selector lever may be used to move the cylinders in both directions on the shaft, or a spring may be utilized to aid the force of gravity. In the particular embodiment shown herein, the flange engaging plate 53 engages the flange 31 of the outer cylinder only if the cylinders have stuck in the upper position thus providing the necessary impact for starting the downward movement of the cylinders. It should be noted that each pair of cylinders in the row are moved downward when a row selector lever moves downward.

Now the detent finger 52 of the selector lever is out of engagement with the detent members of the inner and outer cylinders, as seen in the upper portion of FIG. 3, permitting the spring to rotate both cylinders to their

initial conditions with the homing members 33, 38 engaging the detent finger 52, as seen in FIG. 4.

Each of the shafts is now rotated by its stepping motor to display the new price or other piece of data. The stepping motor provides for rotating the shaft in either direction from the zero or initial position. Clockwise rotation of the shaft as viewed from the bottom engages the collar driving boss 44 with the inner cylinder driving member 37 to move the inner cylinder against the urging of the spring 45. Similarly, counterclockwise rotation of the shaft as viewed from the bottom engages the collar driving boss 43 with the outer cylinder driving member 32 for driving the outer cylinder against the urging of the spring 45. It should be noted that while five sets of cylinders are carried on a shaft, only the particular cylinder set which has been moved downward by the actuated row selector lever is driven by the rotating shaft. The shaft driving motor is preferably set to drive the shaft and cylinder past the desired cylinder position, typically about fifteen degrees of arc past the final location. After the shafts have been rotated, the row selector magnet is de-energized and the row selector lever is raised by the spring 55. The row selector lever engages and lifts the cylinders upward out of engagement with the shaft collar. When freed of engagement with the shaft collar, the spring 45 causes the cylinders to rotate to engage the detent members thereof with the detent finger of the row selector lever. The detent members are positioned on the cylinders so as to exactly position the symbols on the cylinders at the aperture of the panel. Each of the symbol units has now been set to the new value to display the new price and the operation is complete. The shafts may be returned to the initial position at this time or may be returned to the initial position at the initiation of a change cycle.

With the unique structure described herein, rotation of the shaft through three hundred degrees in one direction provides six different symbols for viewing while rotation of the shaft through three hundred degrees in the opposite direction provides five additional symbols for viewing. Thus the symbol unit provides eleven symbols each one sixth of a circle in size, a marked improvement over display units using a single cylinder in which each of the eleven symbols could not be more than thirty-three degrees wide.

The electrical circuitry for a module is shown in FIG. 8. Four stepping motors 61, 62, 63, 64 corresponding to the stepping motor 22 of FIG. 2 provide for driving the column shafts. Five electromagnets 65, 66, 67, 68, 69 corresponding to the magnet 25 of FIG. 3 provide for actuating the row selector levers. In the particular form of stepping motor shown herein, each motor has three windings which may be selectively energized with positive and negative currents to advance the rotor thereof in either direction to any desired angular position. Motors of this type are well known in the art. A control switch, such as the relay 70, provides for switching all of the stepping motors and solenoids of a module between the inactive condition shown in FIG. 8, and an active condition in which each of the leads is connected to circuit ground. With the relay 70 unenergized and the module in the inactive condition, application of signals to any of the leads V_1-V_4 , H_1-H_5 produces no operation in the module. With the relay 70 energized and the module in the active condition, application of signals to any of the leads provides the operation previously described.

The electrical control system for a complete display board is shown in FIG. 7. The information to be displayed is fed from a data source 73 through a buffer 74 which provides temporary storage facilities, to a module selector 75 and a sequence controller 76. The incoming information will have a module identification portion, a symbol identification portion and a symbol value. For example, when used for displaying stock prices, the incoming information will include identification of the stock, identification of the data such as a new high, a new

low, or a last price, and the price itself. The module selector 75 has a plurality of output lines M_1-M_n for energizing the relay 70 of each of the modules. The module selector applies a relay actuating voltage to the particular output line connected to the module which displays the price data for the particular stock on which information has just been received. This module will be switched to the active condition and maintained thus until the change operation is complete.

