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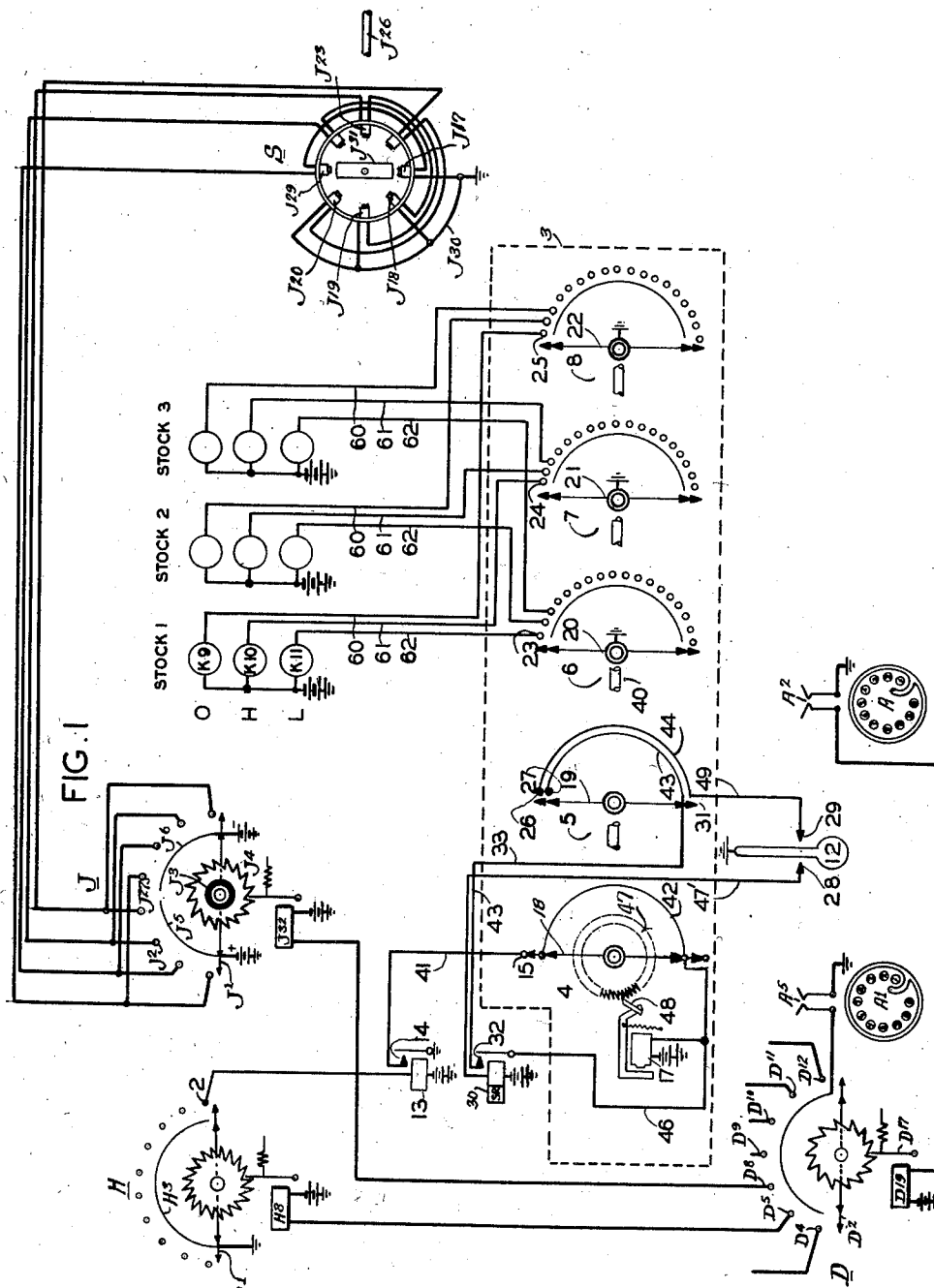
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1,967,331

