Jan. 12, 1965 T. R. SMITH 3,165,187

TOKEN DEVICE

Filed Sept. 6, 1962 2 Sheets-Sheet 1

Fig. 1

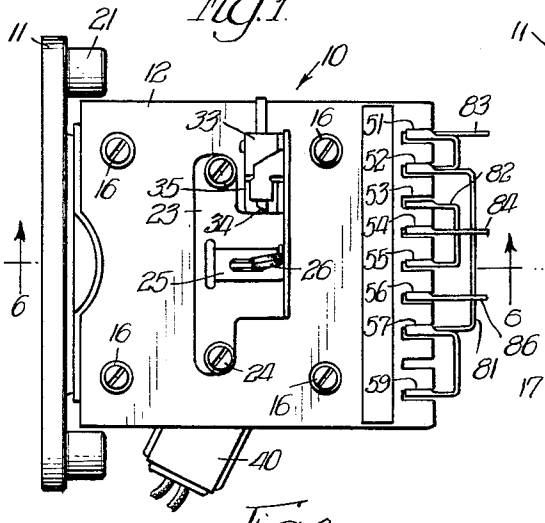


Fig. 2

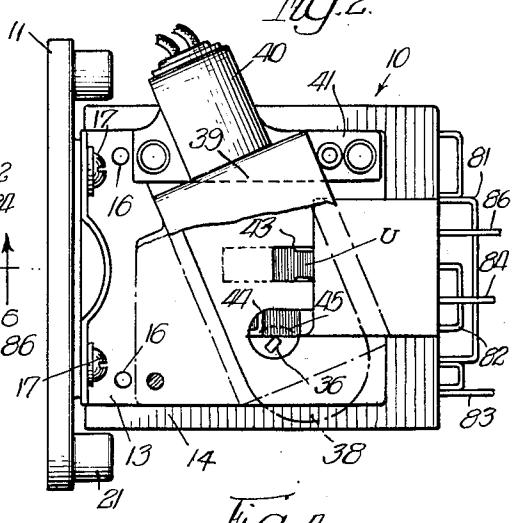


Fig. 3

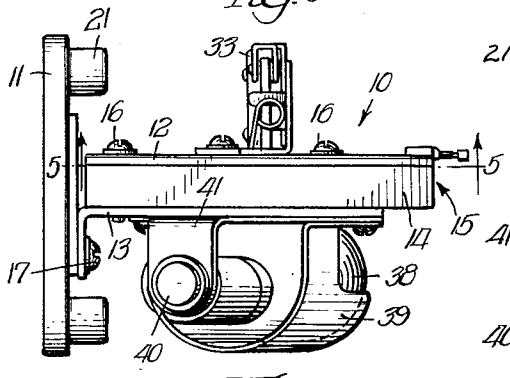


Fig. 4

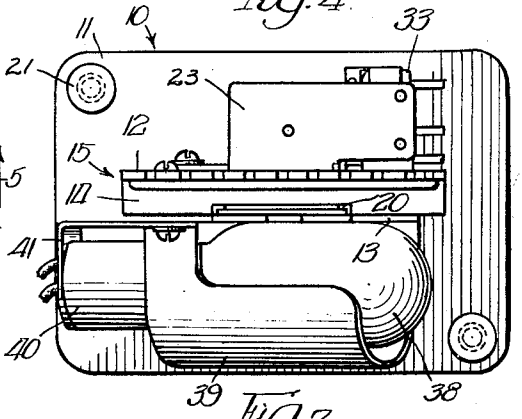


Fig. 5

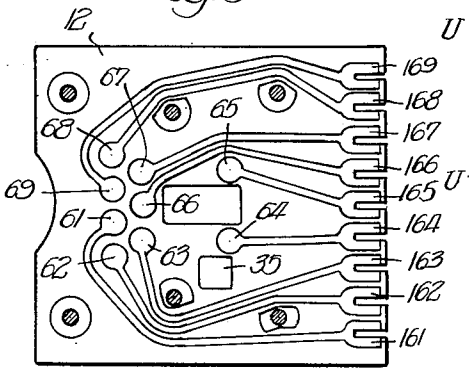
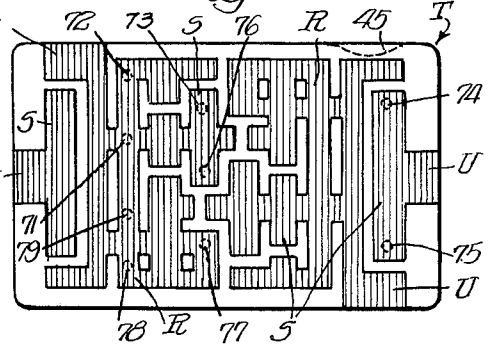


Fig. 7



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TOKEN DEVICE

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Fig. 6.