The sequence controller 76 has five output lines H_1-H_5 with the line H_1 connected to the magnet 65 of each module and with the remaining lines similarly connected to the other solenoids. The sequence controller also has four sets of output lines V_1-V_4 , with the set V_1 connected to the stepping motor 61 of each module and with the remaining sets similarly connected to the other motors. The sequence controller is actuated by the symbol identification portion of the incoming data and applies an output voltage to the H output line corresponding to the particular piece of data to be changed. For the stock price example previously referred to, a new high price would call for an output voltage on line H_3 which would tend to actuate the corresponding row selector lever of each module. A new high price ordinarily will also be a new last price, calling for an output voltage on line H_5 also. Since the relay 70 is actuated in only one module, only the row selector lever or levers on the one module will be moved. The sequence controller then applies stepping voltages to the output sets V_1-V_4 to rotate the shafts to move the appropriate symbols into position for viewing. The module selector 75 and sequence controller 76 may utilize conventional switching circuits, which may be relay type or solid-state type, for performing these functions and need not be described in detail.

The control system described above provides for maximum speed of setting of the display modules while utilizing a minimum of control switching. The outputs of the sequence controller are connected at all times to each of the modules so that the output signals which actuate the row selector levers for lowering cylinders to the driving position and which actuate the stepping motors for rotating the shafts are applied to every module. However, such signals are effective only in the particular module which has previously been switched to the active condition by energization of the relay 70 from the module selector. Hence only one selection switching operation is required for each piece of data received, with the relay 70 preferably being mounted on the module itself. This permits the layout of a display board to be modified merely by rearranging the connections between the module selector and the module relays.

Although exemplary embodiments of the invention have been disclosed and discussed, it will be understood that other applications of the invention are possible and that the embodiments disclosed may be subjected to various changes, modifications and substitutions without necessarily departing from the spirit of the invention.

I claim as my invention:

1. In a board for displaying a plurality of symbols in a matrix of rows and columns, the combination of:
 - a plurality of symbol units, each of said symbol units comprising a pair of concentric cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of the inner cylinder symbols;
 - a plurality of shafts arranged in a row, with each shaft carrying a plurality of symbol units in a column, each shaft and associated inner cylinder including means engageable to drive the inner cylinder in one direction when the shaft is rotated in said one direction, each shaft and associated outer cylinder including means engageable to drive the outer cylinder in the opposite direction when the shaft is rotated in said opposite direction;

column means for rotating each of said shafts in either direction a predetermined angle; and
row means for engaging the cylinders of a row with the corresponding shafts for rotation therewith.

2. In a board for displaying a plurality of symbols in a matrix of rows and columns, the combination of:
 - a plurality of symbol units, each of said symbol units comprising a pair of concentric cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of the inner cylinder symbols;
 - a plurality of shafts arranged in a row, with each shaft carrying a plurality of symbol units in a column, each shaft and associated cylinder including means engageable to drive the inner cylinder in one direction to a set indication when the shaft is rotated in said one direction, each shaft and associated outer cylinder including means engageable to drive the outer cylinder in the opposite direction to a set indication when the shaft is rotated in said opposite direction;
 - means for rotating each of said shafts in either direction a predetermined angle; and
 - means for moving the cylinders of a symbol unit from a locking position to a shaft engaging position and return, including means for locking each associated cylinder at its set indication when moved out of engagement with a shaft, each of said symbol units including means urging the cylinders thereof to an initial indication when moved from its locking position.
3. In a board for displaying a plurality of symbols in a matrix of rows and columns, the combination of:
 - a plurality of symbol units, each of said symbol units comprising a pair of concentric cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of the inner cylinder symbols, each cylinder having a driving member, a homing member, and a plurality of detent members corresponding to the symbols carried thereon;
 - a plurality of shafts arranged in a row, with each shaft carrying a plurality of symbol units in a column and having a plurality of inner and outer cylinder driving members for engaging the driving members of the cylinders carried thereon, with each symbol unit independently axially movable on its shaft between a locking position and a driving member engaging position and with the shaft and cylinder driving members interengageable when a symbol unit is moved to the driving member engaging position;
 - means for rotating each of said shafts in either direction a predetermined angle for selectively rotating in opposite directions to set indications the inner cylinder and the outer cylinder of selected symbol units in the drive member engaging position; and
 - symbol unit selection means for moving the cylinders of at least one selected symbol unit from the locking position to the engaging position and return, said selection means including locking means for engaging said detent members when cylinders are moved to the locking position for maintaining cylinders in the set indications produced by shaft rotation, said selection means including homing means for engaging said homing members when cylinders are moved to the engaging position for positioning the cylinders in an initial indication, each of said symbol units including means urging the cylinders thereof contrarotatingly to the initial indication when moved from the locking position.
4. In a symbol display unit, the combination of:
 - a pair of concentric cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of an inner cylinder symbol; and