AUTOMATIC QUOTATION BOARD

Filed Aug. 16, 1929

2 Sheets-Sheet 1



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FIG. 2

STOCK DIAL UNIT ONE

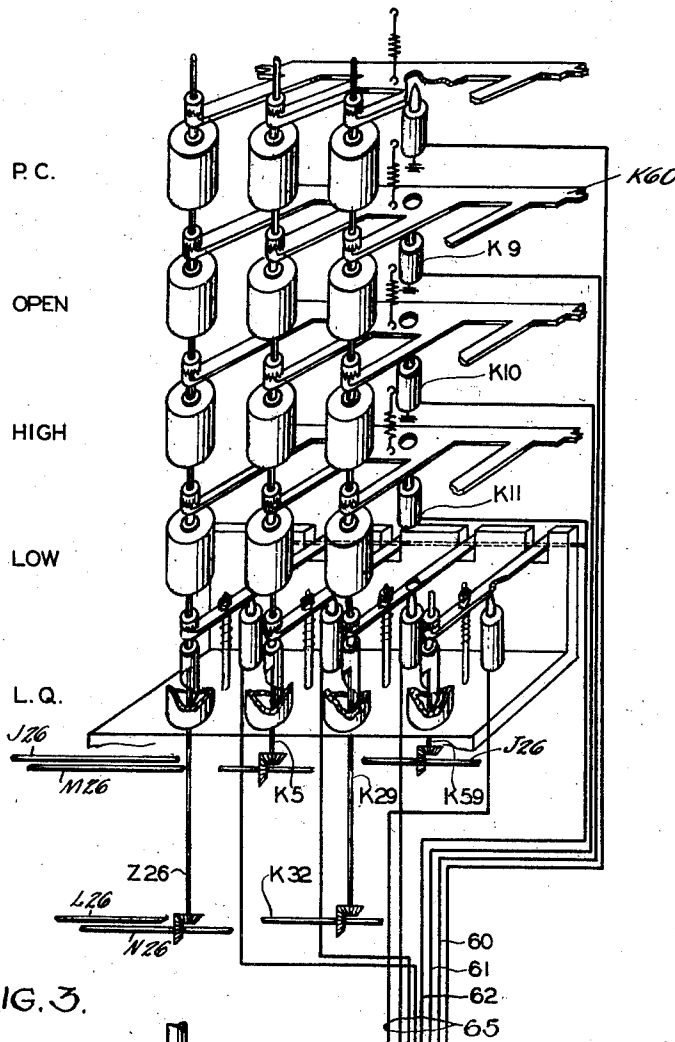
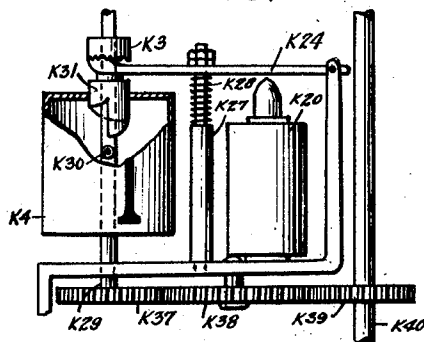


FIG. 3.



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AUTOMATIC QUOTATION BOARD

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9 Claims. (Cl. 177—353)

The present invention relates generally to stock quotation systems, and more particularly to automatic means for setting the indicators on certain shelves of each stock unit in a quotation board to blank position at the end of the market day.

In the automatic stock quotation board disclosed in applicant's co-pending application, Serial Number 382,268, filed July 30, 1929, the sending operator is required to send one series of impulses for setting the desired indicators in each stock unit to blank position. As a stock quotation board ordinarily displays quotations on two hundred or more stocks, the operation of preparing that board for the opening quotations of the following day requires considerable time.

