ANTITHEFT MERCHANDISE DISPLAY SYSTEM

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ABSTRACT

A multiplicity of pedestals, each individually locked to a ring or other article of merchandise, each receivable in a socket in a jewelry box or other display apparatus with a resistor in each of the pedestals. The resistors in a particular system desirably differ among themselves in value of their resistance. When the pedestals are all inserted in their sockets, their resistors form one leg of a Wheatstone bridge circuit to balance the bridge and illuminate a pilot lamp to indicate that the system is in operation. Removal of one of the pedestals, or the substitution of a pedestal having a resistor of incorrect value, will unbalance the Wheatstone bridge circuit and thereby extinguish the pilot lamp and illuminate a warning signal lamp, which, unless extinguished by switch means under the operator's control, remains lighted until a pedestal having the proper resistance is replaced. The pedestal has a rectangular cross section for properly orienting the ring with respect to the jewelry box, and has a hook with an extended leg which is threaded into a fastener rotatable relative to the pedestal, to move the hook toward and away from the pedestal to releasably lock the ring to the pedestal.

10 Claims, 5 Drawing Figures
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1

ANTITHIEFT MERCHANDISE DISPLAY SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to an electrical alarm system, and more particularly to such a system to indicate article placement or removal.

In all business involving retail selling, shoplifting is becoming an ever increasing problem and an ever increasing expense to the retail seller. The problem of shoplifting is particularly apparent in the selling of jewelry because fine jewelry is very expensive and is readily disposed of despite its being stolen, is very small and easily concealed by a would-be thief and its value is not immediately apparent to the eye so that less expensive jewelry can be easily substituted for more expensive jewelry to delay detection that a theft has occurred. The aforementioned reasons make the detection of an antitheft device a highly desirable investment for jewelry stores.

However, these facts plus the fact that any such antitheft device must also permit the jewelry protected thereby to be sold makes the provision of such a device difficult. In the sale of jewelry and especially rings, the appearance of the jewelry is of primary importance and the customer's entire decision to buy may be based upon the appearance of the ring on his hand. In order to judge the appearance of such jewelry the customer must be able to remove the jewelry and try it on, with complete freedom so that he will be able to pursue his tastes unhindered.

Therefore, it is the primary object of this invention to provide a novel antitheft merchandise display system.

Other and additional objects of this invention are to provide such an antitheft merchandise display system which indicates that all articles are in place, to provide such a system which permits the individual article to be removed for inspection by the customer, and then replaced by the customer after inspection, to provide such a system which indicates the substitution of a foreign article, to provide such a system where the order of the articles may be interchanged without affecting the operation of the system, and to provide such a system where an article when sold can be removed from its mounting pedestal and the pedestal replaced to restore the system to normal condition.

Generally, the antitheft merchandise display system according to this invention includes support means having at least one socket therein, a pedestal for each socket, each pedestal having reliably locked thereto an individual article of merchandise, each pedestal being receivable in one of the sockets and having therewithin an element having an electrical characteristic of predetermined value; electrical characteristic sensing means in said support means to sense whether each of the sockets has received therein a pedestal, and indicating means operated by the sensing means for indicating that correct pedestals are in the sockets. The system may include a second indicating means operated by the sensing means to indicate that a pedestal and the article locked thereto have been removed from the socket or that a foreign pedestal, having an element with an incorrect electrical characteristic, has been inserted into one of the sockets. The pedestal and socket may have mating electrical contacts connected to the element, and the element may be a resistor with the sensing means being responsive to a predetermined value of resistance of the resistors. The pedestal may have an irregular polygonal cross section and the socket may be provided with a mating opening. The pedestal may be provided with releasable locking means including a hook for holding the article of merchandise and rotatable locking and unlocking means such as a threaded fastener for moving the hook toward and away from the pedestal to lock the article of merchandise thereto.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary perspective view of the antitheft merchandise display system according to this invention showing a portion of a jewelry box with one of the sockets therein empty and another socket therein containing a pedestal to which a ring is locked.

FIG. 2 is a sectional view on an enlarged scale taken along the plane II—II of FIG. 1, and showing a pedestal received within a socket.

FIG. 3 is a sectional view taken along the plane III—III of FIG. 2.

FIG. 4 is a sectional view looking upwardly along the plane IV—IV of FIG. 3.

