United States Patent [19]

Deitch

[11] **3,813,624**

[45] **May 28, 1974**

[54] **MAGNETIC LOCK SWITCH**

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[22] Filed: **Apr. 9, 1973**

[21] Appl. No.: **349,488**

[52] **U.S. Cl.** **335/206**
[51] **Int. Cl.** **H01h 41/14**
[58] **Field of Search** 335/205, 206, 207

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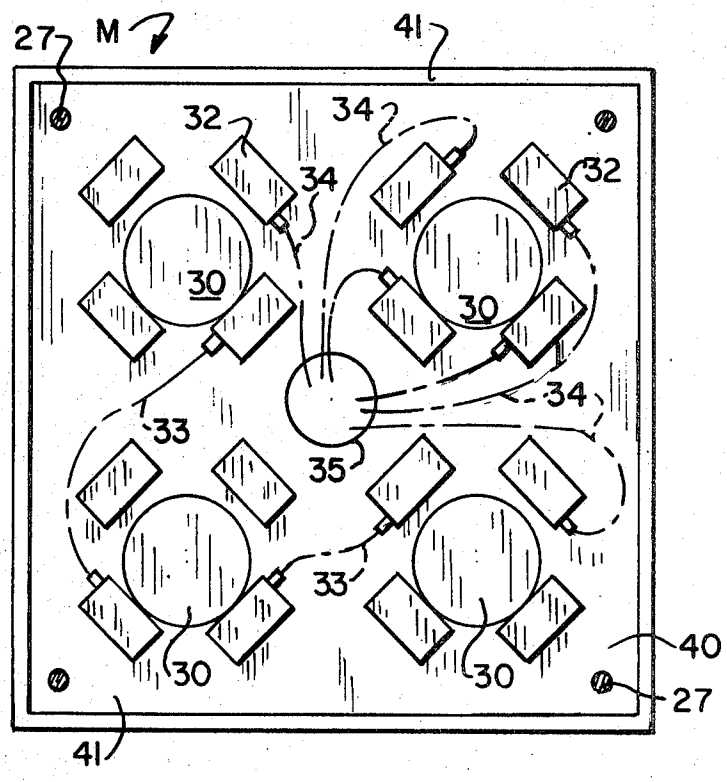
Primary Examiner—Roy N. Envall, Jr.

[57] **ABSTRACT**

A magnetic lock switch for closing a circuit by means of a magnetic key. The switch is formed as a small packet having a flat face plate at one side. A plurality of shiftable magnets are carried within this packet adjacent to the face plate and each magnet is surrounded by a group of posts. A selected pair of adjacent posts in each group is electro-conductive and is connected to circuit wires. The magnet is electro-conductive at least at its peripheral edge so that whenever it is shifted to engage the two selected posts, it will act as a switch to close the circuit. By selecting various pairs of posts at the different magnet positions, a number of lock combinations are possible. The key is a flat member adapted to lie alongside the face plate of the packet and includes a magnetic component within it for each shiftable magnet within the packet. These components are located to shift the magnets to circuit closing positions.