Accordingly, an object of the present invention is to simplify this operation by requiring the sending operator to send only two series of impulses, one serving to set all of the indicator positioning shafts to blank position and the other serving to select a sequence switch that successively selects all the stock units on the board and, upon the selection of each unit, sets the indicators on the open and high and low shelves of each stock unit to blank position. When all of the desired indicators on the board have been set to blank, the sequence switch comes to rest until it is again selected. The arrangement for successively blanking the indicators as set forth in this invention is desirable in order not to disturb the setting of the indicator drive shafts, which would occur if a large number of indicators were to be blanked simultaneously.

In carrying out the above object the indicator positioning shafts common to the indicators on the quotation board are set to blank position by the apparatus disclosed in the above-mentioned co-pending application. The sequence switch is then selected by that apparatus in the same manner that it selects a particular stock unit. When the sequence switch is once selected, intermittently operated stepping means therein cause it to select successively the stock units on the board and to set the indicators on the open, high and low shelves of each stock unit selected to the position of the corresponding positioning shafts.

Other objects and features will be apparent from the following description, the appended claims and the drawings, wherein:

Fig. 1 illustrates schematically the sequence switch, suitable control means for positioning the indicator drive shafts and initiating the action of the switch, together with the open, high and low operating magnets for three stock units;

Fig. 2 illustrates in perspective a single stock

unit provided with previous close, open, high, low and last shelves of indicators; and

Fig. 3 illustrates the details of an indicator assembly on the last shelf.

The complete stock quotation board as set forth in applicant's copending application comprises an assembly of commodity or stock units each of which is assigned to a particular stock or commodity (Fig. 2). Each unit consists of a group of registers and each group is divided into a number of sub-groups of shelves each having a plurality of registers for indicating the several orders of digits and fractions of the price. Corresponding registers in the several shelves of the same unit, such as the register for indicating the tens digit of the price, are mounted on the same shaft.

The hundreds, tens, units and fractions of the several stock units are respectively connected through intermediate gearing to a common hundreds shaft, common tens shaft, common units shaft, and common fractions shaft. Motor means such as S (Fig. 1) are associated with each of the common shafts and a fractions, units, tens and hundreds price selector such as J is provided for variably operating the motor means associated with the digits driving shafts; a tens and a units stock or commodity selector such as H is provided for conditioning the registers of the particular stock or commodity for a subsequent operation. A shelf selector similar to H is provided for conditioning the registers on predetermined shelves of the selected unit for operation in accordance with the previous setting of the common shafts.

Since a complete description of this stock quotation system is not necessary for the purposes of this invention, only those portions that are essential are herein set forth.

Referring now to Fig. 1, A and A1 are the transmitting mechanism and shown here as conventional impulse dials. D is a sequence switch for connecting the transmitting means with the various stock, price and shelf selectors such as H and J. Dial A controls the position of switch D and dial A1 controls the positioning of selectors as H and J, if they are connected to dial A1 by D. Stock selector H normally controls the various stock relays which serve to connect the lead wires 65 of the operating magnets, such as K9, K10, K11 (Fig. 2) of a particular stock to the common leads under the control of a shelf selector (not shown) similar to selector H. J, which is shown as the fractions price selector, is similar to the hundreds, tens and units price

selectors with the exception that it has eight contacts, 7 of which represent $\frac{1}{8}$ - $\frac{7}{8}$ respectively and the eighth a blank space; while the others have 12 contacts, 10 being needed for the figures 1, 2, 3 0 and two for blank spaces. The twelfth contact is added to effect the desirable even number of spaces for the paired stator coils of the indicator shaft operating motors such as S.

The contacts of the price selectors are divided into two groups, each group having its first, second, third, etc., contact multiplied to a like contact of the other. Each pair of contacts is connected to a pair of stator coils in the associated motor such as S. The wiring of the switch is so arranged through the inside ring sections J5 and J6 that positive battery is supplied to the first half of the contacts and negative to the other by the wipers J1 and J4 (insulated from each other by ring J3) depending upon which wiper makes the first contact when the selector is actuated.