FIG. 5 is a schematic diagram of an exemplary electrical circuit which may be used in the sensing means of the system.

DETAILLED DESCRIPTION

Referring now to the drawing and particularly to FIG. 1, the antitheft merchandise display system according to this invention is indicated generally at 10, and protects articles of merchandise 11 and here illustratively shown as a ring 12 including a setting 13 and a band 14.

System 10 includes support means or display panel 15 having sockets 16 formed therein, pedestals 20 including hook means 30 (see FIG. 2) for holding the article of merchandise 11 to the pedestal, locking and unlocking means 35 for releasing the hook means 30, and electrical component or element 40, electrical characteristic sensing circuitry in a housing indicated generally at 45 responsive to the electrical characteristic of the element 40, and indicating means such as small lamps 56 and 57 operated by the sensing means.

As seen in FIG. 1, the support means 15 is shown exemplary as being a jewelry box 16 having a decorative upper plate 17 secured therein, in which sockets 18 are recessed.

Referring now to FIGS. 2, 3 and 4, each pedestal 20 has an upper body 21 desirably molded of a lightweight plastic material and including sidewalls and a top wall defining a downwardly open cavity 22. The long sidewalls provide a side marking surface 23 suitable for marking the item of merchandise 11 attached to the particular pedestal 20. An aperture 24 extends from the cavity 22 through the upper wall 25 of the upper body 21. A dimple or recess 26 is located in the upper surface 25 adjacent to the aperture 24. Pedestal 20 is provided with hook means indicated generally at 30 for securing the merchandise 11 or rings 12 thereto. In the preferred embodiment the hook includes an arcuate hook end 31 having a short leg 32 for insertion into the dimple 26 and a long threaded leg 33 extending downwardly through aperture 24. The hook end 31 extends around the lower portion of band 14 of ring 12 to engage the ring and hold it to the upper surface 25 of the pedestal 20. To maintain the ring in a stable upright position, a small recess or groove 27 may be formed in the upper surface of wall 25 and 42 respectively the lowermost arcuate portion of the ring band 14. The engagement of legs 32 and 33 into dimple 26 and aperture 24 respectively prevents ring 12 from being removed from the pedestal.

Means are provided for releasable locking hook 30 in its position seen in FIG. 2, such means being here shown as including nut 37 threaded on leg 33 within cavity 22. For added strength of the assembly the pedestal may have embedded or molded therein an apertured metal insert 36 against which nut 37 bears when the assembly is locked. Unscrewing the nut several turns, as by a suitable wrench inserted upwardly in the cavity when the pedestal has been removed from its socket, serves to permit the ring and hook to be moved upwardly, thus releasing ring band 14 from arcuate hook 31.

Disengagable electrical connector means are provided in the bottom of each socket and in the lower portion of each pedestal. Such means are here shown as including a pair of upstanding prongs 51 and 52 in the bottom of the socket, best seen in FIGS. 1 and 3, and mating female jacks 41 and 42 carried by the pedestal and adapted to make electrical contact with prongs 51 and 52 respectively. The electrical component 40 previously mentioned is here shown as a resistor having leads 43 and 44 connected to female jacks 41 and 42 respectively. As best seen in FIG. 4, the prongs and jacks are...
preferably symmetrically disposed on the socket and pedestal respectively, in order to permit insertion of the pedestal in a socket with either major side wall facing to the front of the display panel, as desired by the user. Also, as seen in FIGS. 2 and 4, resistor 40 is offset laterally within cavity 22 oppositely to the lateral offset of threaded leg 33, to permit access to nut 37 threaded thereon. As seen in FIG. 3, prongs 51, 52 have attached thereto leads 53, 54 for connection to other parts of the electrical sensing circuitry to be now described.

FIG. 5 shows illustrative circuitry by which to sense the combined resistance of the pedestal resistors, and to indicate whether such combined resistance is equal to a predetermined value.

If unequal, the circuitry will produce a "safe" indication; if unequal, a "danger" or "alarm" indication. The two indications are preferably the illumination of green and red signal lamps respectively. The following description assumes a system having a total of six sockets for connection to six pedestal resistors. Obviously the indication is applicable to a system having any number of sockets.