15 Claims, 16 Drawing Figures



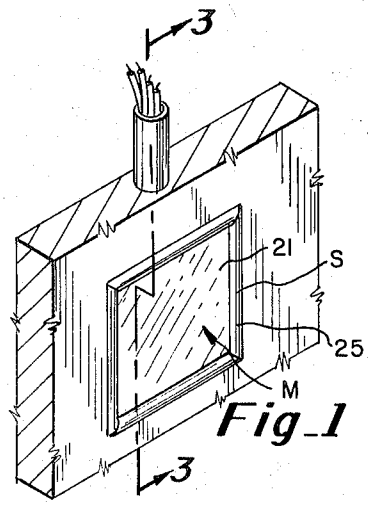


Fig_1

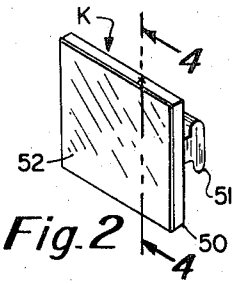


Fig_2

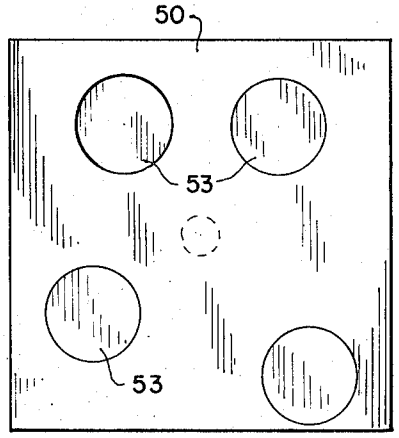


Fig_5

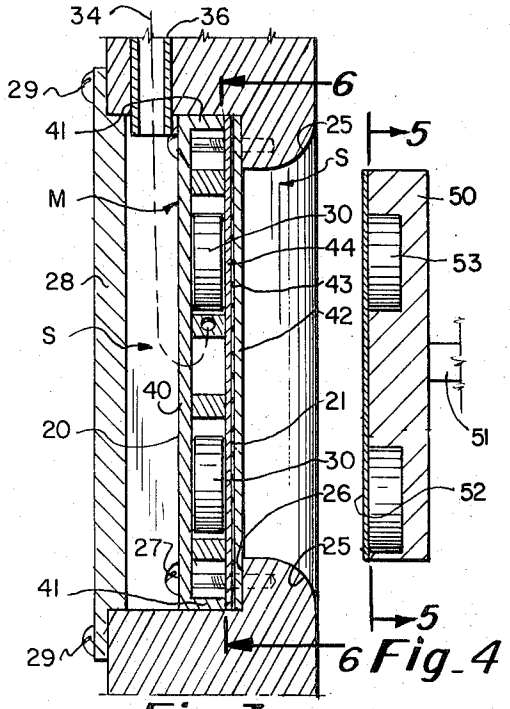


Fig_4

Fig_3

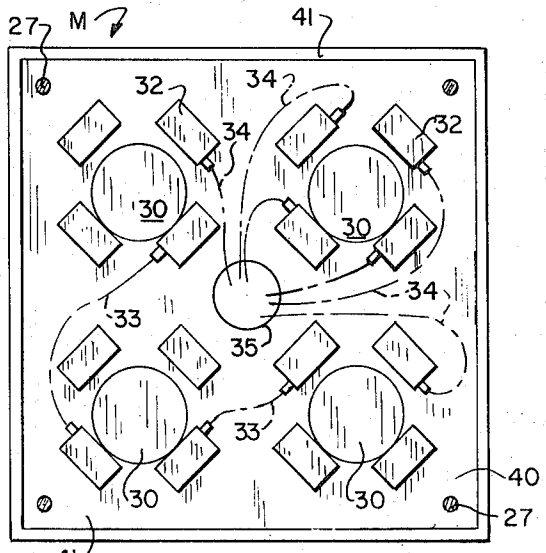


Fig_6

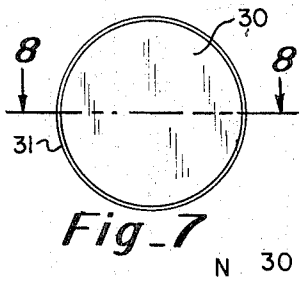


Fig_7

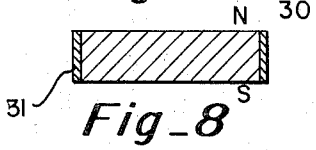
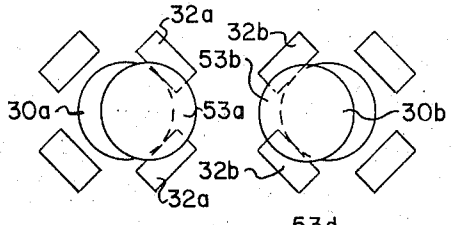