In the operation of the system the operator may first dial with A to select the first stock selector, not shown. The operation of A causes magnet D19. Wiper D2 advances and makes with contact D4. Dial A1 may now be operated to cause the selector to advance to the desired position. By advancing D2 to D5 the second stock selector H is connected to dial A1. Subsequent dialling of A1 causes stepping magnet H8 to operate and select any one of its contacts through its wiper H1. Next, the price selection is made by advancing D2 to contacts D8, D9, D10 and D11 which serve to connect the dial A1 with the fractions, units, tens and hundreds price selectors such as J, respectively. If the price has a fractions digit and D2 has been advanced to D8 the operation of dial A1 will actuate the stepping magnet J32. If the fraction is $\frac{3}{8}$ wiper J1 is advanced three steps by means of dial A1 to contact J2. Upon reaching J2 a circuit is completed from positive battery, wiper J1, contact J2, through the lead wires, to and through stator magnet J23, to and through the stator magnet J19, to ground at J30. The permanent magnet armature of the motor S is then attracted by the paired stator coil J19 and J23 so that J31 turns in a counter-clockwise direction until it is opposite J23 and J25 is then opposite coil J19. This movement of the armature, which is fastened to shaft J26, causes shaft J26 to turn, which motion is transmitted through gears and shaft K59 (Fig. 2) to position the indicator drive mechanism for subsequent operation of the indicators. If any of the shelf magnets, such as K9, K10, K11, are now operated, the fractions indicator of the shelf or shelves will turn to a position whereby the figure $\frac{3}{8}$ will be displayed. If, however, the fraction were $\frac{5}{8}$, J1 would be advanced under control of A1 until it made with contact J27. On the making of contact J27 a circuit would be completed from negative battery, wiper J1, contact J27 through the lead wires to and through the stator magnet J29 to and through the stator magnet J17 to ground at J30. If the permanent magnet armature were in the position last described, that is $\frac{3}{8}$, J25 would be attracted in a clockwise direction to stator magnet J29, and J31 likewise would be attracted to stator magnet J17. This movement of the armature is transmitted through shafts J26 and K59 to position the dial actuating means for subsequent operation of the indicators. If there are units, tens or hundreds digits to be positioned, the switch D is stepped so that its wiper D2 makes with contact

D9, D10, D11, respectively, and the same operations as heretofore described with regard to the fractions selector J take place. After the selection of the stock and the price it sometimes is desired to position the price only of a particular shelf, that is a previous close, open, high, low or last shelf. Contact D12 is connected to a switch similar to the stock selector H whose contacts are connected to the various shelf operating magnets, such as K9, K10, K11. The particular selection is made in the heretofore described manner by means of the dial A1.

At the end of the market day, the last quotation on each stock is posted on both the last and on the previous close shelves of the stock unit for displaying quotations on that stock. Following this the indicators on the open, high and low shelves of each stock unit on the board are set to blank position in preparation for the opening quotations of the next market day.

In order to carry out the design of this invention one contact of either of the stock selectors, shown in the drawings as contact 2 of the switch H, instead of being connected to a stock relay is connected to a relay 13. If contact 2 of selector H is selected, ground from ring H3 is connected through wiper H1 and contact 2 to relay 13 and battery. Operation of relay 13 serves to start the sequence switch 3 which has five banks of contacts 4 to 8 inclusive over which wipers 18 to 22, respectively, are arranged to rotate. These wipers are mounted in the usual manner on a shaft 40 which is shown broken away.

The wipers 18 to 22 of the switch are arranged to be stepped by the motor magnet 17. The motor magnet is provided with an initial and a subsequent stepping circuit. This initial operating circuit may be traced from battery, winding of motor magnet 17, common contact strip 42, contact 15, and to ground at contacts 14 of relay 13.

Mounted on the wiper shaft 40 is a ratchet 47 arranged to be advanced intermittently, step-by-step, in a clockwise direction by pawl 48 which is controlled by the motor magnet 17. When ratchet 47 is advanced by the pawl, the wipers 18 to 22 are advanced clockwise, step-by-step.