In general the circuitry of FIG. 5 includes a Wheatstone resistance bridge indicated generally at 60, a differential amplifier indicated generally at 80 for amplifying the output of the resistance bridge, a rectifier bridge indicated generally at 100 for deriving the absolute value of the amplifier output signal, means 105 for amplifying the rectifier bridge output and feeding the amplified output signal to a transistor switch 106 for controlling current flow to a relay 110 and an indicating circuit 120 controlled by the relay.

More specifically, the circuitry of FIG. 5 includes a Wheatstone bridge indicated generally at 60 having input terminals 62, 63 and output terminals 65, 66. Three legs are each represented by a single resistor 67, 68, 69, while the fourth leg includes, in series, pedestal resistor 40 and other pedestal resistors 70, 71, 72, 73 and 74, as well as an adjustable resistor 75 by which to calibrate the bridge. The resistance of each of the pedestal resistors 40, 70–74 may be equal or, preferably, their resistances may vary substantially from one another. The latter situation enhances the security of the system, by minimizing the likelihood that a thief, aware of the system, can provide himself in advance with a counterfeit ring mounted on a pedestal having a resistor of correct value.

The output signal of Wheatstone bridge 60 is amplified by suitable means, here shown as an emitter-coupled differential amplifier indicated generally at 80. More specifically, output terminals 81, 82 of the bridge are connected to input terminals 81, 82 of amplifier 80. Power is supplied at 83 and, in accordance with conventional operation at balanced conditions and with resistors 85 and 87 of equal resistance, current flow divides substantially equally between the left-hand and right-hand circuits including transistors indicated generally at 86 and 87 respectively. The emitter currents of the two transistors are fed through a common line 89 to a transistor indicated generally at 90, whose base 91 is maintained at a constant potential above ground 95 by Zener diode 92. The emitter 93 of transistor 90 is connected through resistor 94 to ground 95, and its collector 96 may be connected through diode 97 to input terminal 82 of the amplifier to minimize excessive voltage swing, such as under conditions of removal of one of the pedestal resistors 40, 70–74.

Thus, with equal input voltages impressed upon input terminals 81, 82, current flow in resistor 85 will equal that in resistor 87, and equal voltages will thus appear at output terminals 98, 99. On the other hand, an unbalance of voltage applied to input terminals 81, 82 creates a division of current flow between resistors 85, 87, and consequent unequal voltages appearing at output terminals 98, 99.

As will be evident, the output voltage signal at terminals 98, 99 may be either zero or some finite value in either of two polarities. Means are desirably provided for deriving the absolute value of the output signal, and for using such signal, suitably amplified if necessary, for controlling a relay in order to produce the desired indicating signals in accordance with the invention.

Thus output terminals 98, 99 are connected to a rectifier bridge indicated generally at 100 in which the absolute value of an input signal appearing at input terminals 101 and 102 will appear at the output terminals 103 and 104. This output signal may be amplified if desired by conventional transistor means indicated generally at 105, and the amplified signal may then be fed to a transistor indicated generally at 106, serving essentially as an off-on switch for controlling current flow through a relay constituting a portion of the indicating means.

A relay indicated generally at 110 includes a winding 111 and an armature 112 having a rest or normal position as indicated in solid lines and an energized position indicated in dotted outline. Winding 111 of the relay is supplied with current from source 115 through switching transistor 106 and resistor 116, the other side of the winding being grounded at 117.

Relay armature 112 forms part of the indicating circuit indicated generally at 120, and including the pilot lamps 56, 57 previously mentioned and a battery or similar source of power 211. It will be seen that, with armature 112 in its rest or normal position indicated in solid lines in FIG. 5, pilot lamp 56 will be illuminated, and it may be assumed that a green lamp. With relay winding 111 energized, armature 112 is moved to its operative position shown in dotted outline in FIG. 5, thus extinguishing lamp 56 and illuminating lamp 57, which may be the alarm or danger lamp, desirably colored red. The indicating circuit 120 may also include a master switch 123, desirably under the control of the operator in a relatively hidden position. Thus, the operator, by moving switch 123 to its off position, can deenergize the alarm lamp 57 while a customer is trying on a ring; but can immediately energize that circuit when the pedestal corresponding to the ring is replaced, thus giving to the operator an immediate indication as to whether the correct pedestal has been replaced in its socket.

