

Aug. 23, 1938.

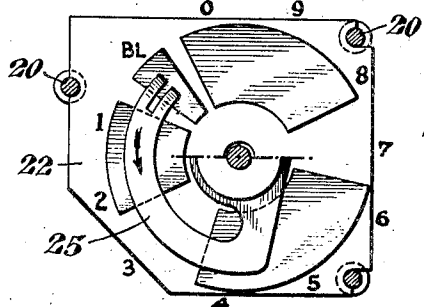
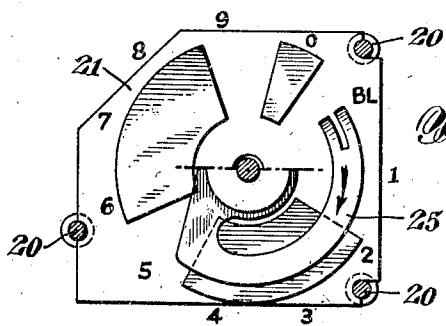
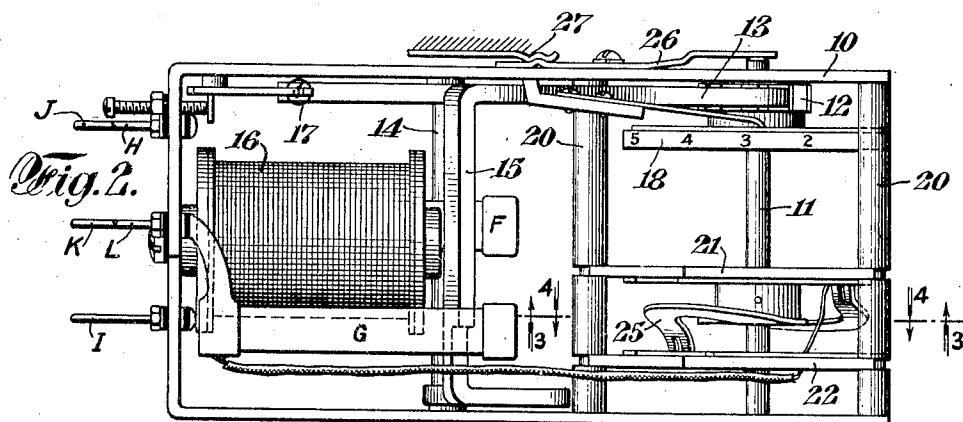
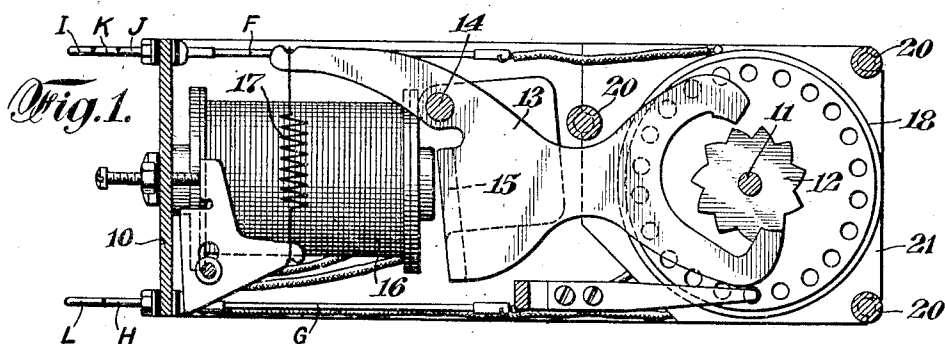
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2,127,733