Fig_8



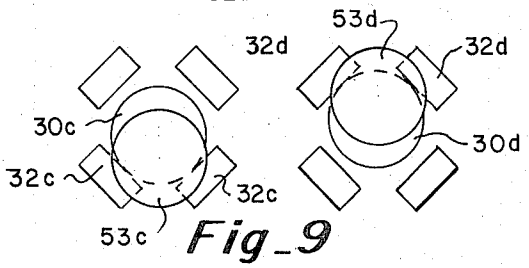


Fig_9

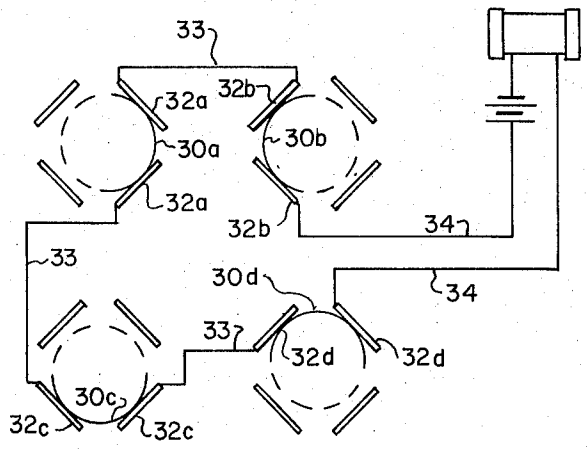


Fig_10

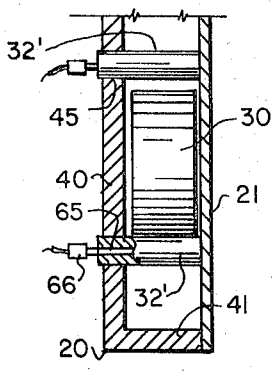


Fig_12

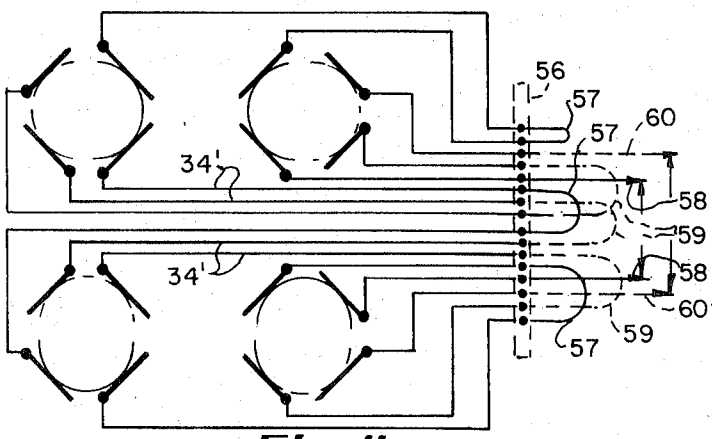


Fig_11

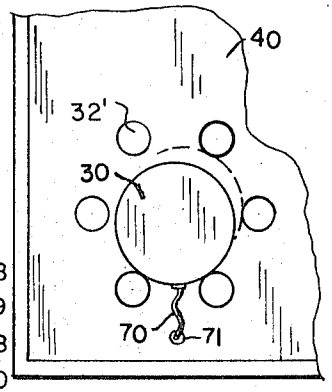


Fig_13

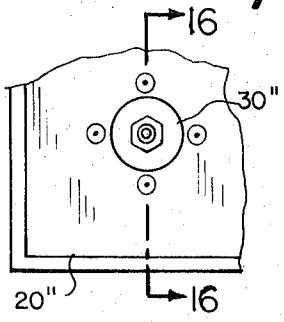


Fig_15

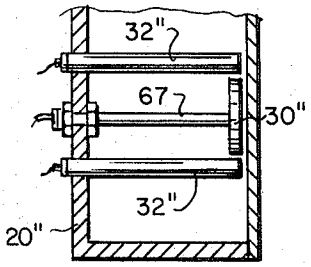


Fig_16

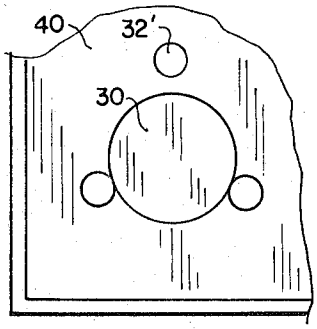


Fig_14

MAGNETIC LOCK SWITCH

The present invention relates to locking devices which are actuated by a magnetic key, and more particularly to magnetic locking devices of the type which, when actuated, close an electrical circuit. As such, the invention can be called a "Magnetically Actuated Lock Switch" and accordingly, will be hereinafter sometimes referred to as a "Magnetic Lock Switch."

Locking switches of the type which actuate to close an electrical circuit to accomplish a supplementary function such as drawing the bolt of a door, are well known and find many varied applications including applications connected with security, where the locking switches can be operated only by specific keys or by combinations known only to authorized users. In this field, the art of miniaturizing such devices for security purposes has been neglected except for coded cards which require complex scanning devices. The present invention is directed towards producing a result analogous to the result of a complex scanning device but with a comparatively simple array of components encapsulated in a small container. To do so, the present invention takes advantage of recent developments in magnet technology, since small, powerful magnets in various forms are now being made available. As such, the invention comprises, in essence, a lock switch formed as a small container having an array of magnets within it which may be shifted about and to a position with respect to circuit contacts to complete a circuit. A key to operate this lock switch is formed as a simple, flat-faced member having magnets at its face which are arranged to influence the magnets within the lock switch to close the circuit. The key is merely placed against a flat side of the lock to accomplish this function.