- a single first cylinder drive means carrying said pair of cylinders and rotatable through more than half a revolution in either direction from an initial indication position, said drive means and outer cylinder including means engageable to drive said outer cylinder in one direction to move each symbol thereon to a viewing position, said drive means and inner cylinder including means engageable to drive said inner cylinder in the opposite direction to move each symbol thereon to said viewing position.
5. In a symbol display unit, the combination of:
- a pair of concentrically positioned cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of an inner cylinder symbol;
- a rotatable cylinder shaft carrying said cylinders, said shaft and outer cylinder including means engageable to drive said outer cylinder in one direction as said shaft rotates in said one direction, said shaft and inner cylinder including means engageable to drive said inner cylinder in the opposite direction as said shaft rotates in said opposite direction; and
- a stepping motor for rotating said shaft in either direction from an initial indication position for selectively rotating said inner and outer cylinders.
6. In a symbol display unit, the combination of:
- a pair of concentrically positioned cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of an inner cylinder symbol;
- a single first cylinder drive means carrying said pair of cylinders and rotatable through more than half a revolution in either direction from an initial indication position, said drive means and outer cylinder including means engageable to drive said outer cylinder in one direction to move each symbol thereon to a viewing position, said drive means and inner cylinder including means engageable to drive said inner cylinder in the opposite direction to move each symbol thereon to said viewing position; and
- second cylinder drive means for urging both of said cylinders to said initial indication position.
7. In a symbol display unit, the combination of:
- a pair of concentrically positioned cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of an inner cylinder symbol;
- a rotatable cylinder shaft carrying said cylinders with said cylinders rotatable about said shaft and slidable along said shaft, said shaft and outer cylinder including drive means engageable to rotate said outer cylinder in one direction as said shaft rotates in said one direction, said shaft and inner cylinder including drive means engageable to rotate said inner cylinder in the opposite direction as said shaft rotates in the said opposite direction;
- means for moving said cylinders along said shaft between a first drive means engaging position and a second drive means disengaging position; and
- means for rotating said shaft in either direction from an initial indication position for selectively rotating said inner and outer cylinders when in said first position.
8. In a symbol display unit, the combination of:
- a pair of concentrically positioned cylinders, each cylinder having a series of symbols on the outer surface thereof and a cylinder setting means for each symbol thereon for setting a symbol at a viewing location, the outer cylinder having an aperture for viewing of an inner cylinder symbol;
- a rotatable cylinder shaft carrying said cylinders, said shaft and outer cylinder including drive means engageable to rotate said outer cylinder in one direction, said shaft and inner cylinder including drive means engageable to rotate said inner cylinder in the

