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CODING APPARATUS

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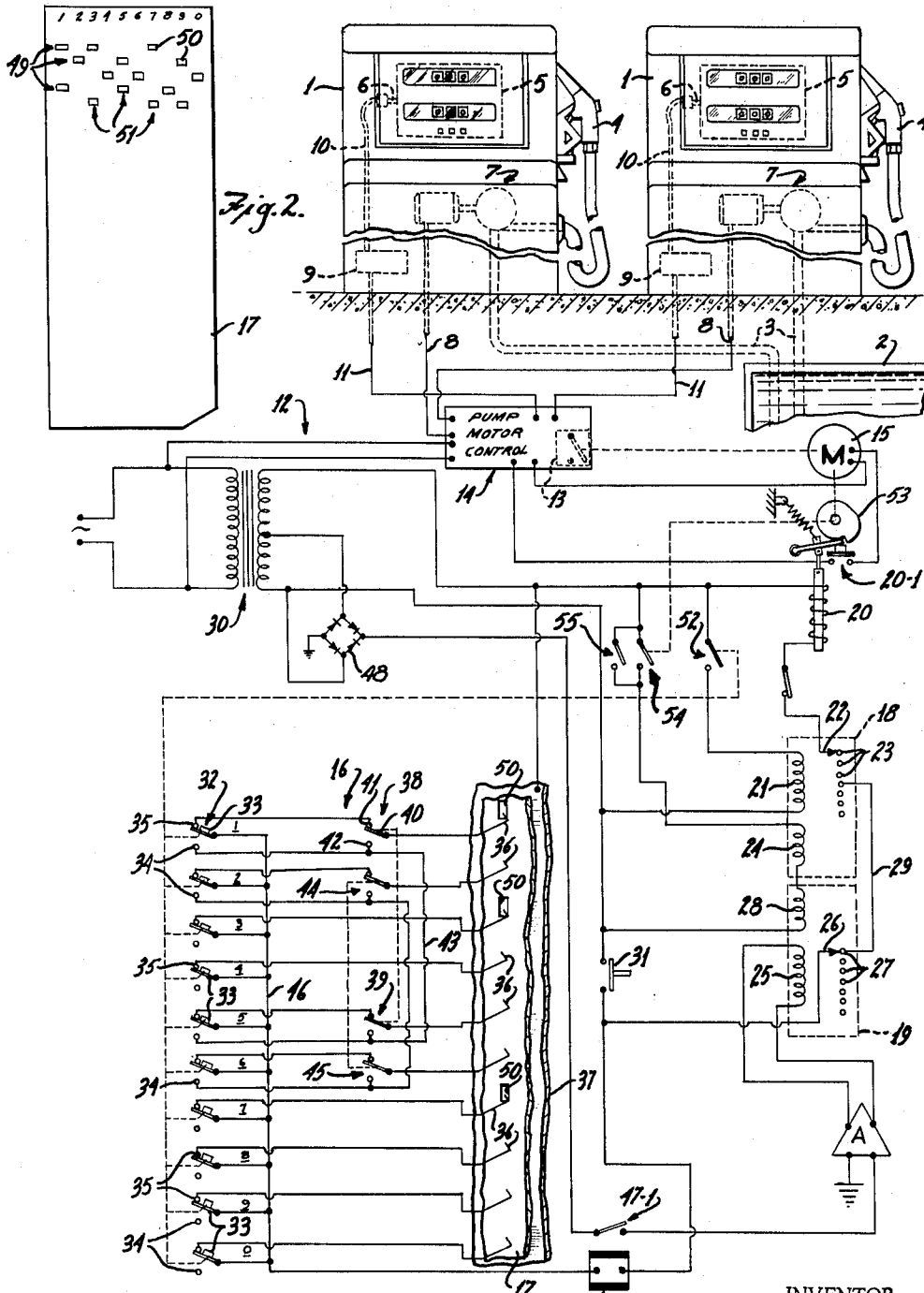


Fig. 1.