It follows that an object of the invention is to provide a novel and improved magnetic lock switch of a compact, simple construction which is fully enclosed to protect the several parts and components within it from being tampered with and from the effects of weather.

Another object of the invention is to provide a novel and improved magnetic lock switch having shiftable magnets within it formed in an array which can be altered to produce a large number of possible alternative operative combinations requiring similar alternative combinations for the key, or keys, needed to operate the same.

Another object of the invention is to provide in such a lock switch an arrangement of components for locking circuits which can be used to actuate a plurality of different circuits using different keys.

Another object of the invention is to provide a novel and improved magnetic lock switch which is positive acting responsive to the use of a proper key to effectively and positively close an actuating circuit.

A further object of the invention is to provide in a magnetically operated switching system, a simplified, economical arrangement of components which is especially easy to manufacture and install in various applications such as with door locks and the like.

With the foregoing and other objects in view, my invention comprises certain constructions, combinations and arrangements of parts and elements as hereinafter described, defined in the appended claims and illustrated in the accompanying drawing, in which:

FIG. 1 is an isometric view of a portion of a wall wherein an improved magnetic lock switch is mounted, showing at the outer side of the wall an inset to expose a flat portion of the lock switch and showing within the wall, a conduit with electrical leads from the magnetic lock switch.

FIG. 2 is an isometric view of a rectangular flat key which may be used with the lock shown at FIG. 1.

FIG. 3 is a transverse sectional view of the lock switch as taken from the indicated line 3—3 at FIG. 1, but on an enlarged scale.

FIG. 4 is a transverse sectional view of the key, as taken from the indicated line 4—4 of FIG. 2, but on an enlarged scale and with this figure being oriented with respect to FIG. 3, to indicate the manner in which the key is placed against the lock to operate the switching magnets within the lock.

FIG. 5 is a face view of the key as taken from the indicated line 5—5 at FIG. 4 to show one arrangement of the shifting magnets within the key when the cover sheet is removed.

FIG. 6 is a sectional view as taken from the indicated line 6—6 at FIG. 3 to show the interior of the magnetic lock switch including the switching magnets and the stop posts, and also, with dashed lines indicating various arrangements of circuit leads within the lock.

FIG. 7 shows a disc-shaped magnet such as may be used with the invention.

FIG. 8 is a transverse sectional view as taken from the indicated line 8—8 at FIG. 7, but with a collar about the same being exaggerated in thickness to better illustrate the construction of the unit.

FIG. 9 is a diagrammatic view of the switching magnets and stop posts within the lock switch, similar to the showing at FIG. 6, but with the shifting magnets of the key overlying the same to shift the switching magnets within the lock to selected positions as to where a circuit may be closed.

FIG. 10 is a circuit diagram of a continuous circuit within the lock switch which is closed when the switching magnets within the lock are shifted to the positions shown at FIG. 9.

FIG. 11 is a general circuit diagram of the apparatus where leads are extended from every stop post within the apparatus to a common board, where certain leads are interconnected to form the same circuit shown at FIG. 10 and where other leads are interconnected as shown in dotted lines to form a different circuit, requiring a different key.

FIG. 12 is a fragmentary sectional view of the lower portion of a magnetic lock switch which is similar to the unit shown at FIG. 3, but illustrating a different mode of forming stop posts for the same.

FIG. 13 is a fragmentary view of an arrangement similar to FIG. 6, but showing six cylindrical stop posts about a single switching magnet.

FIG. 14 is similar to FIG. 13, but with only three stop posts.

FIG. 15 is a fragmentary view of yet another arrangement where the magnet is carried upon a flexible member to normally remain evenly spaced between an array of stop posts and to be deflected to contact selected posts.

FIG. 16 is a sectional view as taken from the indicated line 16—16 at FIG. 15.

Referring more particularly to the drawing, the magnetic lock switch is a small, flat packet M which is pref-

erably square as illustrated, but which may be formed in any suitable manner. The packet is formed as a shallow cup **20** and it is covered by a face plate **21.** This packet which is a container carries switching magnets, posts and circuit leads within it as hereinafter described.

The packet may be mounted within a suitable socket S in a wall or door. This socket is proportioned to receive the packet as illustrated at FIGS. **1** and **3.** The preferred construction of this socket S will provide a rabbetted lip **25** about the opening to protect the edges of the packet and to provide a shoulder **26** for mounting screws **27** at the corners of the packet M as illustrated. When the packet M is mounted in the socket S against the shoulder **26,** the back side of the socket may be closed by a plate **28** as with screws **29,** as illustrated at FIG. **3.** In lieu of the plate **28,** the back side of the socket may be filled with a suitable resin or similar filler.