CODING AND DECODING APPARATUS

Filed Oct. 26, 1932

3 Sheets-Sheet 1



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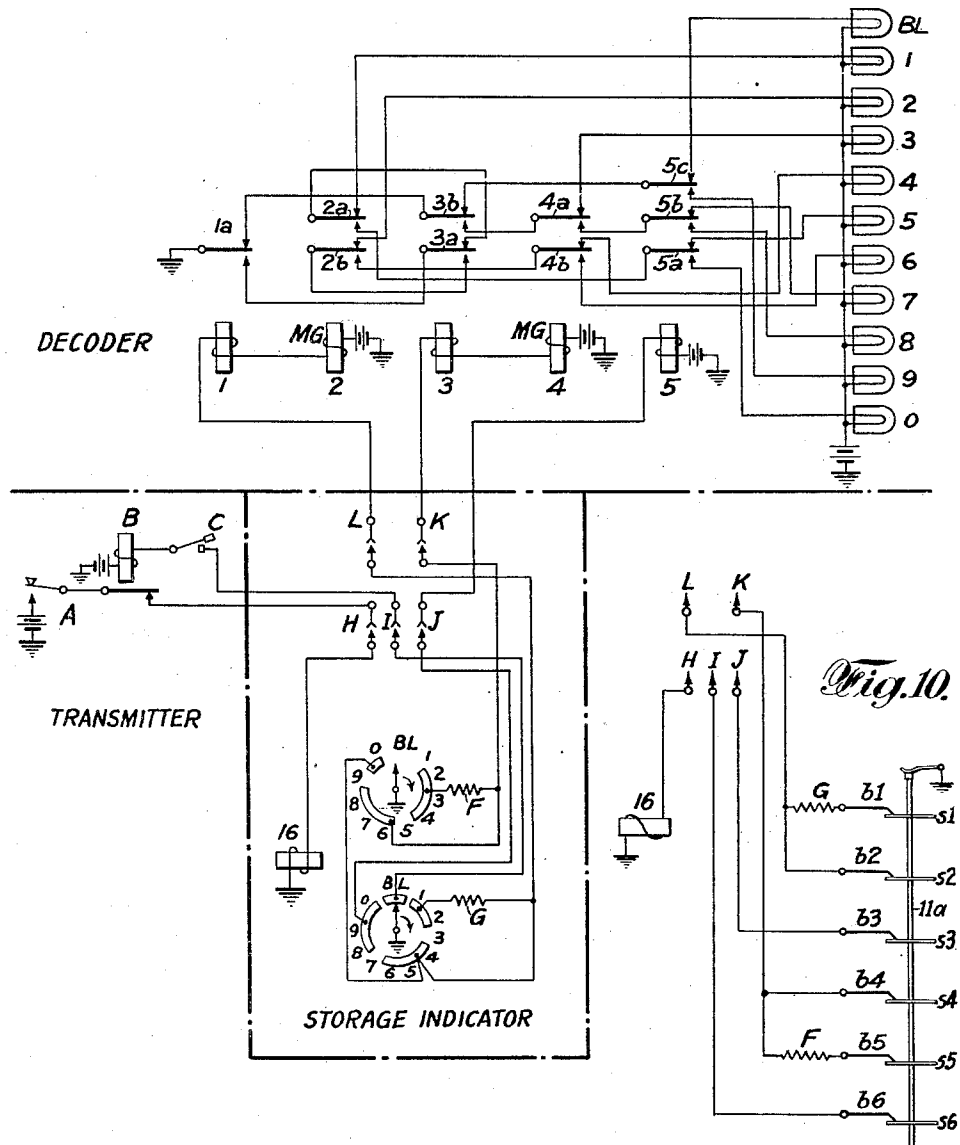
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Fig. 6.