Upon the initial energization of the motor magnet 17, the wiper 18 is therefore advanced off the contact 15 and onto the common strip 42, thus opening the initial stepping circuit, the wiper 19 is advanced to bridge the common contact strips 43 and 44, and the wipers 20 to 22 make contact with the first contacts 23 to 25, respectively, of banks 6 to 8.

At this time the subsequent stepping circuit for the motor magnet 17 is closed. This stepping circuit is controlled by the pendulum 12 which serves as a conventional time control element for intermittently energizing the slow-release relay 30 and the motor magnet 17. When the pendulum closes contact 28, the slow-release relay 30 is operated over an obvious circuit. Subsequently, when the pendulum closes contact 29, the subsequent stepping circuit of the motor magnet 17 is closed. This circuit may be traced from battery, winding of motor magnet 17, contacts 32 of relay 30, strip 43, wiper 19, strip 44, to ground through contact 29. The energization of the motor magnet causes the wipers 18 to 22 to take another step. As relay 30 is slow-releasing, each time the pendulum closes contact 29 the motor magnet 17 is energized and the wipers 18 to 22 advance clockwise to another contact. In this way the wipers 18 and 19 are stepped around over the associated common strips and the wipers 20 150

to 22 are rotated over the contacts on the associated banks. When the wipers 20 to 22 have wiped over the last contact on these banks, wiper 19 no longer bridges common contact strips 43 and 44, as 44 is shorter than 43, and the motor magnet 17 and the relay 30 are de-energized, bringing the wipers 18 to 22 to rest. In this position, the wiper 18 rests on contact 15 so that the initial stepping circuit of the motor magnet 17 (previously traced) will be closed upon the selection of contact 2 of the stock selector H.

Stocks 1, 2 and 3 are each shown provided with three operating magnets K9, K10 and K11 connected to corresponding contacts in the banks over which the wipers 20 to 22 rotate. Referring now to Fig. 2, it will be seen that K9, K10 and K11 are respectively associated with the indicators on the open, high and low shelves of the stock unit 1. In the drawings, the right-hand or fractions indicator is shown only on the last shelf "LQ" and even there is shown cut away, for the purpose of showing the method of positioning the dial. The fractions dial is omitted on the previous close shelf PC, the open shelf, the high and the low shelves in order to show more clearly the armature 34 of the magnet K9, the armature 35 of the magnet K10 and the armature 36 of the magnet K11.

Referring to Fig. 3, an assembly of a display indicator unit, one of the units digits indicators K4 on the last shelf LQ (Fig. 2) is shown. As the hundreds, tens and fractions indicator assemblies on the last shelf LQ are similar to the units assemblies, a description of the latter will serve for all of them. In Fig. 2, K29, the shaft, on which K4 is mounted, is shown driven directly by the units main drive shaft K32. In actual practice, however, the K29 shaft is driven by the main units driving shaft K40 in the manner shown in Fig. 3, that is, the gear K39 rigidly mounted on shaft K40 drives the gear K37 rigidly mounted on shaft K29, through the pinion K38 which is supported by the frame.

The display indicator unit assembly includes an electromagnet K20 with its armature K24. The armature is kept in place by an upright bar K27 which passes through a hole therein and its upward range of movement is limited by nuts against which it is pressed by return spring K28 when the magnet is not energized. The outer end of the armature, when the magnet coil is energized, presses downward the display indicator drum K4 and its cam K31, mounted loosely on the shaft K29.

The indicator drum K4 is cup-shaped to make it light in weight. It carries on its periphery a series of large figures 1, 2, 3, 4 . . . 0 with two blank spaces, or one blank space of double width, between the 0 and 1. The twelve spaces are required on the periphery because of the twelve stator coils in the digits prime movers, serving to position the indicators. The fractions indicators, of course, have the figures $\frac{1}{8}$ to $\frac{7}{8}$ with one blank space between the 0 and 1 around their peripheries, only one single blank space being required because the fraction price mover of the co-pending application is provided with only eight stator coils. The outer end of the armature K24 is formed upward and is toothed, so as to effect engagement with the crown teeth on the lower surface of the retaining collar K3. Thus, as the shaft rotates K29 rotates within the assembly to its predetermined position by the driving of the rotor, the friction of the shaft against the cam cannot displace the indicator drum K4.