So mounted in the socket S, the face plate **21** of the packet M will be exposed and it is contemplated that a flat magnetic key K, such as shown at FIG. **2,** can be placed against this face **21** to actuate the magnets within the packet as will be explained. This key is shaped and proportioned to correspond with the face of the packet M and fit in the socket S when in use. Although the drawing shows a preferred, recessed construction wherein the key will easily fit, it is to be noted that the packet may be mounted in the wall or door in other ways. For example, it may be flush to a wall surface and covered within a coating of paint or thin plastic in such a manner as to be completely concealed from an individual looking at the wall or door. Then, only a person who knows the precise location of the packet is able to use the key to actuate the lock switch. Regardless of the arrangement contemplated, an important feature of the construction contemplated is to expose a sufficient area of the face **21** as to permit effective use of the key K placed against this face to actuate the lock switch.

The proportions of the packet will be dependent upon the size and the number of switching magnets **30** used within it. Preferably, each magnet **30,** such as shown at FIGS. **7** and **8,** is formed as a small, disc-shaped member having magnetic poles at the opposite faces of the disc, as indicated at FIG. **8.** In the development of recent magnet technology, these disc-shaped magnets **30** and other types of magnets, having a surprising strength for their size, have been developed and are now available in many sizes, some being as small as ⅛-inch in diameter. Such magnets may be made out of metal, such as Alinco V steel, or of a ceramic material containing particles of metal such as Samarium or iron or the like. Thus, some types of magnets are electro-conductive and some are poor conductors. In the present invention, it is important that the magnets be good conductors because they are to act as switch contacts as hereinafter described. Thus, if a magnet **30** is used which is a poor electrical conductor, it is desirable to embrace the disc-shaped magnet with a collar **31** of a conductive metal suitable for making contacts, such for example, as silver.

A selected number of magnetic discs **30** are placed within the packet M depending upon the number of possible lock combinations which are desired. For example, the drawing illustrates four magnets within the packet; however, any number of magnets may be selected, with **4, 9** or **16** magnets filling a square packet and other groups filling a rectangular or circular packet. The number of possible operative lock combinations will increase according to some geometric relationship as the number of magnets is increased.

Each magnet **30** will be surrounded by an array of stop posts **32** to form an enclosure to keep the magnet within a restricted space, but with the group of posts for a given magnet **30** being spaced apart in a manner which will permit shifting of the magnet to various positions. Thus, a magnet **30** may be shifted to contact any selected pair of adjacent posts.

Each post **32** may be of any suitable form, such as the rectangular posts illustrated at FIG. **6** or the cylindrical posts **32'** illustrated at FIGS. **12 – 14.** In the embodiment illustrated at FIGS. **1 – 9,** four posts **32** are provided for each magnet and they are arranged in an orthogonal, symmetrical pattern which is preferably diagonaled with respect to the vertical whenever a packet M is to be placed in an upright position, as in a wall or door so that each magnet **30** will lie within the embrace of its two lower posts under the influence of gravity, as shown. When the lock switch is actuated by the key K, however, these magnets may be shifted to positions between other pairs of posts as hereinafter described.

Each magnet **30** is electro-conductive as explained. Each post **32,** or at least selected pairs of posts within the packet which cooperate to define a selected lock combination, must also be electro-conductive to contact the peripheral edge **31** of the disc-shaped magnet **30** to close a circuit. Circuit leads **33,** indicated in broken lines at FIG. **6,** may be provided between the selected pairs of posts in the several post groups so that when the magnets of the groups contact the selected pairs of posts, a closed circuit will be defined. Other circuit leads **34** from the posts, at the end of such a circuit, will extend from the packet as through an opening **35** and to the operative means, such as a relay adapted to trigger a main switch, a lock bolt or the like, which is to be actuated by the magnetic lock switch M. In FIGS. **1** and **3,** a lead, or leads **34,** may be extended through a suitable conduit **36** in the wall or panel wherein the socket S is located. However, the location of these leads which extend from the packet and to the operative means is entirely optional. Also, it is to be noted that if the packet is to be sealed, the opening **35** can be plugged with a suitable plastic material after the leads **34** are extended therefrom and to a desired location.

As an alternate arrangement to that above described, the circuit leads indicated at FIG. **6** may be arranged so that an individual lead **34'** may extend from every post of each group as in the manner indicated for one group of posts shown at FIG. **6.** The circuit diagrams and the manner in which these leads may be arranged is illustrated at FIGS. **10** and **11,** as will be hereinafter further described.