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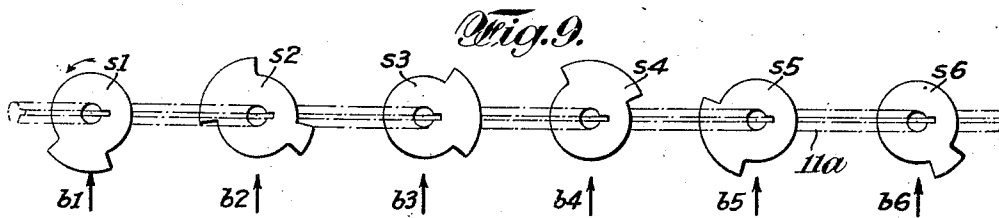
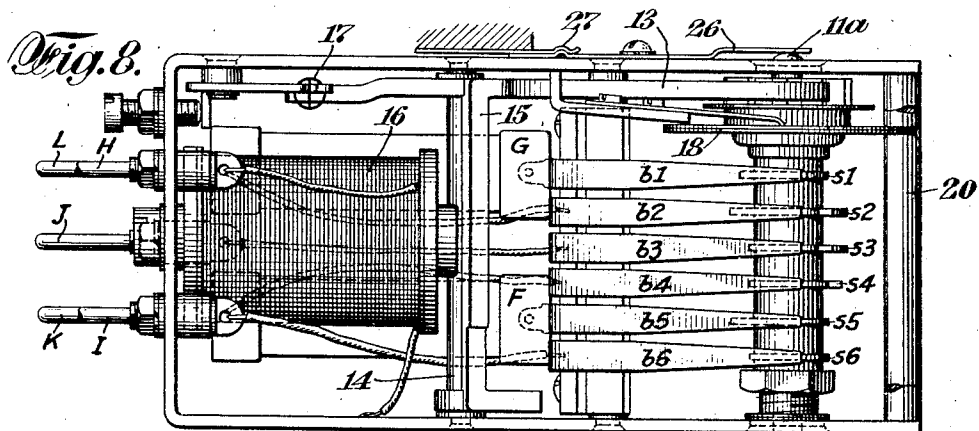
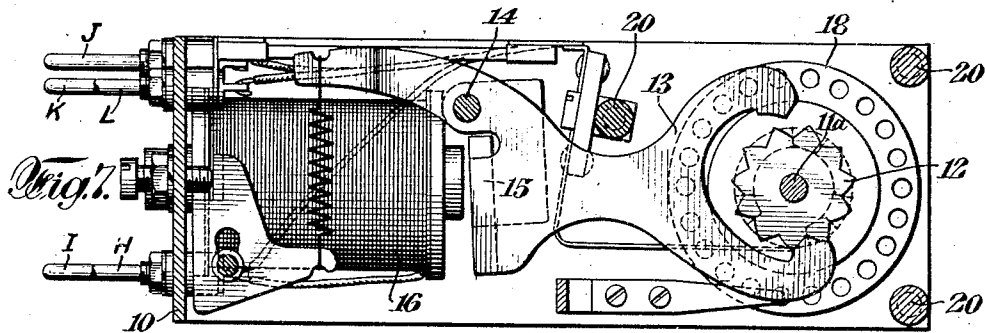


Fig. 11.

SEGMENT POSITION	BRUSH NO.					
	1	2	3	4	5	6
1	X				X	
2	X					
3					X	
4		X			X	
5		X				
6		X				
7				X	X	
8			X	X		
9			X			
0		X	X			
BLANK						X

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CODING AND DECODING APPARATUS

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3 Claims. (Cl. 177—353)

This invention relates to a coding and decoding apparatus more particularly adapted for ascertaining the position of a mechanically or electromagnetically settable storage unit or the like.

Among the objects of this invention are the provision of means for ascertaining the position of a settable device over a small number of line channels at a point which may be remote from the settable device.

A more specific object of the invention is the provision of a coding mechanism in a device which is settable to digit positions in which any one of the digit positions may be ascertained over a smaller number of line wires through a decoding apparatus controlled over said line wires.

