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KEY OPERATED MULTIPLE ELECTRIC CIRCUIT SWITCH

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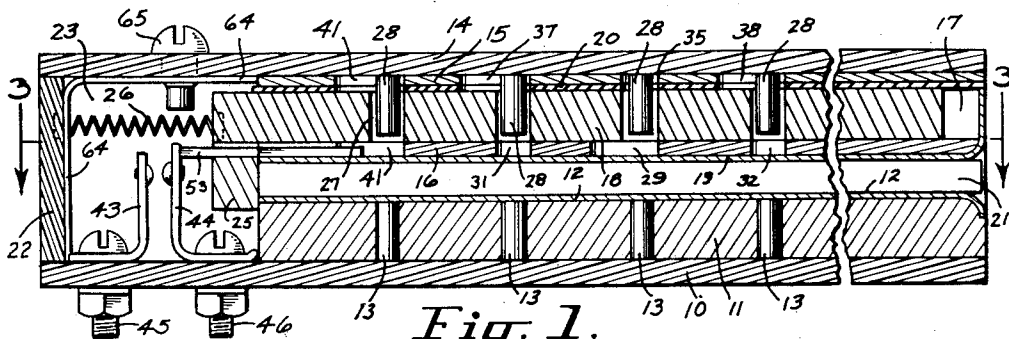


Fig. 1.

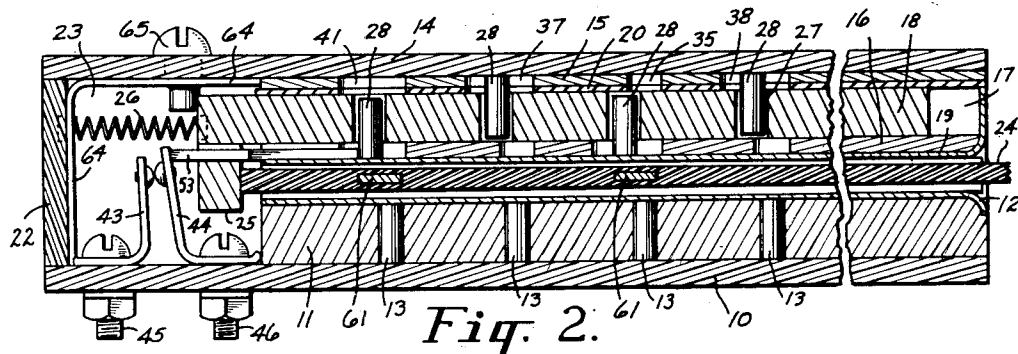
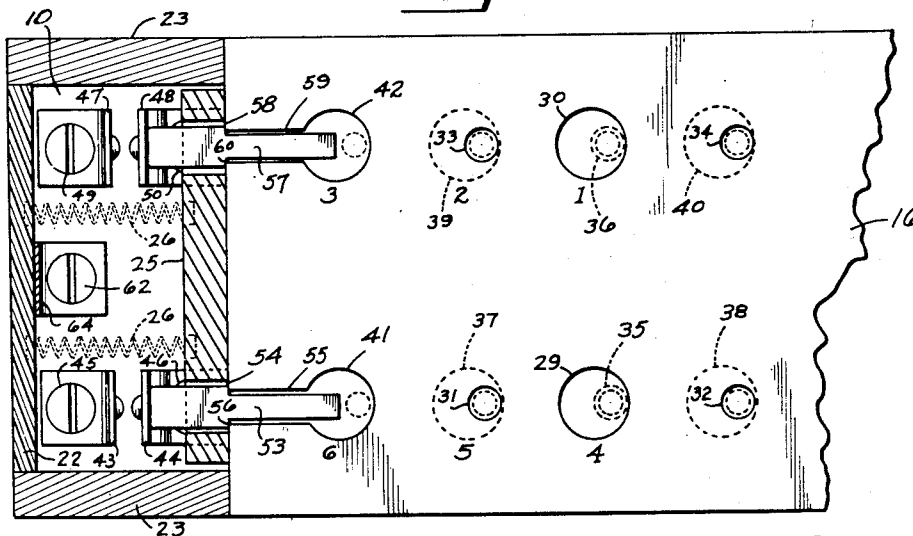


Fig. 2.