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CODING APPARATUS

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This invention relates to coding apparatus and particularly to an improved coded actuation of an electrical control circuit which may be employed with a punched card having each code determined by the locations of openings in the card.

The present invention is particularly adapted for use in connection with an automatic control system requiring a high degree of reliability in operation when a correct input is received. The remote inventory control shown and described in the copending application of James H. McGaughey entitled Control System, filed on February 9, 1961 with Serial No. 88,208 and assigned to a common assignee herewith, is an example of a system requiring a high degree of reliability in order to be practicable and maintain customer relations. As more fully described therein, the coded control system is employed to successively release preselected quantities of gasoline from underground storage tanks at a gas station or service station. The main supplier maintains the underground tanks filled and makes use of full storage capacity without requiring a substantial investment by the service station operator. The operator then purchases increments of the total gasoline stored in the tank and is given a proper code for actuating a mechanism which releases such an increment of the stored gasoline or other fuel for subsequent delivery. As disclosed in the above application, the code control includes a punched card having a series of individual and separate codes which are sequentially employed for releasing succeeding quantities of the fuel.

Although the punched card system shown therein provides a satisfactory operating system, it has been found that the reliability of this system has certain disadvantages. The completion of a release is dependent upon making electrical contact between a contact brush and a contact plate through an opening in a card. If firm contact is not made or the resistance between the brush and the contact plate is increased sufficiently, the current through the circuit may be insufficient to trigger the necessary actuating mechanism and prevent proper actuation of the release mechanism even though the station operator has correctly actuated the coded control. For example, the resistance will increase if the brush is not precisely aligned with an opening and therefore is partially spaced from the opposed contact plate or the end of the contact brush is burned.

However, in view of the simplicity and the low cost of a card system and the substantial development of its use for bookkeeping purposes, the punch card is a very desirable code control for remote inventory controls of this variety.

The present invention is directed to the provision of a punch card system including a brush reading circuit which provides a high degree of reliability in establishing an actuating output if the proper code is inserted. Although the degree of security with the present system is somewhat less than with other more elaborate systems, customer relations and similar intangible factors weighs strongly in favor of the sacrifice in security.

In accordance with the present invention, a pair of interlocked circuit altering means is connected to conjointly energize a load such as the preset release circuit of a remote inventory control. The circuit altering means is each adapted to have a plurality of operating positions. One

of the circuit altering means is conditioned to complete a circuit. The second of the circuit altering means is conditioned to require actuations before conditioned to complete a circuit. The coded input is coupled to both of the circuit altering means with the input connected to actuate the second circuit altering means upon each input. The first circuit altering means is actuated only if a circuit is completed through an opening in the code card. Consequently, in accordance with the present invention, the apertures in the card are adapted to disenable the circuit whereas the solid portion of the card acts as the means to allow actuation of the control to establish operation of the load. If the operator therefore strikes an incorrect code, he will automatically disenable the circuit. Similarly, if too many inputs are actuated, the second circuit altering means will disenable the complete circuit.

The present invention has the distinct advantage that proper code actuation will always result in triggering of the circuit because for practical purposes the code card is effectively removed from the control of the circuit. It is only when an incorrect code is inserted that the openings in the code card become effective. If the brushes do not make firm contact with the contact plate or the like, an incorrect code may result in actuation of the circuit. This slight loss of security is more than compensated for by the assurance that at no time will the code device malfunction upon input of the proper code. The reliability of this system, while permitting the use of the highly developed punch card, maintains customer relations without unduly complicating the bookkeeping and control system.

The drawing furnished herewith illustrates the best mode presently contemplated for carrying out the invention.

In the drawing:

FIG. 1 is a diagrammatic illustration of a pumping system with a schematically illustrated release circuitry; and

FIG. 2 is an enlarged elevational view of a code card constructed for application in the present invention.

Referring to the drawing and particularly to FIG. 1, a pair of conventional service station dispensing pumps 1 is shown mounted in suitably spaced relation to a central storage tank 2 which is buried within the ground. Individual suction lines 3 connect the pump 1 to the tank 2.