Also attached to the shaft K29 is a pin having

a roller K30 mounted thereon. Positioned to bear upon this roller by downward movement is the spiral outline of the cam K31 as illustrated. The downward movement of the cam upon the shaft, forced by the armature attraction to the magnet coil, presses this spiral upon the roller K30. As the roller is fixed to the shaft K29, which is in turn held by the associated rotor (not shown), the cam K31 with its attached display indicator K4 is caused to rotate until the end of the spiral is reached. The extent of movement of the indicator K4 is determined by the distance between the first point of contact of the spiral upon the roller and the end of the spiral. The required measure of movement to effect the display of any figure by the dial K4 involves the distance relations between the rotor movement, the movement of the shaft K29, the cam movement, and the figure spaces; and is a matter of constructional design. It is immaterial from what point the indicator and cam may start their movement, the correct end of the movement is attained.

Referring to Fig. 2, the indicators on the previous close, open, high and low shelves shown are of the same construction as the indicator on the last shelf, just described. There is, however, a single operating magnet K9 and a single armature K60 for positioning all of the indicators on each shelf, as the open shelf.

All of the stock units 1, 2, 3 etc. on the quotation board are identical with the one described, and all the indicators are positionable by the hundreds main drive shaft N26, the tens main drive shaft M26, the units main drive shaft L26, and the fractions main drive shaft J26. The means for setting these main drive shafts has been previously described. When these main drive shafts have been set to blank positions, and the open, high and low shelf operating magnets K9, K10 and K11, respectively, in each stock unit on the board are then energized, it is evident from the foregoing description that the indications on the open, high and low shelves on all the stock units will be set to blank position.

It has previously been explained that, upon the selection of the contact 2 in the stock selector H, the sequence switch 3 is started and its grounded wipers 20 to 22 are stepped over successive contacts in the associated banks 6 to 8 respectively. As the open, high and low shelf operating magnets K9 to K11 are connected to the first contact in each of these contact banks, and the open, high and low shelf operating magnets of the remaining stock units of the board are connected to subsequent corresponding contacts in these banks, it is evident that the open, high and low shelf operating magnets in all the stock units on the board are successively operated as the grounded wipers 20 to 22 rotate over the contacts in the banks 6 to 8, respectively.

It is, of course, obvious that by adding additional contact banks to the switch 3, the indicators on the previous close and last shelves of each stock unit on the board can be likewise set to blank when the switch 3 is selected.

A modification of this invention is applicable to such a stock quotation board as set forth in applicant's British Patent No. 363,395. In that particular type of quotation board it is a feature that the indicator drive shafts are automatically returned to a blank position after the posting of each quotation. Therefore, instead of connecting the starting relay 13 to a contact on the stock selector of the system, it is only necessary to substitute a grounded push button for the contact.

Upon the completion of the day's transaction the operator would, by operating the push button, supply the necessary ground impulse to relay 13 to start the operation of the sequence switch 3.

Other modifications of the principal design of this invention are possible without essential departure therefrom and the appended claims are to be construed as broadly as is consistent with the real spirit and scope of the invention.

I claim:

1. In a stock quotation system, a quotation board provided with a plurality of stock units each having a plurality of price indicators, a plurality of shafts, means for setting the shafts independently of one another to blank position, each group of corresponding indicators in the different units being associated with one of said shafts, means including a sequence switch effective, when selected, to select successively the stock units on the board, means for selecting said switch, and means in each stock unit, responsive to the selection of the unit, for setting the indicators therein to the positions of their associated shafts.