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KEY OPERATED MULTIPLE ELECTRIC CIRCUIT SWITCH

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12 Claims. (Cl. 200—87)

This invention pertains to electric switches, and relates particularly to a switch which is operated by selective keys to control a multiplicity of electric circuits.

It is a principal object of the present invention to provide a switch having a plurality of electrical contacts each of which may be actuated selectively by use of a different key of a series of keys, all of which keys are accommodated by the switch.

Another important object of the present invention is to provide a switch wherein the selective actuation of a plurality of electrical contacts is afforded by means of a plurality of keys all of which appear to be identical.

A further important object of this invention is the provision of a multiple circuit switch which is actuated selectively by a plurality of different keys and which includes an alarm circuit which is activated upon insertion of a wrong key or other unauthorized object, whereby to render the switch pickproof.

A still further object of this invention is to provide a multiple circuit switch having a plurality of electrical contacts each of which is actuated selectively by the movement of magnets arranged in given patterns, each magnet pattern being controlled by a key containing magnetic elements disposed in the same pattern as its corresponding magnet pattern.

Still another object of the present invention is to provide a multiple circuit switch which is particularly applicable to the doors, etc. in defense plants and is operable by the identification card of the employees.

A still further object of this invention is the provision of a multiple circuit switch which is of simplified and therefore economical construction and is consistently accurate in operation.

These and other objects and advantages of the present invention will appear from the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a foreshortened sectional view in side elevation of a switch embodying the features of this invention, the elements thereof being shown in their normal, unoperated, positions;

Figure 2 is a view similar to Figure 1, illustrating the switch in operated condition;

Figure 3 is a fragmentary sectional view taken along the line 3—3 in Figure 1, with certain parts located above said line being shown in dotted lines; and

Figure 4 is a diagrammatic view illustrating the electrical circuits for the switch shown in the preceding views.

Referring to the drawings, the switch comprises two main sections, namely the base section and the locking pin section. The base section includes the cover plate 10, the fixed magnet housing 11 and the shield 12. The cover plate 10 is constructed of plastic or other electrically non-conducting and non-magnetic material while the housing 11 and shield 12 are preferably constructed of electrically conducting but non-magnetic metal. The housing 11 is perforated transversely to accommodate a

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plurality of magnets 13 fixed therein in a predetermined pattern.

The locking pin section includes the electrically non-conductive and non-magnetic cover plate 14, the locking plates 15 and 16 supported in spaced relation by the laterally spaced non-conductive guide bars 17, the locking pin plate 18 and the shield 19. The elements 15, 16, 18 and 19 are constructed of electrically conducting but non-magnetic material and the locking plate 15 is isolated electrically from the locking pin plate 18 by the electrically non-conducting spacer 20 such as a thin film or sheet of plastic.

The base section and the locking pin section are arranged in superimposed relation with their respective shields 12 and 19 facing each other but separated by the laterally disposed spacer plates 21. The entire assembly is secured together along the sides thereof by means of screws or bolts (not shown). The cover plates 10 and 14 extend rearwardly from the remaining elements of the base section and locking pin section, the projecting inner area thereof being enclosed by back wall 22 and side walls 23.

The spacer plates 21 are slightly thicker than the thickness of the card key 24 and the spacing between the plates is slightly greater than the width of the key. In this manner the card key is receivable in the slot formed between the plates 21 and the shields 12, 19. The forward ends of the spacer plates 21 are preferably cut away obliquely to form an enlarged entrance for facilitating the insertion of the key.

The locking pin plate 18 is contained freely within the space defined by the lateral guide bars 17 and the shield 19 and spacer 20, thereby permitting the plate 18 to be reciprocated therein. A flange 25 secured to the rearward end of the reciprocating locking pin plate 18 projects downwardly across the rearward end of the central slot formed between the spaced shields 12, 19 by the spacer plates 21 for engagement by the inserted end of the card key 24. Coil compression springs 26 are secured at their opposite ends in the back wall 22 and the rearward end of locking pin plate 18 and function to return the latter to its normal forward position, shown in Figure 1, after having been moved rearwardly to the position shown in Figure 2.