Each pump 1 is of any suitable construction and is generally shown including a dispensing nozzle 4 which is connected to the output side of the suction line 3 and permits selective discharge of fuel from the central storage tank 2. A computer 5 is provided for recording the gallonage and the cost of the fuel which is dispensed at each operation. The computer 5 establishes a mechanical movement in accordance with the fuel flow which movement is translated into a visual gallonage and cost reading in accordance with well-known construction. A stub shaft 6 projects outwardly of one side of the computer 5 within the pump 1 and is driven in synchronism and proportion to the fuel flow.

A pump-motor unit 7 is housed within the pump 1 and connected in the suction line 3 for propelling the fuel out of the nozzle 4. Suitable power lines 8 are connected to energize the pump-motor unit 7 in response to proper operation of the dispensing nozzle 4 which normally includes a suitable pump-motor unit switch control, not shown.

A small signal transmitter 9 is mounted within the pump 1 and is connected to be driven in synchronism with the discharge of fuel from the pump 1 in any suitable manner, such as by a flexible shaft 10 connecting the transmitter 9 to the stub shaft 6.

The transmitter 9 may be of any suitable construction, such as more fully described in the previously referred to

compending application of James H. McGaughey and in any event establishes a control signal which is transmitted over lines 11 to actuate a gasoline control release mechanism 12 which is housed in a suitable service building or the like, not shown. A pump-motor disconnect switch assembly 13 is provided within a pump-motor control 14 of the release control mechanism 12 for selectively controlling the operation of the pump-motor unit 7. The disconnect switch assembly 13 is of any suitable electro-responsive device adapted to respond to predetermined actuation before moving from a closed to an open position. The switch assembly 13 may, for example, be controlled by a suitable counter mechanism which opens the switch when the counter reaches a zero reading and holds the switch closed at all other readings, as shown in the previously referred to compending application.

A cyclically operable preset motor 15 is coupled to the disconnect switch assembly 13 and upon operation presets the switch assembly in accordance with a predetermined volume to allow a predetermined flow of gasoline through the pumps 1 before the switch assembly 13 is moved to the position opening the circuit of the pump-motor unit 7.

A push button card reader 16 is provided for selective coded actuation of the preset motor 15 and the presetting of the disconnect switch assembly 13. A code card 17 is associated with the card reader 16 to establish coded and selective actuation of an alternating current stepping relay 18, hereinafter referred to as an A.C. stepping relay, and a direct current stepping relay 19, hereinafter referred to as a D.C. stepping relay. The stepping relays 18 and 19 are interconnected to conjointly control a trigger solenoid 20 having a set of normally open contacts 20-1 connected in an energizing circuit with the preset motor 15.

The A.C. stepping relay 18 includes an operating coil 21 adapted to be energized by a suitable alternating current. A movable contact 22 is electromagnetically coupled to the coil 21 and sequentially engages a series of fixed contacts 23. The movable contact 22 is biased to engage an initial or starting fixed contact 23 and moves into sequential engagement with the immediately adjacent contact 23 in response to energization of the coil 21. A reset coil 24 is also coupled to movable contact 22 for releasing the contact and returning it to the starting position.

Similarly, the D.C. stepping relay 19 includes an operating coil 25 adapted to be operated by a suitable direct current. A movable contact 26 is electromagnetically coupled to the coil 25 and is adapted to similarly sequentially engage a series of contacts 27. The movable contact 26 is also biased to engage an initial fixed contact 27, as shown in the drawing. Relay 19 also includes a reset coil 28 for selective resetting of the movable contact 26. The contacts of relays 18 and 19 are interconnected to conjointly control the operation of preset motor trigger solenoid 20, as follows.

A jumper lead 29 connects the fourth contact 23 of stepping relay 18 to the starting fixed contact 27 of the relay 19. The movable contact 22 of relay 18 is connected to one side of the trigger solenoid 20, the opposite side of which is connected to one side of a secondary of a suitable step-down transformer 30. The movable contact 26 of the D.C. stepping relay 19 is connected to the opposite side of the transformer secondary through a normally open and manually operable release switch 31 and completes a series energizing circuit for the solenoid 20 including the contacts of relays 18 and 19 via the lead 29.