- opposite direction, said cylinders being axially movable on said shaft between a locking position and a drive means engaging position;
- cylinder drive means urging said cylinders contrarotatingly to said shaft;
- selection means for moving said cylinders along said shaft between said locking and drive engaging positions, said selection means including means for engaging a cylinder setting means when said cylinders are moved to said locking position to maintain a symbol at said viewing location against the urging of said cylinder drive means; and
- shaft drive means for rotating said shaft in either direction from an initial indication position for selectively rotating said inner and outer cylinders when in said drive engaging position to angular positions beyond the desired setting position against the urging of said cylinder drive means, with said cylinder drive means returning the cylinder to the desired set position.
9. In a symbol display unit, the combination of:
- a pair of concentrically positioned cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of an inner cylinder symbol;
- a rotatable cylinder shaft carrying said cylinders with said cylinders rotatable about and slidable along the axis of said shaft, said shaft and outer cylinder including drive means engageable to rotate said outer cylinder in one direction, said shaft and inner cylinder including drive means engageable to rotate said inner cylinder in the opposite direction;
- a cylinder moving lever pivoted about an axis perpendicular to the axis of said shaft and engageable with said cylinders;
- means for moving said lever between first and second positions for moving said cylinders along the axis of said shaft between a first shaft drive means engaging position and a second drive means disengaging position; and
- means for rotating said shaft in either direction from an initial indication position for selectively rotating said inner and outer cylinders when in said first position.
10. An apparatus as defined in claim 9 in which said shaft axis is vertical and in which said cylinders are moved downward to said first position by the action of gravity following movement of said lever to said first position.
11. An apparatus as defined in claim 9 in which said lever directly engages at least one of said cylinders for movement in each direction.
12. An apparatus as defined in claim 9 in which said shaft axis is vertical and including spring means for urging said cylinders downward to said first position.
13. In a board for displaying a plurality of groups of symbols and changing the displayed symbols at random in response to signals from a symbol information source, each signal including a module identification portion, a symbol identification portion and a symbol value, the combination of:
- a plurality of symbol display modules, each module providing a group of symbols and having a plurality of symbol units arranged in a matrix of rows and columns with each symbol unit comprising a pair of concentric cylinders having a series of symbols on the outer surfaces thereof with the outer cylinder having an aperture for viewing of the inner cylinder symbols, each module including a plurality of row setting means and a plurality of column setting means whereby actuation of a row setting means and a column setting means permits changing of the symbol value of a symbol unit by selective rotation of a cylinder of the pair to position a symbol for viewing;

9

a control switch for each module for setting the row and column setting means of the module in a first inactive condition and a second active condition;
 a module selector unit having the signals as an input and selectively actuating the control switch of the module corresponding to the module identification portion of a signal to said active condition; and
 a setting means control unit having the signals as an input and selectively actuating in all modules the row and column setting means corresponding to the symbol identification portion of the signal to set the new symbol value for viewing in the particular symbol unit having the row and column setting means thereof in the said active condition.

14. In a board for displaying a plurality of symbols in a matrix of rows and columns, the combination of:

a plurality of symbol units, each of said symbol units comprising a pair of concentric cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of the inner cylinder symbols;

a plurality of shafts arranged in a row, with each carrying a plurality of symbol units in a column; and means for selectively rotating each of said shafts a predetermined angle in either direction from a neutral position;

said cylinders and shafts having interengaging drive elements for rotating an inner cylinder by shaft rotation in one direction from the neutral position and for rotating the concentric outer cylinder by shaft rotation in the opposite direction from the neutral position.

15. In a board for displaying a plurality of symbols in a matrix of rows and columns, the combination of:

10

a plurality of symbol units, each of said symbol units comprising a pair of concentric cylinders, each cylinder having a series of symbols on the outer surface thereof, the outer cylinder having an aperture for viewing of the inner cylinder symbols;

means for mounting said symbol units in a plurality of rows and columns;

column means for rotating the inner cylinder and the outer cylinder of the units of a column and including a single drive shaft for each column with the units of the column mounted thereon, said shaft including drive means for selectively and independently driving the inner and outer cylinders of a unit; and

row means for selecting one symbol unit of a column for actuation by said column means.

References Cited by the Examiner

UNITED STATES PATENTS

1,923,759	8/1933	Smith	340-154
1,952,513	3/1934	Reynolds	340-154
2,010,158	8/1935	Kelinschmidt et al.	340-154
2,145,032	1/1939	Smith	340-154
2,200,802	5/1940	Morton	340-154
2,244,665	6/1941	Allen et al.	340-154
2,264,563	12/1941	Bumstead	340-154
2,375,383	5/1945	Potts	340-154 X
2,456,226	12/1948	Thorpe	340-154
3,069,082	12/1962	Garland et al.	

FOREIGN PATENTS

240,836 5/1946 Switzerland.

DAVID G. REDINBAUGH, *Primary Examiner.*

35 H. PITTS, *Assistant Examiner.*