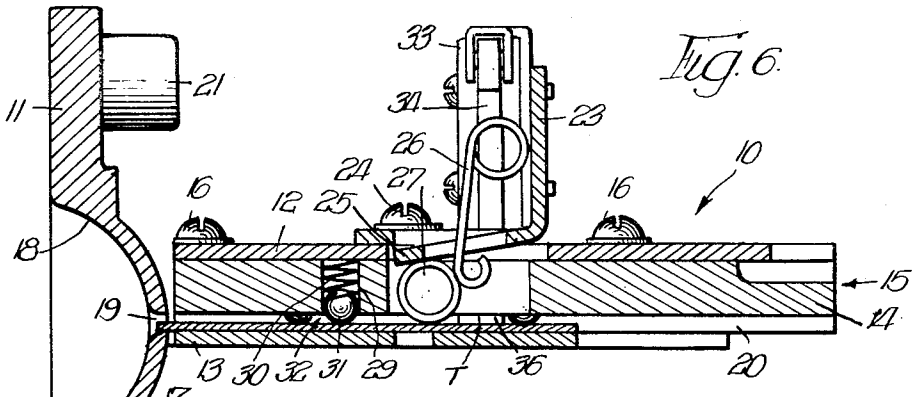


Fig. 8.

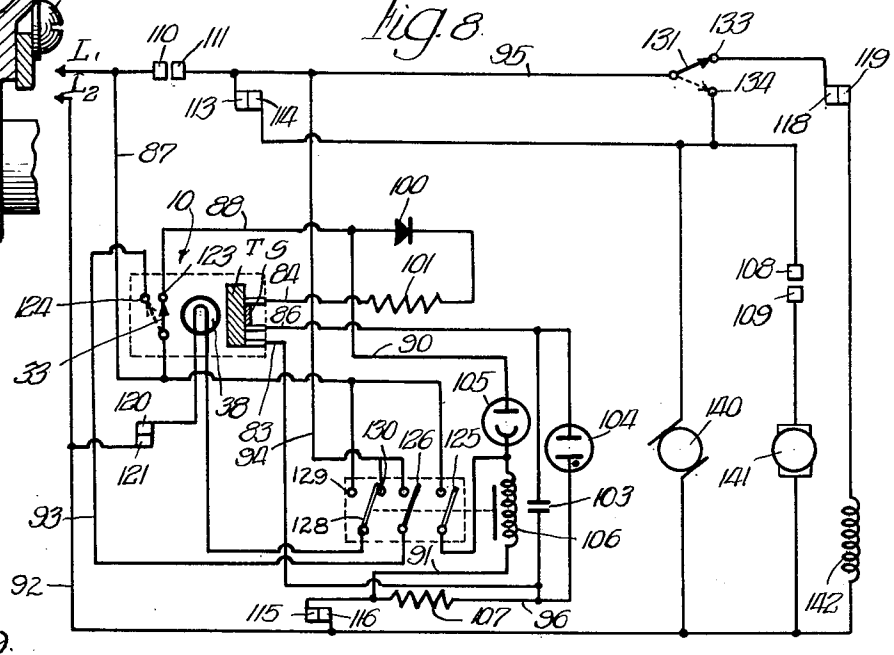
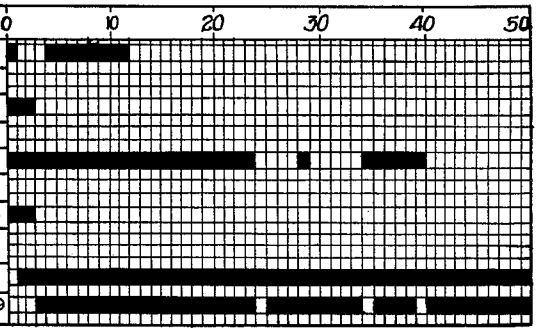


Fig. 9.

FUNCTION	CAM CONTACTS
CANCEL	120-121
TIMER RUN	113-114
RINSE - WASH	118-119
TICKET CONTROL	115-116
ON - OFF	110-111
MOTOR RUN	108-109



United States Patent Office 3,165,187 Patented Jan. 12, 1965

3,165,187

TOKEN DEVICE

Thomas R. Smith, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa, a corporation of Delaware

Filed Sept. 6, 1962, Ser. No. 221,723
13 Claims. (Cl. 194—4)

This invention relates to token-operated devices, and more particularly, to the utilization of tokens having electrically conductive areas for completion of an electrical circuit in order to initiate actuation of a device and represents an improvement of the invention disclosed and claimed in my co-pending application Serial No. 83,677, filed January 19, 1961, and assigned to the assignee of the instant application and of which this application forms a continuation-in-part.