The energizing circuit can be completed by the closing of switch 31 only when the stepping relay 19 remains de-energized and holds its movable contact 26 in engagement with the initial or starting fixed contact 27. Further, while maintaining this relationship, the movable contact 22 of the A.C. stepping relay 18 must be moved

in three steps from the initial fixed contact 23 to the fourth fixed contact 23.

The energizing of solenoid 20 and the resultant energizing of the preset motor 15 is therefore determined by a proper actuation of the energizing circuit for relays 18 and 19. The actuation of the stepping relays 18 and 19 is controlled by proper manipulation of the card reader 16 as related to the code card 17 as now described.

The push button card reader 16 includes a series of single-pole, double-throw switches 32 respectively related to the numerical digits 0-9, inclusive, as shown in the drawing. The switches 32 include a contact arm 33 which is adapted to be manually actuated through any suitable push button mechanism, not shown. Each contact arm 33 is biased into non-engagement with a normally disengaged contact 34, some of which are dead or disconnected contacts and certain of which are connected in circuit, as hereinafter described. Arm 33 is biased into engagement with a normally engaged contact 35 which is connected in circuit through the card 17 as follows.

A similar series of ten card reading elements or brushes 36 is mounted as a part of reader 16 and is generally connected one each to correspondingly digit designated contact 35. Contact brushes 36 are mounted with one end resiliently, frictionally engaging a contact plate 37 with the code card 17 interposed therebetween to separate all but certain of the brushes 36 from the plate 37.

A first pair of deception push button switches 38 and 39 is shown interposed between the contact brushes 36 and the corresponding push button switches 32 for the numerical digits 1 and 5. Each of the switches 38 and 39 is a single-pole, double-throw switch having contact arms 40 coupled for simultaneous movement and each connected directly to the corresponding reading brushes 36. Contact arms 40 are biased into engagement with a normally engaged contact 41 which is connected to the corresponding normally engaged contacts 35 of the corresponding push button switches 32. Deception switches 38 and 39 each includes a normally open or disengaged contact 42 which is connected to the normally disengaged contact 34 of the corresponding push button switches 32. A jumper lead 43 interconnects the normally disengaged contacts 42 of the deception switches 38 and 39.

A second pair of deception push button switches 44 and 45 is similarly interposed in circuit for the digits 2 and 6 between the contact brushes 36 and the push button switches 32.

A common lead 46 interconnects all of the contact arms 33 of the several push button switches 32 and constitutes one output side of the card reader 16. The contact plate 37 constitutes the other output side of reader 16.

A small alternating current relay 47 is connected in series with the output of the card reader 16 and manually operated release switch 31. If a circuit is completed through the card reader 16, closing of release switch 31 energizes the relay 47 which closes a set of associated normally open contacts 47-1.

The D.C. stepping relay coil 25 is connected in series with the normally open relay contacts 47-1 of relay 47 to the output of a rectifier 48 for suitable energizing of relay 19 when the card reader 16 presents a complete circuit path for relay 47 which closes contacts 47-1.

Relay 47 is interposed in the circuit to minimize the current in the circuit of the brushes 36 and essentially prevent arcing and burning of the brush tips.

Referring to FIG. 2, the code card 17 for controlling which switches 32, 38, 39, 44 and 45 are effective to complete the circuit to relay 19 is shown as the usual rectangularly shaped punched card having a series of code rows 49 longitudinally spaced of the card. Each of the rows 49 is defined by the plurality of apertures or holes 50 provided in ten code columns 51 equally spaced laterally of the card 17 in accordance with the spacing of brushes 36. The code columns 51 are assigned the code

digits 0-9 and are thereby related to the reading brushes 36 and push button switches 32 and establish completed circuits through the card reader 16. These circuits must be opened before actuation of the release switch 31 to properly operate the preset motor 15.

The code in the illustrated embodiment of the invention includes three different digits. The code further includes a letter designation "A" or "B" related respectively to the pairs of deception switches 38, 39 and 44, 45. The code may thus appear as A-237 or B-135.