The cup **20** is formed of a rigid, insulated, non-magnetic material, such as a selected plastic, and the floor **40** of the cup and the walls **41** about it are preferably formed as a unitary, molded structure. The height of the walls **41** is slightly greater than the thickness of the magnets **30** to permit freedom of movement of these magnets within their selected spaces. On the other hand, the height of the walls is preferably the same as the height of the posts to better support a face plate **21.**

The face plate **21** is a thin, non-magnetic sheet of a suitable rigid material. It will overlie the cup and be sealed thereon at the top of the walls **41**. This face plate may be a single sheet of material such as a selected plastic, or it may be a metal or plastic laminate, such as brass with a plastic inner face. When the face plate is a laminate, it may consist of several arrangements, one of which consists of an outer sheet **42** of brass, an insulation layer **43** at the inner face of the brass sheet and a non-conductive plastic layer **44** at the inner face of the insulation layer. With such an arrangement, a simple printed circuit, not shown, may then be provided on the plastic layer adjacent to the insulation layer **43** where it is protected against electrical contact. This printed circuit can then function as a security circuit to actuate a warning signal should the magnetic lock switch be physically broken into by an intruder. Such a construction is disclosed in detail in my prior application, Ser. No. 175,998, filed Aug. 30, 1971, and this security system is a desirable adjunct to the present invention.

The posts **32** are necessarily non-magnetic and at least certain pairs of the posts must be of a conductive material, such as copper, to provide for connection of the leads **33, 34** or **34'**. These posts may be small, rectangular blocks as illustrated at FIGS. **3** and **6**, which are glued or otherwise affixed to the floor **40** of the cup and to the inner side of the face plate **21**. The posts may also be built in other ways, as by providing cylindrical members **32'** which extend through holes **45** in the floor **40** of the cup and to the face plate **21** at the opposite side of the packet as illustrated at FIG. **12**. Although the four posts for each manget shown at FIG. **6** is a good working arrangement, it is possible to provide a larger number of posts, such as six posts, illustrated at FIG. **13**, or as a minimum, the three posts illustrated at FIG. **14**. It is to be noted that the larger the number of posts about each magnet of a packet, the greater the number of possible lock combinations in the given packet.

The key K illustrated at FIGS. **2, 3** and **5** is formed as a flat plate **50** of non-magnetic material having a suitable handle **51** at its back side and a thin cover sheet **52**, of non-magnetic material, at its face. This sheet conceals a set of shifting magnets **53** embedded within the body of the key and operation of the switching magnets **30** within the packet M will depend upon the location of the several magnets **53** within the key. To shift a switching magnet in a selected direction, the shifting magnet must be offset in that direction if the magnets **30** and **53** attract each other, or in an opposite direction if they repel each other. In a given lock switch and key, it is optional as to whether one or more sets of shifting and switching magnets attract or repel each other. A shifting magnet **53** is provided for each switching magnet **30** within the packet. Thus, whenever the key is placed against the face plate **21**, at its proper position, the switching magnets **30** will be offset from their at-rest position by the shifting magnets in various directions to cause these switching magnets **30** to shift to contact selected adjacent pairs of posts.

When a key having magnets **53** arranged as shown at FIG. **5** is placed over the packet having magnets **30** arranged between their sets of posts as illustrated at FIG. **6**, and when the switching magnets **30** and shifting magnets **53** are attracted to each other, the shift of the switching magnets **30** will be as in the manner illustrated at FIG. **9**. Referring specifically to FIG. **9**, the first magnet **30***a* will shift laterally to the pair of posts indicated as **32***a*, following its shifting magnet **53***a*. A second magnet **30***b* will shift laterally to a pair of posts **32***b* following the shifting magnet **53***b*. The third magnet **30***c* will remain in its initial position at posts **32***c* since its shifting magnet **53***c* urges it downwardly. The fourth magnet **30***d* will be lifted to contact the upper pair of posts **32***d* by the shifting magnet **53***d*.

A circuit, which is closed when the magnets **30** are shifted as shown at FIG. **9**, is illustrated at FIG. **10**. This is a permanent circuit. The several posts **32***a*, **32***b*, **32***c* and **32***d*, contacting their respective switching magnets, must include circuit leads **33** between them and leads **34** extending to operative components as illustrated. It is to be noted in FIG. **10** that a lead **33** connects a post **32***a* and **32***b*. Another lead **33** connects the other post **32***a* with a post **32***c*. Another lead **33** connects a post **32***c* with a post **32***d*. The leads extending from this closed circuit include one lead **34** connecting with the other post **32***b* and another lead **34** connecting with the other post **32***d*. These leads **34** are indicated as extending through a battery **54** and to a relay solenoid **55** to complete the circuit.