While cards, or tickets, containing electrically conductive portions for actuation of a device have been used previously, as for example in the patents to Osteen, 2,073,904, and Noregaard, 2,794,869, there have been several problems. Either the electrically conductive area is exposed to an observer, so that it is readily susceptible to counterfeiting, or it is covered by material, in order to conceal its location, which must be pierced for operation. In addition, little consideration has been given in prior use of tokens to the selection of the material for the token base member, or to the utilization of the selected material's characteristics for performing a function in actuating the device. The lack of such requirements has contributed to the ease of counterfeiting prior tokens. Counterfeiting must be prevented, but at the same time, the cards or tickets, and the entire system must be reliable and yet not be prohibitively expensive.

The present invention embodies a token-operated system for controlling the actuation of a device which requires a thorough verification of the authenticity of the token before the device is actuated, including verification of the material of the token base member as well as verification of the size of the token and electrical circuit contained on the surface of the token.

One of the primary objects of this invention is to provide a system for actuating a device with a token which must be invalidated prior to actuation of the device.

It is an object of the present invention to provide a system for the actuation of a device, and tokens usable therewith, which is simple in operation and yet comparatively inexpensive to manufacture.

It is a further object of the invention to provide a system operable by a token which contains electrically conductive portions and which is difficult to counterfeit.

It is a still further object of the invention to provide a token-operated system which verifies the authenticity of the token before actuation of the device.

It is yet a further object of the invention to provide a token-operated system in which the characteristics of the material of which the token base member is formed, are utilized in actuating the token-operated device.

It is another object of the invention to provide a token-operated system in which the token is invalidated to prevent use.

It is still another object of the invention to provide a disposable token for a token-operated device.

It is yet another object of the invention to provide a token-operated device with reliable protection against tampering.

Further objects and advantages of this invention will become evident as the description proceeds and from an examination of the accompanying drawings which illustrate one embodiment of the invention and in which numerals refer to similar parts throughout the several views.

In the drawings:

FIGURE 1 is a top view of the token receiver embodying the present invention;

FIGURE 2 is a bottom view of the token receiver of FIGURE 1 with a fragmentary portion removed;

FIGURE 3 is a side view of the token receiver of FIGURE 1;

FIGURE 4 is a rear view of the token receiver of FIGURE 1;

FIGURE 5 is a sectional view taken along lines 5—5 of FIGURE 3;

FIGURE 6 is an enlarged view in longitudinal section of the token receiver, with token inserted, as taken along lines 6—6 of FIGURE 1;

FIGURE 7 is an enlarged top plan view of the token of the present invention adapted to be used with the receiver of FIGURE 1;

FIGURE 8 is a diagram of the control circuitry of the present invention in which switches are shown at their position when the device is in the "off" condition with a new token having been inserted; and

FIGURE 9 is a diagram illustrating the timer operation in a washing machine initiated by the token-operated system of the present invention.

Referring now to the accompanying drawings, there is illustrated a token receiver **10** having a front plate **11**, a top wall **12** in the form of a printed circuit board as best shown in FIGURE 5, and a bottom wall **13** spaced from top wall **12** by contact retainer **14**. Members **12**, **13**, and **14** are held together in sandwich form by screws **16**. This assembly **15** is attached to front plate **11** by screws **17**. Front plate **11** is formed with a semicircular recess **18** and slot **19** sized to facilitate insertion of token T into slot **20** of assembly **15**. Front plate **11** is also formed with studs **21** to facilitate attachment of token receiver **10** to a panel (not shown) of controlled device.

As best seen in FIGURE 6, bracket **23** is mounted on the top wall **12** and attached with screws **24**. Formed in bracket **23** is clutch ramp **25** which in conjunction with spring **26** and roller **27** provides a one-way clutch for engaging inserted token T.

As also shown in FIGURE 6, contact retainer **14** is formed with several circular holes **29** to accommodate contact spring **30** and contact ball **31** which cooperate to function as contact **32**. The contacts **32**, provided in each of the holes **29**, establish electrical continuity between the printed circuitry of top wall **12** and the upper face of the inserted token T. In the embodiment of the invention as shown in the drawings, nine identical contacts, each referred to as contact **32**, are provided, but this number could be greater or smaller as will be more fully explained hereinafter. As shown in FIGURE 5, the top wall **12** of the token receiver **10** is in the form of a printed circuit board which provides electrical connections between each of the points of contact **61** through **69** of the contact springs **30** with the printed circuitry of top wall **12** and corresponding terminal locations **161** through **169** at the inner end of the board. Thus as illustrated, each of the electrical contact points **61** through **69** is electrically connected by printed circuitry to terminals **51** through **57**, **59** at the right-hand edge of the top wall **12**. Terminals **51**, **52**, **57** and **59** are all connected together by multiple jumper lead **81** to lead **83**. Terminal **53** is connected to terminal **55** by jumper **82**. Terminal **54** is connected to lead **84** and terminal **56** is connected to lead **86**.

Mounted on bracket **23** of token receiver **10** is a single pole double throw switch **33**. Switch **33** is actuated by pivotal arm **34** which extends downwardly through opening **35** in top wall **12** and contact retainer **14**. Pivotal arm **34** terminates at its lower extremity in finger **36** which is abutted by an inserted token T so as to move

the arm 34 to actuate the normally open contacts of switch 33.