In the illustrated embodiment of the invention, the holes 50 are located in the digit code columns 51 corresponding to circuit branches of brushes 36 which must be opened by actuation of either switches 32 or the deception switches 38, 39 and 44, 45.

Referring to FIG. 1, in the described circuit, connection code "A" may or may not include holes 50 in the code columns 51 corresponding to the digits 1 and 5. If a hole is provided at either of these digit columns 51, actuation of "A" deception switches 38 and 39 breaks the circuit between the corresponding brushes 36 and the switches 32. These brushes 36 are then connected to the disengaged contacts 34 of switches 32 and the corresponding digits cannot be employed in the code for that row. If the push button switch 32 for such digit is actuated in the presence of a hole 50 at the corresponding brush 36, the circuit from the contact plate 37 to line 46 would be completed through brush 36, the corresponding deception switch and push button switch with the resulting completion of the energizing circuit for the relay 47 upon closing of release switch 31, and coil 25 of the D.C. stepping relay 19.

Similarly, in the described circuit, the code "B" may or may not include holes 50 in the code columns 51 corresponding to digits 2 and 6. However, if a hole is provided, the corresponding digit must not be provided in the code.

The code numbers for codes "A" or "B" can be formed and the corresponding openings placed in any digit position including the two digits related with the corresponding deception switches with the limitation previously discussed as to the digits of the deception switches.

The illustrated first code row 49 includes apertures in columns 1, 3 and 7 digit locations in columns 51. Assuming the code is selected to be an "A" code, the digits for push button switches 32 will include digits 3, 7 and some other digit than 1 and 5; for example, 2 and the code would read A-237.

At the time the card is punched, the several codes will be preselected and recorded at a central station.

The service station operator then, either by mail, phone or otherwise, as prearranged obtains the required code number; for example, the code A-237 just described and proceeds to actuate the card reader 16.

The deception switch actuator "A", not shown, is actuated and the contact arms 40 of the deception switches 38 and 39 disengage the normally engaged contact 41 and engage the normally disengaged contact 42. The actuation of switches 38 and 39 opens the circuit between the brushes 36 of digits 1 and 5 and the common lead 46. The hole 50 in digit 1 position is therefore ineffective unless either of push button switches 32 for digits 1 or 5 is actuated. The digits are not in the code number and will not presumably be actuated. Actuation of push button switches 32 for the digits 3 and 7 of the code results in the opening of the corresponding brush circuits.

The circuit to the relay 47 remains open and the movable contact 26 of relay 19 remains in engagement with the starting contact 27 holding the circuit in condition for completing the energizing circuit for trigger solenoid 20.

However, assume either through error or in attempting to fraudulently obtain a release, the service station operator pushes the code "B" actuator and actuates deception switches 44 and 45 and continues to push the associated "A" number 237. Upon actuation of the release switch

31, the holes 50 in code columns 51 for digit 1 results in a complete circuit from the contact plate 37 to the common lead 46 and thereby completes the energizing circuit of relay 47 which closes contacts 47-1 and completes the circuit for the relay coil 25 of the D.C. stepping relay 19. The movable contact 26 is driven into engagement with the next adjacent fixed contact 27. This immediately opens the circuit for the motor control solenoid 20 at relay 19 and prevents energization thereof until the stepping relays 18 and 19 have been reset to the standby position which will require a service call from the central station as hereinafter described.

Or, assume either erroneously or through attempted deception, the push button switches 32 corresponding to any one of the digits 4, 8, 9 or 0 is actuated in place of digit 3 and 7, the brushes 36 project through the holes 50 at the corresponding columns 51 of digits 3 and 7 into engagement with plate 37 and the energizing circuit for relay 47 is established upon actuation of release switch 31 and the D.C. stepping relay 19 is again actuated. The movable contact 26 moves from the initial contact 27 and makes it impossible to complete the circuit to the motor control solenoid 20 until the stepping relay 19 has been reset to the initial starting position.