Other objects of the invention will appear from the following description taken in connection with the drawings, in which two embodiments of the invention have been shown for purposes of illustrating the principles of this invention, and in which

Fig. 1 is a longitudinal horizontal section of an electromagnetically settable storage unit including a coding apparatus;

Fig. 2 is a side view of said unit;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 shows a double armed brush;

Fig. 6 shows a general wiring diagram of the transmitter, storage and coding devices, and the decoding device and indicating means;

Figs. 7 and 8 are views similar to those of Figs. 1 and 2, showing a second embodiment of the invention;

Fig. 9 shows the various circuit closing cams of said second embodiment;

Fig. 10 shows the wiring diagram of the second embodiment; and

Fig. 11 shows the code table for the second modification.

Various features of the storage unit shown in Figs. 1 and 2 and 7 and 8 may be of the same construction as shown in an application of Merton L. Haselton, Ser. No. 423,599, filed January 27, 1930, Patent No. 2,049,499, dated August 4, 1936, and may include an indicator drum of the character shown in said application.

The storage unit disclosed in Figs. 1 and 2 includes a U-shaped frame 10 on which is mounted a shaft 11 to which is secured a ratchet wheel 12 operated by an operating fork 13 which is suitably pivoted in the frame on a rod 14

passing through the rear end of the fork and through an extension on an armature 15 formed on said fork. An operating magnet 16 secured to the base of the U-shaped frame 10 upon energization attracts the armature 15 and operates the fork 13 to move the ratchet wheel 12 and shaft 11 counterclockwise, Fig. 1, and upon deenergization of the magnet 16 the fork 13 is rocked by means of a spring 17 in a counterclockwise direction into the position shown in Fig. 1, during which movement it operates the ratchet wheel and shaft farther in a counterclockwise direction into a position of adjustment.

As shown in said application, the shaft may carry an indicator which consists of a drum secured on the shaft in the position indicated by the disk 18 in Fig. 2 which, for the purpose of this invention, may itself be provided with indicia 1 to 9 and 0 and blank, providing for a blank space between the 0 and the 1, for use in indicating systems in which several of the units are placed side by side to indicate a number.

As to certain features of the invention, the indicia bearing member may be omitted and the number of positions of the settable member may be varied. However, for the purpose of disclosure the shaft 11 and the parts carried thereby may be set into any one of eleven different positions which correspond to positions 1 to 9, 0 and blank.

The side members of the frame 10 may be spaced by spacing rods 20 which may be located as shown in Fig. 1, and which may be provided with saw cuts for securing plates or shelves 21 and 22 in position on the unit. The plate 21, which is preferably made of non-conducting material, carries three conducting segments, one of which corresponds to the position 0, another to the positions 2, 3 and 4, and the third to positions 6, 7 and 8. The plate 22, which is preferably also made of non-conducting material, carries four conducting segments, one of which corresponds to blank, another to digits 1 and 2, a third to digits 4, 5 and 6, and the fourth to digits 8, 9 and 0. These segments may be grounded in different positions of the shaft by means of a double armed brush 25, such as shown in Fig. 5, which is in electrical contact with the shaft 11 to which it is secured. The shaft 11 may be grounded through a conducting contact element 26, Fig. 2, which has a slip connection with a conducting element 27 secured to a board frame, as disclosed in said Haselton application referred to.

As indicated in Fig. 6, the leads to the stepping magnet 16 and to the various segments carried by the plates 21 and 22 may be provided with slip connections to effect connections between the transmitter and the storage and coding device, and between the latter and the transmission channels extending to the decoder, as the storage unit is mounted on a board as in the Haselton application referred to.

For the purpose of illustrating my invention, I have shown an ordinary operating key A which, when depressed will complete a circuit through the slip connection H and over the coil of the operating magnet 16, to step the shaft 11 and brush 25 ahead one step. By this means the shaft may be moved into any one of its positions.

For the purpose of restoring the shaft to its blank position before the setting-up operation is made, there is provided a key C which when closed will prepare a circuit from battery over the coil of relay B and across the slip connection I to the blank segment BL carried by the plate 22, which circuit will be completed after the shaft 11 has been moved to bring the cooperating brush arm into contact with said "blank" segment BL. This causes the relay B to operate its armature and open the operating circuit for the magnet 16 and thus prevent movement beyond the blank position even if the operation of the key A is continued. The shaft may now, after releasing the key C, be adjusted to any desired position by operating the key A a number of times equal to the digit indicating such position.