Transverse holes 27 are formed in the locking pin plate 18 in the pattern of and for cooperative registration with the fixed magnets 13 provided in housing 11. Magnetic locking pins 28 are disposed for sliding movement in the said holes and are slightly longer than the thickness of locking pin plate 18. Each of the locking pins 28 and its cooperating fixed magnet 13 are arranged with like poles facing each other across the shields 12, 19. In this manner the magnetic forces of repulsion maintain the pins 28 normally at their farthestmost position from the fixed magnets 13, i. e. when no magnetic element is disposed in the slot between the shields 12, 19.

The locking plates 15, 16 are provided with transverse openings disposed in cooperating pairs in the pattern of the movable locking pins 28. The openings comprising each pair except those at the rearward most end of the plates 15, 16 are of different diameters, the smaller opening of one pair being provided in plate 15 while the smaller opening of another pair is located in plate 16. Thus, in the pattern illustrated, the larger openings 29 and 30 and the smaller openings 31, 32, 33 and 34 are provided in plate 16 while the respective cooperating smaller openings 35 and 36 and the larger openings 37, 38, 39 and 40 are provided in plate 15. Openings similar to those in plate 15 are also provided in the electrical insulation sheet 20.

Each of the larger openings is arranged with its periphery closer to the rearward end of the locking plates than is the periphery of the cooperating smaller opening of

the same pair. The smaller opening of each pair functions to receive a locking pin 28 for securing the locking pin plate 18 against rearward movement, while the large opening of each pair receives the locking pin to release the plate 18 for rearward movement, as explained in detail hereinafter.

The cooperating pairs of openings 41 and 42 located at the most rearward end of the locking plates 15, 16 are of equal diameters, and this diameter is at least as large as the diameter of the larger openings of the aforementioned pairs.

Within the area rearward of the base section and locking pin section and enclosed by walls 22, 23 is disposed a plurality of laterally spaced pairs of electrical contact members, there being two such pairs illustrated in the drawing. One of these pairs comprises the resilient L-shaped members 43, 44 secured to cover plate 10 by means of the respective binding posts 45, 46 which function as electrical connectors for the circuit to be controlled. The second pair of electrical contact members 47, 48 are also secured to cover plate 10 by means of the respective binding posts 49, 50.

Each of these pairs of contacts 43, 44 and 47, 48 is adapted to be connected in series in separate electrical circuits for controlling the operation of different devices, illustrated in Figure 4 by the blocks 51 and 52, respectively. As an example, the blocks may represent electrically operated turnstiles or doors in a defense plant, one of which is intended for use by one group of personnel and the other of which is intended for use by a different group.

An elongated bar 53 of electrically conducting but non-magnetic material extends through aligned slots 54, 55 formed in the flange 25 and the rearward end of locking plate 16, the slot 55 extending to the opening 41. Slot 55 is narrower in width than slot 54 and the bar 53 is proportioned similarly to provide a shoulder 56 adapted to abut against the rearward end of slot 55 to limit the forward movement of the bar. The forward end of the bar extends into opening 41 for engagement by the locking pin magnet 28 when the latter is drawn downward into the opening 41 in plate 16. The rearward end of bar 53 abuts against, or, if desired, may be attached to, the upstanding resilient portion of contact member 44. Although the drawing shows space between the bar 53 and the flange 25 and plate 16, this is done to more clearly distinguish the parts and it is to be understood that said parts are actually in sliding contact for electrical continuity.

In manner substantially identical with the foregoing, a second elongated bar 57 extends through aligned slots 58, 59 in flange 25 and plate 16, the forward end of the bar extending into opening 42 in plate 16 and the rearward end of the bar abutting against the upstanding resilient portion of contact member 48. Shoulder 60 is formed between the narrow and wide sections of bar 57 to limit the forward movement of the latter, as previously explained.