The stepping relay 19 thus provides an interlock requiring a selected actuation of the card reader 16 to maintain the energizing circuit for solenoid 20 in condition for completion by proper actuation of relay 18.

The A.C. stepping relay 18 is also coupled to the card reader 16 by an A.C. stepping relay switch 52 which is coupled to each of the contact arms 33 of the push button switches 32. The coupling is diagrammatically shown by the dashed coupling lines for simplicity and clarity of explanation. The switch 52 is connected in series with the relay coil 21 of the A.C. stepping relay 18 to the output side of the transformer 31.

Each time a push button switch 32 is actuated, the stepper switch 52 is momentarily closed to energize the A.C. stepping relay coil 21. The associated movable contact 22 is thereby moved or stepped from the initial fixed contact 23 into engagement with the succeeding fixed contacts 23. The fourth contact 23 of relay 18 is connected by jumper lead 29 to the first contact 27 of relay 19. Upon actuation of three push buttons 32, relay 18 is in a condition to complete the circuit through the contacts of stepping relays 18 and 19. If the D.C. stepping relay 19 has not been actuated to open the circuit, the actuation of release switch 31 completes the energization circuit of the trigger solenoid 20 and triggers the operation of the preset motor 15.

The operation of the motor 15 is thus conjointly controlled by the actuation of relays 18 and 19. Relay 18 must not be energized exactly three times and relay 19 must not be energized in the illustrated embodiment of the invention. The deception switches and the push button digit switches serve as testing or reading elements with the brushes 36 for reading of a code on card 17.

The motor 15 is coupled to actuate the switch assembly 13 to release a predetermined quantity of the gasoline in tank 2. Motor 15 is also coupled to actuate a cycle control cam 53.

Cam 53 is mounted adjacent the contacts 20-1 of solenoid 20 and after initial rotation thereof holds the contacts 20-1 closed for a predetermined cycle.

Motor 15 further is coupled to momentarily close a relay resetting switch 54 which is connected in a series circuit with the reset coils 24 and 28 of relays 18 and 19, respectively. Resetting of relays 18 and 19 opens the circuit to solenoid 20 until a subsequent release operation.

A manual reset switch 55 is connected in parallel with the cam operated switch 54 to allow manual resetting of the stepping relays 18 and 19. The switch 55 is mounted within a locked enclosure, not shown, to prevent operation by the service station operator.

The operation of the illustrated embodiment of the invention is briefly summarized as follows.

The storage tank 2 is periodically filled. The tank truck driver or a separate service representative, places a code card 17 properly located between the reading brushes 36 and the contact plate 37 within the release mechanism 12.

When the service operator desires additional release of gasoline, a code number is received from a central location.

The actuator for the proper deception switches 38 and 39 or 44 and 45 is actuated and then the push button switches 32 related to the code are actuated to operate the mechanism 12. If correctly done, the A.C. stepping relay 18 moves the movable contact 22 into engagement with the fourth contact 23 which is connected to the first contact 27 of the stepping relay 19. The correct insertion of the code does not affect the D.C. stepping relay 19, which remains in the initial standby condition and, upon actuation of switch 31, completes the circuit to the trigger solenoid 20 which closes the associated contacts 20-1.

The motor 15 is energized as a result of closing contacts 20-1 and drives the cam 53 to latch the motor 15 into circuit for one cycle of operation. The cycle period is selected to preset switch assembly 13 of the release mechanism 12 to permit a predetermined additional amount of fuel to be withdrawn from tank 2 through the pumps 1.

During the presetting cycle, the switch 54 is closed and resets the stepping relay 18 to standby.

Automatic means, not shown, relatively move the code card 17 and reading brushes 36 to align the next adjacent code row 49 with the reading brushes 36 and automatically establish a new code in the card reader 16.

If the operator attempts to operate the release mechanism 12 without obtaining a code, the relays 18 and 19 will lock the mechanism in an inoperative position upon an erroneous selection of the actuators for deception switches "A" or "B" or the push button switches 32.

Improper actuation of the push button switches 32 or deception switches 38 and 39 or 44 and 45 completes the circuit between the contact plate 37 and the common lead 46. Switch 31 is closed resulting in the energization of the D.C. stepping relay 19.