Referring now to FIGURE 7 of the drawing, the token T employed in the present invention has on at least one face thereof electrically conductive material in certain areas. The token may be in the form of a ticket or card. The token has a printed circuit S of electrically conductive material on at least one face thereof, arranged so as to be engaged by at least some of the contacts 32. The electrical contacts complete an electrical circuit through the circuit S on the face of the card in order to control operation of the device, and for this reason the conductive material is in a pattern which is related to the arrangement of the electrical contacts. As previously disclosed, this embodiment of the invention utilizes nine contacts which are arranged to engage token T at contact points 71 through 79. Thus it is seen that an electrical circuit will be completed between line 84 and line 86 as follows: line 84 is connected to terminal 54 which is connected electrically to contact point 64 through the printed circuitry of top wall 12, contact 32 provides continuity between point 64 on top wall 12 to point 74 on token T which is electrically connected to point 75 through circuit S of token T, another contact 32 engages token T at point 75 to provide continuity to point 65 on top wall 12 which in turn is electrically connected to terminal 55 through the printed circuitry, terminal 55 is connected to terminal 53 by jumper 82, terminal 53 is connected to contact point 63 by way of printed circuitry of top wall 12, electrical circuit is continued from point 63 to point 73 on token T through contact 32 at this point, point 73 is electrically connected to point 76 through the printed circuit S of token T, point 76 is electrically connected to point 66 through an additional contact 32, point 66 is connected to terminal 56 through the printed circuitry of top wall 12, terminal 56 is in turn connected to line 86 to complete the circuit.

In order to render more difficult counterfeit duplications of the printed circuit token T and its pattern of electrically conductive material S, the face of the card may additionally contain printed material R which is electrically non-conductive, such as printing ink, in order to disguise and conceal the location and design of the electrically conductive material S. By choosing suitable designs of R and S, the conductive area may be camouflaged. The electrically non-conductive material R is arranged in a pattern so as to be engaged by at least some of the contacts 32 as is the electrically conductive material. The actuation circuit, as will be more fully described hereinafter, requires that selected contacts, which shall be called "charging contacts," engage the token at preselected locations on the electrically conductive material to complete a circuit therethrough and also requires that selected other contacts, which shall be called "discharging contacts," engage the token at locations which are not electrically connected to any of said "charging contacts." In this embodiment the camouflaging non-conducting material on the surface of token T is used for the contact point for these selected "discharging contacts" but it is pointed out that these "discharging contacts" could engage the token base sheet directly if it be of an elecrically non-conductive material.

The base sheet of the printed circuit card T is preferably disposable, so that it can be invalidated. For this purpose, it may be made of a heat deformable material, such as a thermoplastic, having a plasticizing temperature in a range which permits it to be readily deformed by a heating element. Additional benefits and advantages may be secured with the use of a biaxially oriented thermoplastic which will tend to shrink and contract as with a "plastic memory" rather than sag or flow as some thermoplastics. These controlled deformation characteristics permit the heat distortion of token T within receiver 10 without the danger of jamming. These deformation characteristics may further be utilized for performing a function in the actuation of the device and thus secure an additional verification of the authenticity of the token inserted as will be more apparent hereinafter.

For heat deforming the token, a heater lamp 38 is positioned below bottom wall 13 and partially enclosed by reflector shield 39. The heater lamp 38 is secured to bottom wall 13 by insertion of its base into socket 40 which is attached to bottom wall 13 by bracket 41. To facilitate localized heating of token T by heater lamp 38, bottom wall 13 is formed with openings 43 and 44 which thus allow heat from heater lamp 38 to be absorbed at selected portions of token T. Reference is made to FIGURE 2 wherein the reflector shield and heater lamp are shown partially in phantom outline. Token T is further provided with heat absorbing material U in localized areas which facilitates more rapid heat absorption by the base sheet of token T. Thus when heater 38 is energized, the inserted token T, when formed of a heat deformable material, such as a biaxially oriented thermoplastic, will be rendered plastic, and will tend to shrink and contract. Final invalidation is realized as a result of at least one relatively large deformed area of the token base sheet which alters the physical size of the token to the extent that it cannot be reinserted into receiver 10. It is also within the scope of this invention, however, to submit the token to such heating as would be necessary to cause the circuit of electrically conductive material on the surface of the token to be interrupted and thus render the token invalidated.

The controlled deformation characteristics of the material for the base sheet of token T are utilized in conjunction with the heater lamp 38 as an additional verification of the authenticity of token T. This verification is accomplished by requiring that token T deform or shrink a predetermined amount at the point of abutment of finger 36 of spring-loaded switch 33 before the device may be actuated. This shrinkage is characterized by the tendency of the thermoplastic to pull away from the edges of the original token base member at the localized areas which are juxtaposed to openings 43 and 44 in bottom wall 13. This pulling away from the edges tends to form an indentation in token T as shown by broken line 45 in FIGURE 7. This initial invalidating deformation allows finger 36 of pivot arm 34 to return to its normal position and thus allows switch 33 to complete an electrical circuit for actuating the device.