As shown in Fig. 6, the segment on the plate 22 corresponding to positions 8, 9 and 0 is connected to the slip joint J. The segment carried by the plate 21 corresponding to the positions 2, 3 and 4 is connected to the slip joint K over a resistance F, while the segment on the same plate corresponding to the positions 6, 7 and 8 is connected directly to said slip joint K. The segment on the plate 21 corresponding to the 0 position and the segment on the plate 22 corresponding to positions 4, 5 and 6 are connected to the slip joint L, and the segment on the latter plate corresponding to positions 1 and 2 is connected over a resistance G to said slip joint L. The slip joints J, K and L connect the segments on the plates 21 and 22 over three wires to decoding relays 1, 2, 3, 4 and 5, as indicated in the upper portion of Fig. 6. The circuit J includes the relay 5, the circuit K the relays 3 and 4 in series, and the circuit L relays 1 and 2 in series.

The relays 2 and 4 are marginal, that is, they are so adjusted that they will operate when one of the brushes connects direct ground to the lead feeding the relay but will not operate when connected to ground through the resistances F and G. Relays 1 and 3, however, operate on either direct ground or ground through the resistances. These relays may be operated to apply ground which is on the armature 1a of the relay 1, to one terminal of the lamps 1 to 9 and 0 which when lighted indicate the position of the shaft 11 of the storage device shown in Figs. 1 and 2.

When the brushes are in the position shown in Figs. 1 and 6, the blank lamp BL will be lighted by a circuit from ground on the normal armature contact 1a of relay 1, over normal armature contact 3b of relay 3 and normal armature contact 5c of relay 5. That is, the lamp BL will be lighted when the decoding relays are deenergized. When the brushes are in the position 1, ground over the segment on the plate 22

corresponding to positions 1 and 2 and over the resistance G and the slip connection L will cause the relay 1 to operate. The current is not sufficient to energize the marginal relay 2. Relay 1 connects ground on its operated armature contact 1a, over the normal armature contact 3a of relay 3 and the normal armature contact 2a of relay 2 to one terminal of lamp 1 causing this lamp to light, which indicates that the shaft 11 is in position 1.

When the brush arms are in position 2 the circuit referred to will operate relay 1 and a circuit made across the segment on the plate 21 corresponding to positions 2, 3 and 4, the resistance F, slip connection K and relays 3 and 4 will operate relay 3 but not relay 4. This will connect ground on the operated armature contact 1a of relay 1, over the operated armature contact 3a of relay 3 and the normal armature contact 2b of relay 2, to one terminal of the lamp 2 causing this lamp to light.

In position 3, as will be apparent from an inspection of Fig. 6, the relay 3 alone will be energized and a circuit will be made from ground on the unoperated armature contact 1a of relay 1, over the operated armature contact 3b of relay 3 and the normal armature contact 4a of relay 4, to one terminal of the lamp 3 causing this lamp to light.

In position 4, relay 3 will again be operated and relays 1 and 2 will be operated by a circuit from ground across the brush and the segment on the plate 22 corresponding to positions 4, 5 and 6, and across the slip joint L. This causes ground on the operated armature contact 1a of relay 1, over the operated armature contact 3a of relay 3, the operated armature contact 2b of relay 2 and the normal armature contact 4b of relay 4 to be applied to one terminal of the lamp 4 causing this lamp to be lighted.

In position 5, relays 1 and 2 will be energized applying ground to one terminal of the lamp 5 over the operated armature contact 1a of relay 1, normal armature contact 3a of relay 3, operated armature contact 2a of relay 2 and normal armature contact 5a of relay 5, causing the lamp 5 to be lighted.