If the operator actuates a series of more or less than three switches 32, the movable contact 22 of relay 18 is not aligned and engaged with the fourth contact 23 which is connected to relay 19. Completion of the circuit to solenoid 20 is thereby prevented until relay 18 is actuated to move contact 22 to the proper contact 23. If less than three push button switches 32 have been actuated, the correct additional switches 32 must be actuated or relays 18 and 19 reset to standby through actuation of the reset coil 24 and the card reader 16 properly actuated. If more than three switches 32 have been actuated, the relays 18 and 19 must be reset through operation of the switch 55.

The present invention does not depend upon establishing a contact between the brushes 36 and the contact plate 37 in order to establish a release cycle. Therefore, the operator is assured that proper actuation of the release mechanism 12 will result in a release of the desired quantity of fuel, assuming the other components function properly.

One of the disadvantages of the circuit is that if the wrong push button switch is actuated and a poor contact or a high resistance otherwise exists between the brush 36 and the contact plate 37 at the opening 50 which should complete a circuit, the D.C. stepping relay switch 19 may not be actuated to lock the device into an inoperative position. However, this only results in the loss of one delivery. The quantities of fuel released by each

actuation are generally relatively small and the loss due to such malfunctioning will be minimal.

The present invention provides a code control system employing punched card, tape or the like and having a very high degree of reliability of load actuation when a proper code is received.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In a coded input control for controlling an electroresponsive device,

(a) a pair of circuit altering means each having a series of operative conditions, certain of said conditions being related to actuate the electroresponsive device,

(b) means biasing said circuit altering means to predetermined conditions whereby selected actuation of a first of said circuit altering means prevents actuation of the device and selected multiple operation of the second circuit altering means permits actuation of the device,

(c) a multiple input code means for actuating said circuit altering means including a plurality of input means at least two of which must be operated to actuate the device,

(d) first means connected to said input means and to said second circuit altering means and including drive means actuated by any of said input means to move said second circuit altering means from the predetermined condition,

(e) control means connected to the input means to operate said first circuit altering means and code means to connect a selected plurality of the input means to operate the control means and thereby the first circuit altering means whereby said selected plurality of input means must be actuated to prevent operation of the first circuit altering means and thereby permit operation of said device in response to the multiple operation of the second circuit altering means.

2. The coded input control of claim 1 wherein said code means includes:

(a) a plurality of code reading contact brushes resiliently engaging a contact plate,

(b) a code card having a series of spaced code rows for selective alignment with said contact brushes and each of said code rows including apertures aligned with selected contact brushes,

(c) said input means including a plurality of switch means connected one each to each of said contact brushes, and

(d) said control means is an electrically responsive relay means connected in circuit with said plurality of switch means and said contact brushes and operable to actuate said first circuit altering means in the absence of actuation of the switch means connected to the contact brushes aligned with the apertures.

3. In a coded input control for controlling energization of a load,

(a) a first stepping relay switch means having a plurality of switching positions and a reset coil for positioning the switch means to a first switching position and a drive coil for positioning the switch means from the first switching position,

(b) a second stepping relay switch means having a plurality of switching positions and a reset coil for positioning the switch means to a first switching position and a drive coil for positioning the corresponding switch means from the first switching position,

(c) an electroresponsive load controller connected in series circuit with said first and second stepping relay switch means to energize the load controller with