A more complex and flexible arrangement may be obtained when each of the four posts, of each set, is connected to an individual lead **34'** which extends from the packet to a suitable control board **56** as indicated at FIG. **11**, it being noted that the control board **56** may be a substantial distance away from the packet M. The same post groups above described, may be interconnected at this circuit board **56** as indicated by solid line loops **57**, with a pair of leads **58** extending to a suitable relay, not shown.

With this arrangement, it is also possible to provide another switching circuit, or other circuits, within the packet for operation of two or more remote instrumentalities. A second wiring arrangement is indicated by dotted line-loops **59** with circuit leads **60** as to another suitable relay, not shown. With the particular arrangement shown, the circuit closed by loops **59** and leads **60** will be actuated by a key having shifting magnets which move the switching magnets opposite to the movement heretofore described. This will require a second key, but it is to be noted that one or more additional circuits may be arranged to operate with a single key by rotating the key or reversing it when placing it against the face plate **21**. The utility of such an arrangement is immediately manifest as where the system is used for unlocking a door and also used for turning on lights in the house which is being unlocked.

A number of alternate arrangements of the components hereinabove described are possible. FIG. **12** shows the use of cylindrical posts which are mounted in openings in the floor of the cup and which extend through this floor with central holes **65** at the butt of each post to receive and electrical jack **66** or any other suitable electrical type of connection.

The arrangement shown at FIGS. **15** and **16** provides for a comparatively deep cup **20''** and each switching magnet **30''** is mounted upon a flexible shaft **67** which is fixed to the floor of the cup to permit the switching magnet **30''** to resiliently move in any selected direction but to remain at a centered position whenever it is not being influenced by a shifting magnet of a key. An array of posts **32''** is provided about this magnet **30''** in any suitable manner to be contacted by the edge of

the magnet whenever it is pulled away from a centered position with respect to the post. In this arrangement, the circuits may be extended between the magnet 30'' and any given post 32'' and it is unnecessary for the magnet to contact two posts simultaneously in order to close the circuit. Accordingly, a larger number of alternate combinations is possible for each magnet and with a given number of posts about the magnet.

In FIG. 13 there is indicated a flexible lead wire 70 connected with the switching magnet 30 and extending therefrom to a suitable opening 71 in the floor 40 of the cup to connect with other circuit leads as in a manner such as heretofore described. This lead 70, which is another alternate construction which may be used with the present invention, is necessarily flexible and loosely connected to the switching magnet 30 to permit it to move to a selected post when the magnetic switch is operated. With this arrangement, a larger number of alternate combinations are possible for each magnet having a given number of posts about the magnet.

In the foregoing description, the magnetic components included the switching magnets 30 of the packet M and the shifting magnets 53 of the key K. Both are described as flat, disc-shaped magnets, a preferred form, which are arranged to attract each other although it is noted that they could be arranged to repel each other. As a further alternative, it is to be noted, that one magnet of each pair, either the switching magnet 30 or the shifting magnet 53, could be eliminated and a disc of metallic, magnetic-responsive material, such as iron or an iron-nickel alloy, could be used in place of the magnet. In such an arrangement, the lock switch would function precisely as heretofore described, with the metal disc forming one component being properly shifted by, or shifting the other component through the magnetic attractive force between the two components. Naturally, this force would be less than that which would be produced by using two magnets, but the same could function just as well.

I have now described my invention in considerable detail. However, it is obvious that others skilled in the art can build and devise alternate and equivalent constructions which are nevertheless within the spirit and scope of my invention. Hence, I desire that my protection be limited not by the constructions illustrated and described, but only by the proper scope of the appended claims.

I claim:

1. A magnetically responsive lock switch comprising, in combination with a magnetic-influencing key means:
   a. a non-magnetic container having a flat face at one side thereof, against which key means may be placed;
   b. a plurality of magnetically responsive switching members shiftably placed within the container at selected locations adjacent to the face plate;
   c. a group of posts surrounding each switching member to limit the movement of the switching member to the contacting of the posts, and with each switching member being shiftable to physically contact a selected post of the group whenever the key means is placed against the aforesaid flat face responsive to magnetic reactions between the key means and the switching members;
   d. a broken electrical circuit having a plurality of leads with an individual lead extending to each said selected post of each group of posts; and
   e. each switching member, at each group of posts, includes a circuit contact means and the circuit contact means of the group are arranged to connect the aforesaid leads in series to close the electrical circuit whenever the switching member of each group physically contacts its aforesaid selected post means in response to said magnetic reaction from said key means.