In position 6, relays 1 and 2 and 3 and 4 will be energized applying ground to one terminal of the lamp 6 over the operated armature contact 1a of relay 1, operated armature contact 3a of relay 3, operated armature contact 2b of relay 2 and operated armature contact 4b of relay 4, causing the lamp 6 to light.

In position 7, relays 3 and 4 will be energized applying ground to one terminal of the lamp 7, over the normal armature contact 1a of relay 1, operated armature contact 3b of relay 3, operated armature contact 4a of relay 4 and normal armature contact 5b of relay 5, causing the lamp 7 to light.

In position 8, relays 3 and 4 and relay 5 will be energized applying ground to one terminal of the lamp 8 over various armature contacts of relays 1, 2, 3 and 4, as in the case of the circuit for lamp 7, and across the operated armature contact 5b of relay 5, causing the lamp 8 to light.

In position 9, relay 5 alone will be energized applying ground to one terminal of the lamp 9, over the normal armature contact 1a of relay 1, normal armature contact 3b of relay 3 and operated armature contact 5c of relay 5, causing the lamp 9 to light.

In position 0, relay 5 and relays 1 and 2 will be energized applying ground to one terminal of

the lamp 0 over the operated armature contact 1a of relay 1, normal armature contact 3a of relay 3, operated armature contact 2a of relay 2 and operated armature contact 5a of relay 5, causing the 0 lamp to light.

The storage unit shown in Figs. 7 and 8 is generally the same as that shown in Figs. 1 and 2, and corresponding parts such as the frame, operating magnet, operating fork, the ratchet wheel, etc. are designated by the same reference characters as those used in Figs. 1 and 2. The settable shaft is indicated at 11a which, in this embodiment, carries six segments which may be suitably keyed on the shaft, these segments being designated as s1, s2, s3, s4, s5 and s6 in Figs. 8, 9 and 10. These segments are in electrical connection with the shaft 11a which is grounded to the supporting frame in the same manner as described in connection with Fig. 2. Cooperating with these segments are brushes designated respectively b1, b2, b3, b4, b5 and b6 in Figs. 8, 9 and 10, these brushes being shown diagrammatically by arrows in Fig. 9.

The position of the segments in Fig. 9 corresponds to position 1 of the shaft 11a, these segments being rotatable counterclockwise step by step into positions 2, 3, 4, 5, 6, 7, 8, 9, 0 and blank. These segments in different positions of the indicator apply ground to various combinations of brushes b1 to b6, according to the code table given in Fig. 11.

In position 1 segment s1 grounds brush b1 which, as indicated in Fig. 10, closes a circuit from ground across the resistance G, slip connection L to one of the terminals of relays 1 and 2, causing the relay 1 to operate and apply ground on its operated armature contact 1a, across the unoperated armature contact 3a of relay 3, and across the unoperated armature contact 2a of relay 2 to one terminal of the lamp 1, causing this lamp to light. The marginal relay 2 is not operated by the circuit across the resistance G. The circuit to the decoder for position 1 of the shaft 11a and the circuit to the lamp 1 in the second embodiment are exactly the same as in the first embodiment described in connection with the diagram shown in Fig. 6.

For position 2 of the shaft 11a, ground on segment s1 will cause the relay 1 of the decoder to operate as in position 1, and ground on segment s5 over brush b5, resistance F and the slip connection K will cause the relay 3, Fig. 6, to operate without operating the marginal relay 4. These circuits for operating the decoder relays, when the shaft is in position 2, are the same as in the first embodiment. The lamp 2 will be lighted by the same circuit as in the first embodiment.

In position 3 of the shaft 11a, ground on the segment s5 and over the brush b5, resistance F and slip connection K will operate the relay 3 but not the marginal relay 4. This circuit for operating the decoder relays, when the shaft 11a is in position 3, is the same as in the first embodiment.