- the first stepping relay switch means in the first switching position and the second stepping relay switch means in a selected switching position other than said first switching position,
- (d) input switches connected to an electromagnet means connected in a coded power control circuit for actuating the drive coil of said second stepping relay switch means,
- (e) code means interposed in the coded power control circuit of said input switches and restricting actuation of the second stepping relay switch means to selected input switches,
- (f) switch means in circuit with the drive coil of the first stepping relay switch means, and
- (g) means coupling said input switches and said last named switch means to actuate the drive coil with operation of each input switch.
4. In a coded control,
- (a) a series of single-pole, double-throw input switches having a normally open contact and a normally closed contact selectively engaged by a contact arm,
- (b) a code card reader having a series of reading brushes resiliently biased into engagement with a common contact plate,
- (c) a code card interposed between the brushes and contact plate and having a series of code columns spaced in accordance with said reading brushes and a series of code rows defined by selected openings in the code columns,
- (d) a first pair of single-pole, double-throw deception switches each having a contact arm engaging a different reading brush and a normally closed contact connected to a normally closed contact of the input switch corresponding thereto and a normally open contact connected to the normally open contact of the same input switch, the normally open contacts of the pair of deception switches being connected,
- (e) a second pair of single-pole, double-throw deception switches corresponding to said first pair and being similarly connected to a different pair of reading brushes and corresponding input switches,
- (f) circuit means connecting the other reading brushes directly to the normally closed contact of the corresponding input switches, and
- (g) electrically operated means connected in an energizing circuit with said contact arms of the input switches and the contact plate for energization upon completion of a circuit through an opening in the code card.
5. In a coded resetting control for use in a remote inventory control for releasing quantities of fuel for successive subsequent deliveries through a dispensing means,
- (a) a pair of stepping relays each having a contact arm and a series of successively engaged contacts with the contact arm biased to engage a first contact,
- (b) a release triggering means to establish a release cycle,
- (c) circuit means connecting the first contact of the first stepping relay and a contact other than the first contact of the second stepping relay in a series circuit with said release triggering means,
- (d) a plurality of single-pole, double-throw input switches having a normally open contact and a normally engaged contact selectively engaged by a contact arm,
- (e) a code card reader having a plurality of resiliently mounted contacts connected in circuit with said input switches and biased into engagement with a common contact plate,
- (f) a code member interposed between the brushes and contact plate and having a series of code related openings aligned with only certain contacts,
- (g) a drive means for the first stepping relay and being connected in an operating circuit, an electrically actuated switch means connected in a coded power circuit

- with said contact arms of the input switches and the contact plate for actuation upon completion of a circuit through an opening in the code member and connected in said operating circuit for said drive means, and
- (h) drive means for the second stepping relay and having input means coupled to all said input switches for actuation with each of the input switches.
6. In a coded resetting control for use in a remote inventory control for releasing quantities of fuel for successive subsequent deliveries through a dispensing means,
- (a) an A.C. stepping relay having a contact arm and a series of successively engaged contacts and having means biasing the contact arm to engage a first contact,
- (b) a D.C. stepping relay having a contact arm and a series of successively engaged contacts and having means biasing the contact arm to engage a first contact,
- (c) a release triggering means to establish a release cycle,
- (d) circuit means connecting the selected contact of the D.C. stepping relay and a contact other than the first contact of the A.C. stepping relay in a series circuit with said release triggering means,
- (e) a plurality of single-pole, double-throw input switches having a normally open contact and a normally closed contact selectively engaged by a contact arm,
- (f) a code card reader having a plurality of reading brushes resiliently biased into engagement with a common contact plate,
- (g) a code card interposed between the brushes and contact plate and having a series of code columns spaced in accordance with said reading brushes and a series of code rows defined by selected openings in the code columns, said code rows being progressively aligned with said reading brushes,
- (h) a first pair of single-pole, double-throw deception switches each having a contact arm engaging a different reading brush and having a normally closed contact connected to a normally closed contact of the input switch corresponding thereto and a normally open contact connected to the normally open contact of the same input switch, the normally open contacts of the pair of deception switches being connected,
- (i) a second pair of single-pole, double-throw deception switches corresponding to said first pair and similarly connected to a different pair of reading brushes and corresponding input switches,
- (j) circuit means connecting the other reading brushes directly to the normally closed contact of the corresponding input switches,
- (k) control means connected in a power circuit with said contact arms of the input switches and the contact plate and connected to said D.C. stepping relay to establish actuation of the D.C. stepping relay upon completion of a circuit through an opening in the code card, and
- (l) circuit controlling means connecting the A.C. stepping relay to a source of power and coupled to said input switches for actuation with the input switches.

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