Referring now to FIGURE 8, by way of example, the invention will be described in connection with the control for an automatic washing machine. It will be understood, however, that the invention may be employed with other token-operated devices.

The source of power, such as 110 volt 60 cycle alternating current, is supplied through lines L_1 and L_2. With the machine at the "off" condition, timer contacts 110 and 111 are open, switch 33 is made to contact 124 and relay switch 126 is open. When token T is inserted into receiver 10, pivotal arm 34 moves to make switch 33 to contact 123 to energize a relay actuation circuit.

The relay actuation circuit is from power line L_1 to lead 87, switch 33 to contact 123, and through lead 88, selenium half wave rectifier 100, resistor 101, to lead 84 at token receiver 10. As previously described, the circuit is completed within token receiver 10 from line 84 to line 86 through terminals 54 and 56, the printed circuitry of top wall 12, two pairs of electrical contacts 32, the electrically conductive material S at two separate locations on the face of token T, and jumper 82 with terminals 53 and 55. This circuit continues from line 86 to one side of capacitance 103. The other side of capacitance 103 is connected to power line L_2 through resistor 107 and timer contacts 115, 116 (normally closed at the start of the cycle of operation) and line 92. Connected in parallel to the capacitance 103 is a gas neon tube 104. The resistors 101 and 107 in series with the capacitance 103 are of sufficiently high value to keep the current in the circuit

completed through the electrical conductive portion S of token T below dangerously high levels to prevent hazards to persons inserting the token T. The resistors, however, allow the charge on the condenser **103** to build up during the period of time from 1 to 6 seconds to an amount sufficiently high to fire the neon gas tube **104**. The neon gas tube **104** is designed to fire in a range from approximately 68 to 76 volts, so thus when the charge on condenser **103** has achieved this amount, after a period of time determined by resistors **101** and **107** through recognized capacitance-resistance principles, the gas tube **104** fires. A light responsive resistor, such as the photoelectric cell **105**, is positioned at a location to be illumined by the neon gas discharge tube **104**. The photoelectric cell **105** is connected on one side to power line L_1 through line **90**, line **88**, contact **123** of switch **33**, and line **87**. The other side of the photoelectric cell **105** is connected to power line L_2 through a relay **106**, line **91**, timer switch contacts **115**, **116**, and line **92**. The photoelectric cell **105** has a very high resistance when dark; however, when illuminated, its resistance is reduced to a low value so that relay **106** is energized. When relay **106** is energized, it closes switches **125** and **126** and breaks continuity of switch **128** to contact **130** and makes switch **128** to contact **129**. Relay switch **125** completes a holding circuit in parallel to the photoelectric cell **105** to maintain relay **106** energized. Relay switch **126**, in series with token switch **33** makes to line **94**. Relay switch **128** completes a circuit through contact **129** to energize heater lamp **38** for the initial heating period for verification of the material of the token base sheet.

The token verification as related to deformation characteristics of the token base material will now be more fully described. The initial phases of the token vertification include utilizing the physical size of token T to make switch **33** to contact **123** which in turn permits the electronic control circuit to energize relay **106** through the printed circuitry of token T. The energizing of relay **106** in turn energizes heater lamp **38**. Heater lamp **38** being placed so as to impinge heat on selected portions of token T through openings **43** and **44** of bottom wall **13** causes token T of biaxially oriented thermoplastic to heat and thus contract or shrink at the selected areas. Contraction of token T in the area of abutment of finger **36** on pivotal arm **34** allows pivotal arm **34** to move a distance required to break continuity of switch **33** to contact **123** and to make continuity to contact **124** which completes a circuit for actuating the washing cycle. Thus it is seen that the deformation characteristics of the token base member are utilized for performing a required function in the actuation of the device.

As indicated above, the contraction of token T allows switch **33** to make continuity through contact **124** to complete an electrical circuit to fill valve **142** and timer motor **140** for initiating the washing cycle. The circuit completed is as follows: power line L_1 through line **87** to switch **33**, through contact **124** to line **93**, through relay switch **126** and line **94** to line **95**. The fill valve is then energized through switch **131** to contact **133** and through timer switch contacts **118**, **119** (closed at the beginning of the timer cycle). Simultaneously timer motor **140** is fed through timer switch contacts **113**, **114** (closed at the beginning of the timing cycle). The other side of solenoid **142** and timer motor **140** is connected to power line L_2 through line **92**. Heater lamp **38**, controlled by relay switch **128** and timer contacts **120**, **121**, remains energized for a period of one-half minute following the initiation of the washing cycle to further deform and invalidate the token. Timer contacts **120**, **121** are then opened to de-energize heater lamp **38**.