2. In a stock quotation system, a quotation board provided with a plurality of stock units each having a plurality of price indicators, a plurality of shafts, means for setting the shafts independently of one another to predetermined positions, each group of corresponding indicators in the different units being associated with one of said shafts, means including a sequence switch effective, when selected, to select successively the stock units on the board, means for selecting said switch, and means in each stock unit, responsive to the selection of the unit, for setting the indicators therein to the positions of their associated shafts.

3. In a stock quotation system, a quotation board provided with a plurality of stock units each comprising an "open", "high" and "low" shelf of price indicators, a plurality of shafts means for setting the shafts independently of one another to blank position, each group of corresponding indicators in the different units being associated with one of said shafts, a magnet for each shelf operable when energized to set all the indicators thereof to positions corresponding to the positions of the shafts, means including a sequence switch effective, upon its selection, to complete operating circuits for the magnets in the several units, unit by unit, and means for selecting said switch.

4. In a stock quotation system, a quotation board provided with a plurality of stock units each having a plurality of price indicators, common driving means for each group of corresponding indicators on the board, means for setting each driving means independently of the other driving means to blank position, means including a sequence switch effective, when selected, to select successively the different stock units on the board, and means in each stock unit, responsive to the selection of the unit, for setting the indicators of the unit to the positions of their associated driving means.

5. In an indicator system, a display board provided with a plurality of indicator units each having a plurality of indicators, a plurality of shafts, means for setting the shafts independently of one another to blank position, each group of corresponding indicators on said board being associated with one of said shafts, means including a sequence switch, effective when selected, to select successively the different indi-

cators on the board, means for selecting said switch, and means in each indicator unit, responsive to the selection of the unit, for setting the indicators thereof to the positions of their associated shafts.

6. In a stock quotation system, a quotation board provided with a plurality of stock units each having a plurality of price indicators, a plurality of shafts, means for setting the shafts independently on one another to blank position, each group of corresponding indicators in the different units being associated with one of said shafts, means including a sequence switch for successively selecting the stock units on the board, means for selecting said switch, means in each stock unit, responsive to the selection of the unit, for setting the indicators therein to the positions of their associated shafts, stepping means for the switch, means responsive to the selection of the switch for initially actuating said stepping means, and means thereafter effective for intermittently actuating said stepping means until all the stock units have been selected by the switch.

7. In a stock quotation system, a quotation board provided with a plurality of stock units each having a plurality of price indicators, a plurality of shafts, means for setting the shafts independently of one another to blank position, each group of corresponding indicators in the different units being associated with one of said shafts, means including a sequence switch for successively selecting the stock units on the board, means for selecting said switch, means in each stock unit, responsive to the selection of the unit, for setting the indicators therein to the positions of their associated shafts, stepping means for the switch, means responsive to the selection of the switch for initially actuating said stepping means, and means thereafter effective for intermittently actuating said stepping means until all the stock units have been selected by the switch, said switch being removed from operative relation with said selecting means upon its initial actuation and restored to operative relation therewith after its final actuation.

8. In a stock quotation system, a quotation board provided with a plurality of stock units, each having a plurality of price indicators, a plurality of shafts, means for setting said shafts to predetermined positions, each group of corresponding indicators in the different units being associated with one of the shafts, means including a sequence switch effective, when started in operation, to select successively the stock units on the board, means for starting said sequence switch in operation, and means in each stock unit, responsive to the selection of the unit, for setting the indicators therein to the positions of their respective associated shafts.

9. In a stock quotation system, a quotation board provided with a plurality of stock units each comprising a shelf of price indicators, a plurality of shafts, means for setting the shafts independently of one another to blank position, each group of corresponding indicators in the different units being associated with one of said shafts, a magnet for each shelf operable when energized to set all the indicators thereon to positions corresponding to the positions of the shafts, means including a sequence switch effective upon selection thereof to complete operating circuits for the magnets in the several stock units, unit by unit, and means for selecting said switch.