As is apparent from the code chart shown in Fig. 11, the circuits made over the slip connections J, K and L for any position of the shaft 11a are the same as the circuits made for the same position of the shaft 11 in the first embodiment. All of these circuits will pull up the same combinations of decoder relays and will operate the lamps 1 to 0 over circuits made over operated and unoperated armature contacts of the decoder relays.

In the blank position of the shaft 11a, ground on the segment s6 will be extended over the brush

b6 and slip connection I to the fixed contact of the switch C, Fig. 6. This switch C is closed when it is desired to move the shaft into its blank position, as described in connection with the first embodiment, to complete the circuit for the relay B at the time the shaft 11a moves into the blank position so as to open the circuit over which the operating impulses are transmitted by the key A to the operating magnet 16.

It is to be understood that the decoder and indicating mechanisms may, if desired, be permanently connected to the storage unit, or may be connected, when desired, to ascertain the position of the storage unit. This decoder and indicating mechanism may be located close to the storage unit or at a distant point. A series of indicating devices may be provided which may be arranged in any relation so as to build up numbers, if desired, which numbers may indicate prices of items such as the "bid" and "ask" prices of stock, rates of exchange, or the various range prices of stocks or prices of any other commodities, or may indicate or represent any attribute of any stock item or commodity. It is of course obvious that transmission from a plurality of storage units may be made to corresponding indicators simultaneously or successively by known devices. If desired, provision may be made whereby subscribers may be provided with the required number of series of indicator lamps and in which switching connections, well known in the telephone art, may serve to permit the subscribers to connect the series of lamps in their installations to any of a plurality of storage units in a central station. It is also to be understood that the circuits made across the decoder may be used to control the transmission of impulses to set up rotatable indicators or the like, if such type of indicator is preferred to the type of indicating means disclosed including a series of lamps.

While the invention has been shown in connection with mechanism and apparatus which operate successfully to carry out the principles of the invention and which disclose the principles of the invention, it is to be understood that various changes and substitutions may be made within the scope of this invention, and that any words of description imported into the claims from the specification shall be considered as words of description and not as words of limitation.

What I claim is:

1. A system for transmitting price information regarding stocks or other commodities, comprising a settable device rotatable into different positions respectively corresponding to one of the digits 1 to 9 and 0 of said price, said settable device comprising two segmented distributor rings and two brushes respectively associated with said distributor rings for applying potentials to the segments thereof to transmit permutation code signals in accordance with the setting of the said device, a plurality of lines connected to said distributor rings, and means connected to said lines responsive to said permutation code signals for indicating the setting of the settable device.

2. The combination of a settable device adapted to be moved in one direction only to different positions, said device comprising two closed circular series of contacts and rotatable brushes for engaging the said contacts in accordance with a setting of the device, certain of said contacts being longer than others of the contacts thereby to engage one of the brushes in a plurality of

different positions of said brush corresponding to different settings of the settable device, a first line connected to one of the contacts of one of the series, a second line connected to two other contacts of the other series, a third line connected to all but one of the remaining contacts of both series, means including said contacts and rotatable brushes for sending a permutation code signal over said lines representative of the setting of the device, means connected to said three lines for decoding said signal, and means responsive to the decoded signal for indicating the setting of said settable device.

3. A system for receiving and coding information as to the digits 1 to 9 and 0 of the price of a stock or other commodity, comprising a transmitter for sending step-by-step impulses corresponding to said digits, a coding indicator unit

connected thereto adapted to take settings in accordance with the digits represented by said step-by-step impulses, a line connecting said transmitter and said coding indicator unit, said coding indicator unit comprising a plurality of series of arcuately arranged segments for transmitting permutation code signals and for normalizing the indicator unit, rotatable brushes adapted to engage said segments in accordance with the setting of the said unit, a relay connected in circuit with one of said segments for interrupting said line when said one of the segments is engaged by one of the rotatable brushes as the unit moves into its blank position, and means for controlling the operation of the said relay to re-establish the line.

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