In operation of the present system, with all pedestal resistors 40, 70–74 in the circuit as shown, the operator balances bridge 60 by adjustment of calibrating resistor 75 until reaching the null condition of zero voltage between output terminals 65, 66, which will be indicated by illumination of green signal lamp 56. The system is then ready for use.

If now one of the pedestal resistors 40, 70–74 is removed from its socket, bridge 60 is of course unbalanced, producing a voltage across output terminals 65, 66 and actuating relay 110 to energize alarm lamp 57. If a pedestal having a resistor of incorrect value is inserted in the empty socket, bridge 60 will remain unbalanced, although its output voltage may be changed in magnitude and even in polarity. Thus the alarm lamp 57 remains lit until a pedestal with a proper resistance is inserted in the empty socket, unless the operator opens switch 123.

Accordingly there is here provided a system by which to immediately and reliably indicate whether a correct pedestal resistor has been replaced in one of the sockets of the display panel. It is to be understood that the size of the pedestal compared to that of the ringborne thereon has been somewhat increased in the drawing for clarity of illustration and explanation. In an actual system, the pedestal is desirably substantially smaller relative to the ring than as hereinbefore illustrated, and therefore interferes insignificantly with the customer's selection and temporary wearing of the ring while considering its purchase. Modifications and changes from the specific forms of the various components of the present system are within the contemplation of the invention, and are intended to be included within the scope of the appended claims.

I claim:
1. An anti-theft merchandise display system for the display of individual articles of merchandise or the like, which permits the individual article to be removed for inspection by the customer and then replaced by the customer after inspection, such system comprising:
   a support means having at least one socket therein;

3,668,681
a pedestal for each socket, each locked to an individual article of merchandise, each pedestal being receivable in a socket and having therewithin an element having an electrical characteristic of predetermined value; electrical characteristic sensing means in said support means responsive to the electrical characteristic of the element when a pedestal is in a socket; and indicating means operated by the sensing means for indicating that each socket has a pedestal therein.

2. The invention as defined in claim 1, additionally including a second indicating means, operated by the sensing means when the first indicating means is not operating, for indicating that a pedestal has been removed from the socket, or that a pedestal whose element has a value different from the predetermined value is in a socket.

3. The invention as defined in claim 1 wherein the electrical characteristic of the element is impedance, and wherein the pedestal and the socket have mating electrical contacts, the electrical contacts of the pedestal being connected to the element, and the electrical contacts of the socket being connected to the sensing means.

4. The invention as defined in claim 3 wherein the element is a resistor, and the sensing means is responsive to the predetermined value of the resistance of the resistor.

5. The invention as defined in claim 1 wherein a plurality of sockets are provided in the support member, and wherein the sensing means senses the predetermined value of the sum of the electrical characteristics, permitting the pedestals to be placed in the sockets in random order and still operate the indicating means.

6. The invention as defined in claim 5 wherein the electrical characteristic is impedance, and wherein the pedestal and the socket have mating electrical contacts, the electrical contacts of each pedestal being connected to its element, and the electrical contacts of the sockets being connected with each other and the sensing means.

7. The invention as defined in claim 1 wherein the pedestal includes a body with an upper end for contacting the article, and a lower end sized to mate with the socket, said element being mounted in the body adjacent said lower end, and means are provided in said body adjacent the upper end for releasably locking the article to the body.

8. The invention as defined in claim 7 wherein the socket is of rectangular cross section, and the pedestal lower end has a mating rectangular cross section, and the body and the socket are provided with mating male and female contacts located along the major center line of the rectangle, and equally spaced from the minor center line of the rectangle.

9. The invention as defined in claim 7 wherein the releasable locking means includes:

hook means for hooking the article of merchandise to hold the article, and rotatable locking and unlocking means in the pedestal for moving the hook means towards the pedestal in response to rotation in one direction to lock the article to the hook means, and for permitting the hook means to be moved away from the pedestal in response to rotation in the opposite direction.

10. The invention as defined in claim 9 wherein the article is a ring, wherein the hook means has a hook end for passing through the ring, said hook end having two legs, one of which is extended and threaded, wherein the pedestal has a hollow body with an opening therein through the top wall for receiving the extended leg, and wherein the rotatable locking and unlocking means is a threaded nut engaging the threaded leg.