In addition to the system already described, another method is employed to prevent operation of the device by counterfeit objects inserted in the token receiver **10**. Terminals **51**, **52**, **57** and **59**, with their respective printed circuitry and contact members, which I have called "discharging contacts," are connected to a separate circuit through multiple jumper **81** to line **83**.

Referring now to FIGURE 8, it will be seen that line **83** is connected to one side of the condenser **103** while line **86** is connected to the opposite side as described in the relay actuation circuit. It is apparent that if a metal object or improper conductor is inserted in the token receiver **10**, to accomplish the completion of a circuit between a pair of contact members **32** at locations **74** and **75** and also between a pair of contact members at locations **73** and **76**, touches a "discharging contact" member at location **71**, **72**, **77** or **79**, the condenser **103** will be shorted through that "discharging contact" member and thus be discharged to prevent firing of neon gas discharge tube **104**. The relay actuation circuit is thus not completed, the heater lamp is not energized, and the washing cycle is not initiated. Furthermore, the correct "charging contacts" must be held closed and all "discharging contacts" held open for a period of time sufficient to charge condenser **103**. It is thus seen that random insertion of an electrical conductor in receiver **10** cannot accidentally start the washing cycle.

Even assuming that the correct electrical contacts for completing a circuit between terminals **54** and **56** be closed for a period of time without touching the contacts at any of the locations **71**, **72**, **77** and **79**, the circuit for actuating relay **106** will not be energized unless switch **33** is closed to contact **123** which is accomplished with an authentic token. In this way, an effective system is provided for preventing operation of the device by tampering.

Thus it is seen that a system is provided that requires a thorough verification of the token before actuation of the device is initiated. Specifically it is seen that requirements which must be met in this verification process include: the token must be of a proper thickness for insertion in slot **19** of front plate **11**; the token must be of a proper size for actuating switch **33**; the token must contain proper electrically conductive and electrically non-conductive patterns on its face engageable by the electrical contacts **32** for completing a circuit for a predetermined time period through selected contact members and not completing a circuit through selected other contact members in receiver **10**; and the token base member material must be such as to undergo a predetermined degree of contraction at a particular location with a given amount of heat. It is now apparent that this receiver, related circuitry, and token useable therewith, provide an effective system for preventing the actuation of the device with counterfeit tokens.

It will be apparent that the printed circuitry on token T may be arranged in various designs and patterns since it may be desirable to change the design from time to time and also desirable to provide different tokens for actuating machines at different locations. The token receiver can be changed quite readily to accommodate tokens having revised or different patterns of electrically conductive and electrically non-conductive material. This change is accomplished by changing the position of various terminals so that different pairs of electrical contacts are used for completing a circuit to the capacitance **103**. At the same time the change provides for using different contact members as the "discharging contacts." As was previously disclosed this embodiment of the invention provides for nine contact members of which eight are used in any one installation for checking the printed circuit of the inserted token, with four serving as "charging contacts" and four serving as "discharging contacts." It is apparent that the number of "charging contacts" and number of "discharging contacts" could be either reduced or increased. The number of contacts used, however, not only affects the ease and cost of manufacturing but also affects the degree of reliability achieved in checking the authenticity of the token and determines the number of

alternate designs and patterns that can be utilized by changing the location of the various terminals.

Referring now to FIGURE 9, there is illustrated the position of the timing switch contacts through a cycle of operation, the shaded areas indicating the periods in which the timer contact switches are closed. The timer contact switches are, of course, regulated by a conventional timing mechanism driven by timer motor **140**, for opening and closing the switches at the proper interval.

After the timer motor **140** has been energized through switch **33** to contact **124** and relay switch **126**, it begins to operate and after one interval closes timer switch contacts **110**, **111**. Timer switch contacts **110**, **111** are in a circuit parallel to switch **33** and relay switch **126** so that, after timer contact switches **110**, **111** have been closed, the timer motor continues to operate under the control of its own timer contact switches **110**, **111** apart from the relay actuating circuit. Thus, upon closing of the timer switches **110**, **111**, the washing machine operation proceeds under its own automatic control, apart from the circuits energized by token T.

It will be noted that the timer motor **140** is also under the control of timer switch contacts **113**, **114** since it is connected to power line L_1 through contacts **113**, **114**. It will be noted in FIGURE 9 that, after the timer motor has advanced three intervals, contacts **113**, **114** are open to de-energize the timer motor **140**.

The fill solenoid **142**, however, remains energized to operate a valve for introducing water into the machine until the float switch **131** indicates that the water level in the machine has reached a predetermined height. After the water level attains the predetermined height, contact **133** is opened de-energizing solenoid **142**, and contact **134** is closed. When float switch **131** closes contact **134** (as indicated by the dotted lines shown in FIGURE 8), timer motor **140**, and drive motor **141**, which is in series with timer switch contacts **108**, **109**, are energized to continue the operation.