2. In the combination defined in claim 1, wherein said magnetic-influencing key means includes:
   a. a body portion having a key face adapted to be placed against the flat face of the container; and
   b. a plurality of magnetically responsive, fixed shifting members at the key face which are located to correspond with the switching members within the container, with the respective switching and shifting members magnetically influencing each other, and with each shifting member being located at said key face at a position which will shift the corresponding switching member to contact its respective selected post for closing of the circuit when the key face is placed against the face plate of the container.

3. In the organization set forth in claim 1, wherein the circuit contact means of each switching member includes:
   a lead connecting with the switching member adapted to close with the aforesaid individual lead on the said selected post when the switching member contacts the post.

4. In the organization set forth in claim 1, including a conductive portion on each said selected post connecting with its individual lead, and wherein the circuit contact means of each switching member includes:
   a. a conductive portion at a post adjacent to the aforesaid selected post connecting with a lead; and
   b. a conductive portion at the periphery of the switching member adapted to contact the aforesaid conductive portions of the said selected post and adjacent post to close the leads connected therewith.

5. In the organization set forth in claim 1, wherein: the switching members are magnetic discs.

6. In the organization set forth in claim 2, wherein: the shifting members in the key are magnetic discs.

7. In the organization set forth in claim 1, wherein the container includes:
   a floor plate member opposite the face plate and in substantial parallelism therewith to form a space wherein switching members may shift.

8. In the organization set forth in claim 7, wherein: the posts are formed as rectangular members secured to the floor.

9. In the organization set forth in claim 7, wherein: the posts are cylinders and are extended through the floor.

10. In the organization set forth in claim 1, wherein: the face plate is formed as a thin laminated member including two layers of non-conductive material; and
   a disruptible circuit means between the layers, whereby a warning means associated with the circuit means will actuate should the circuit means be disrupted as by destruction of the face plate.

11. In the organization set forth in claim 3, wherein: said switching member is a magnetic disc; and

a flexible shaft supports the disc to normally lie at a position between the group of posts about the member.

12. In the oranization set forth in claim **3**, wherein: said switching member is a magnetic disc; and wherein the circuit contact means includes:

a flexible lead wire loosely connecting with the disc to permit the disc to move to any selected post in the array about the member.

13. In the organization set forth in claim **1**, including:

a second broken electrical circuit having a plurality of leads with an individual lead extending to a second selected post, of each group of posts, whereby the aforesaid circuit contact means of the group will connect the leads of the second circuit whenever the switching member contacts the second mentioned post.

14. A magnetically responsive lock switch comprising, in combination with a magnetic-influencing key means:

a. a non-magnetic container having a flat face at one side thereof, against which the key means may be placed;

b. a plurality of magnetically responsive switching members shiftably placed within the container at selected locations adjacent to the face plate;

c. a post means forming an enclosure surrounding each switching member to limit the movement of the switching member to the contacting of the psot means, and with each switching member being shiftable to physically contact a selected post means of the enclosure whenever the key means is placed against the aforesaid flat face responsive to magnetic reactions between the key means and the switching members;

d. a broken electrical circuit having a plurality of leads with an individual lead extending to each said selected post means of each enclosure; and

e. each switching member, at each enclosure, includes a circuit contact means and the circuit contact means of the enclosure are arranged to connect the aforesaid leads in series to close the electrical circuit whenever the switching member of each enclosure physically contacts its aforesaid selected post means in response to said magnetic reaction from said key means.

15. A magnetically responsive lock switch comprising, in combination with a magnetic-influencing key means:

a. a non-magnetic container having a flat face at one side thereof, against which the key means may be placed;

b. a magnetically responsive switching member placed within the container at a selected location adjacent to the face plate;

c. a post means forming an enclosure surrounding the switching member to limit the movement of the switching member to the wall of the enclosure and with the switching member being shiftable to physically contact a single selected post means of the enclosure whenever the key means is placed against the aforesaid flat face responsive to magnetic reactions between the key means and the switching members; and

d. a broken electrical circuit having a lead extending to the said selected post means and another lead extending to the said switching member and being adapted to close whenever the switching member physically contacts the aforesaid selected post means in response to said magnetic reaction from said key means.

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