After timer motor **140** has operated through four intervals, timer contacts **120**, **121** are closed to reenergize the heater lamp **38** for completing the cancellation or invalidation of token T. The heater lamp is connected to power line L_1 through line **94** to contact **130** and relay switch **128**. The other side of the heater lamp **38** is connected to power line L_2 through timer switch contacts **120**, **121**. The heater is energized for four minutes to insure complete invalidation of token T by raising the temperature above the plasticizing point of the thermoplastic material of the base sheet, at which temperature the card undergoes considerable contraction at the areas juxtaposed to the openings **43**, **44** in bottom wall **13**. The resulting token is thus deformed to the extent that it cannot be reinserted into slot **19** of receiver **10**, but may be ejected from receiver **10** by the insertion of a new token in slot **19**.

During the washing cycle the timer switches **108**, **109** and **118**, **119** are opened and closed for energizing and de-energizing the timer motor, drive motor, and fill solenoid for various operations. At the completion of the washing cycle, the timer contacts **110**, **111** are opened to de-energize the timer motor **140** and the other units of the washing machine such as fill solenoid **142** and drive motor **141**. The washing cycle is thus stopped.

From the foregoing, it is believed operation of the device is apparent. If an operator desires a washing cycle, a token T, which may be purchased at a suitable place, is inserted in the slot **19** of token receiver **10**. Upon insertion of the token in the receiver, switch **33** is closed to contact **123**. Also, a circuit is completed between preselected electrical contacts **32** through the conductive material S on the face of the token. The circuit through contact **123** of switch **33** and through the circuit of token receiver **10** and token T between lines **84** and **86** energizes a time delay circuit for actuation of relay **106**. After relay **106** is energized, it remains energized through a holding circuit controlled by timer switch contacts **115**, **116**.

The relay actuating circuit is from power line L_1, line **87**, switch **33** to contact **123**, line **88**, rectifier **100**, resistor **101**, line **84**, printed circuitry of top wall **12**, selected contact members **32**, electrical conductive material S on token T, and line **86** to one side of condenser **103**. The other side of condenser **103** is connected to power line L_2 through lead **96**, resistor **107**, timer switch contacts **115**, **116**, and line **92**. After the condenser has achieved a predetermined voltage after a predetermined time in acordance with well-known principles, the neon gas tube in parallel with the condenser fires and illumines the photoelectric cell **105**. When the photoelectric cell **105** is illuminated, its resistance is reduced to a point which allows current to flow to and energize relay **106**. The circuit for energizing the relay is from power line L_1, line **87**, switch **33** to contact **123**, line **88**, line **90**, through photoelectric cell **105** to relay **106**. The other side of the relay is connected through line **91**, timer switch contacts **115**, **116**, and line **92** to power line L_2. When the relay **106** has been energized, a holding circuit is completed by relay switch **125** which short circuits the photoelectric cell **105**. The relay also closes switch **128** to contact **129** which energizes heater lamp **38**. The heater lamp circuit is from power line L_1, line **87**, through contact **129** and switch **128** to one side of the heater lamp **38**. The other side of heater **38** is connected to power line L_2 through timer switch contacts **120**, **121**. After the heater lamp **38** is energized, token T is heated at preselected locations until plasticizing temperature is reached and token T is distorted sufficiently to allow switch **33** to close to contact **124**. After switch **33** is made to contact **124**, a circuit is completed through switch **126** of relay **106** to various units in the automatic washing machine for energizing automatic controls.

Thus it is seen from the foregoing description and explanation that the present invention provides a unique system for actuating various electrical devices. It is a system which facilitates use of a token or ticket which is inexpensive to fabricate yet difficult to counterfeit and which is invalidated when used to prevent reuse. It is a system that removes the incentive and object of theft from the device and thus prevents damage to the machine. Further, it is a system that is simple in operation and comparatively inexpensvie to manufacture but which provides a high degree of reliable protection against tampering.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, these are used in a generic and descriptive sense only, and not for purposes of limitation. Changes in form and proportion of parts as well as the substitution of equivalents are contemplated, as circumstances may suggest or render expedient, without departing from the spirit or scope of this invention as further defined in the following claims.

I claim:

1. In a token operated apparatus, the device for verification of the token comprising: receiver means for reception of a token having a thermoplastic base, heating means positioned to heat the token when inserted in said receiver means for deforming said thermoplastic base, and actuation means mounted in said receiver means positioned for initiating operation of said apparatus responsive to predetermined heat deformation of said thermoplastic base caused by said heating means.

2. In a token operated apparatus, the device for verification of the token comprising: receiver means for reception of a token having a thermoplastic base, heating means positioned in said receiver means to heat the token when inserted for deforming said thermoplastic base, means for energizing said heating means controlled by insertion of said token, and means mounted in said receiver means positioned for initiating operation of said

apparatus responsive to predetermined heat deformation of said thermoplastic base.

3. In a token operated apparatus, the device for verification of the token comprising: receiver means for reception of a token having a thermoplastic base, heating means positioned to heat the token when inserted in said receiver means for deforming said thermoplastic base, means for energizing said heating means controlled by insertion in said receiver of a token of the proper physical size, and means mounted in said receiver means positioned for initiating operation of said apparatus responsive to predetermined heat deformation of said thermoplastic base.

4. In a token operated apparatus the device for verification of the token comprising: receiver means for reception of a token having a thermoplastic base and electrically conductive material in a prearranged pattern thereon, contact members positioned for engaging spaced points of said electrically conductive material of said token when inserted, circuit means connected to said contact members for completing a circuit through said electrically conductive material to verify authenticity of said prearranged pattern of electrically conductive material, heating means positioned to heat said token when inserted for deforming said thermoplastic base, means for energizing said heating means controlled by completion of the circuit through said conductive material, and actuation means positioned for response to a predetermined deformation of said thermoplastic base for actuating said apparatus.

5. In an apparatus actuatable by a token having a heat deformable base and electrically conductive material thereon, the combination comprising: means for receiving said token, at least one pair of electrical contact members positioned for engaging said token at spaced locations on said electrically conductive material, switch means positioned for actuation upon insertion of said token for completion of a circuit through said electrically conductive material and through said electrical contact members, heating means positioned for heating said token to deform said heat deformable base, means controlled by completion of said circuit for energizing said heating means, and means controlled by a predetermined deformation of said base for initiating actuation of said apparatus.

6. In an apparatus actuatable by a token having a heat deformable base, the combination comprising: receiver means for receiving said token, heating means positioned to heat said token when inserted in said receiver means and induce deformation of said heat deformable base in at least one predetermined location, means for energizing said heating means, and switch means mounted in said receiver means positioned for initiating operation of said apparatus responsive to predetermined heat deformation of said token at said predetermined location for completing a circuit.

7. In an apparatus actuatable by a token having a heat deformable base and at least one localized area of substantially greater heat absorption characteristics relative to said base, the combination comprising: means for receiving said token, switch means positioned for actuation to a first position by contact with said token when inserted for completing a circuit, and heating means positioned to heat said token when inserted for inducing deformation of said area of greater heat absorption characteristics, means for energizing said heating means controlled by completion of said circuit, said switch means positioned for movement to a second position in response to said deformation of said token for initiating actuation of said apparatus.

8. In combination, a receiver for use in association with a token operated device, a token inserted within said receiver, said token formed of a thermoplastic material having on a face thereof electrically conductive portions in a prearranged pattern, electrical contact members associated with said receiver engaging said token at spaced locations for completion of a circuit through the prearranged pattern of electrically conductive portions in order to control actuation of the device, heating means associated with receiver for deforming the inserted token, and means for energizing said heating means controlled by insertion of said token in said receiver.

9. In a combination, a receiver for use in association with a token operated device, a token inserted within said receiver, said token formed of a heat deformable substance having on at least one face thereof electrically conductive portions in a prearranged pattern, electrical contact members engaging said token at spaced locations for completion of a circuit through the prearranged pattern of electrically conductive portions in order to control actuation of the device, heating means associated with receiver for deforming the inserted token, and switch means on said receiver operable by the inserted token for completion of a circuit to control energization of said heating means.

10. In a token operated device, control means for operating the device through a cycle and then stopping, actuation means for initiating said control means, a receiver, said receiver mounted for reception of a token with electrically conductive portions, electrical contact members associated with said receiver for engaging a token when inserted, said actuation means controlled by completion of a circuit through said electrically conductive portions of the inserted token between at least some of said electrical contact members, and heating means responsive to insertion of the token in the receiver for deforming the token after insertion in said receiver.

11. In a control for a token operated device, a receiver adapted to receive tokens having electrically conductive portions in a prearranged pattern, electrical contact members in said receiver engaging the inserted tokens at spaced locations for controlling actuation of said device, heating means associated with said receiver for distorting the inserted token, and switch means engaged by the inserted token for controlling energization of said heating means so that when the token is distorted said heating means is deenergized.

12. In a token for use in association with a token-operated device having a biased switch member operable by contact with said token, the combination comprising: a base member of a heat deformable material; and at least one area on said base member having substantially greater heat absorption characteristics relative to the remainder of said base member whereby said area having greater heat absorption characteristics permits relatively rapid heat absorption for inducing localized deformation of said token.

13. In a token for use in a token-operated device having a biased switch member operable by contact with said token to a first position, the combination comprising: a base member formed of a heat deformable material; electrically conductive material on said base member restricted to a prearranged pattern for cooperation with said token-operated device; and at least one area on said base member having substantially greater heat absorption characteristics relative to the remainder of said base member whereby said area having greater heat absorption characteristics permits relatively rapid heat absorption by said base member for inducing localized deformation of said token.

References Cited in the file of this patent

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