It will be apparent from the foregoing description that the actuation of contacts 43, 44 depends upon the downward movement of the magnet 28 into the opening 41 in plate 16, whereas the actuation of contacts 47, 48 depends upon the downward movement of the magnet into the opening 42 in plate 16. Thus, there may be provided as many pairs of contacts as is desired, it being required that a separate magnet and cooperating openings similar to 41 and 42 be provided for each pair of contacts.

The key 24 employed to operate the switch may comprise a card made of fibrous layers in the interior of which are placed a plurality of magnetic elements. These elements may be pieces of shim steel or the like or, alternatively, they may comprise patches of iron filings or other suitable magnetic material applied by means of an adhesive or otherwise affixed to the card. In any case, the pattern of magnetic elements 61 must correspond with the pattern of the smaller openings 35, 36 in locking plate

15 from which the magnets 28 must be removed in order to unlock the locking pin plate 18 for movement. In addition, the card key 24 must have a magnetic element positioned to correspond with one of the magnets in the openings 41 or 42 in order that one of the pairs of electrical contacts 43, 44 or 47, 48 may be actuated.

On the other hand, if the wrong card key or any other unauthorized magnetic element is employed and any one or more of the magnets are drawn into the smaller openings 31-34, inclusive, it will be evident that the locking pin plate 18 will thereby be prevented from moving rearwardly and the contact members will not be actuated. Thus, by dispersing a plurality of magnets 28 and cooperating pairs of openings of different diameters in random pattern throughout the area of the locking plates 15, 16 the possibility of actuating the switch without the proper card key 24 is eliminated.

The present construction also provides means for sounding an alarm when the insertion of an unauthorized key fails to retract the magnets 28 from the smaller openings 35, 36 in plate 15. Mounted upon face plate 10 between the contact members 43, 47 is a binding post 62 adapted to be connected to the circuit of an electrically actuated alarm 63. An electrically conducting strap 64 leads from the post 62 and is connected to the electrically conducting locking plate 15. Thus, if neither of the magnets 28 are withdrawn from the smaller openings 35 or 36 and an attempt is made to move the locking pin plate 18 rearwardly, the magnet contacts the edge of the opening 35 or 36. The electrical circuit of the alarm 63 is thereby closed from terminal 62 through strap 64 to locking plate 15, through the magnet 28 contacting the plate 15, through locking pin plate 18 and bars 53, 57 and thence through the flexible contact members 44, 48 and binding posts 46, 50 to the electrical circuit return.

It will be apparent that since binding posts 46 and 50 are both connected to the same side of the electrical circuit one of said binding posts may be omitted, if desired, by simply connecting the contact members 44, 48 together electrically. This may be done by a length of wire, for example, or it may be achieved by providing firm contact of the base of each contact member 44, 48 with the electrically conductive housing 11, as illustrated in Figures 1 and 2 of the drawing. In this regard, it will be further evident that when the contacts 44, 48 are in contact with housing 11 the alarm circuit is completed without involving the sliding bars 53 or 57, since there is electrical continuity from the locking pin plate 18 through locking plate 16 and shields 19, 12 to a housing 11 and thence to terminal 46 or 50. As a further alternative construction the terminal 46 or 50 may be electrically connected directly to the locking pin plate 18 by means of a wire. An abutment, such as the screw plug 65 extending through the face plate 14, is preferably provided to intercept the rearward movement of the locking plate 18 before the magnets 28 have moved rearwardly sufficient to contact the plate 15 at the rearward edges of the large openings 37-40, inclusive. This is necessary in order to prevent improper closure of the alarm circuit.

In the operation of the switch described hereinbefore a card key 24 containing the hidden magnetic elements 61 arranged in the pattern required to register with the magnets disposed in the smaller openings 35, 36 and to register with the magnet disposed in one of the openings 41 or 42 is inserted in the slot between the shields 12, 19. The inserted end of the card thus comes in contact with the flange 25 attached to the locking pin plate 18 and the aforesaid magnets 28 are drawn downwardly by attraction of the magnetic elements 61. Assuming the magnet disposed in openings 41 is actuated, said magnet enters the opening 41 in plate 16 adjacent the forward end of the elongated bar 53. Then, as the card key is pushed further rearward and thereby moves the locking pin plate 18, the magnet 28 in opening 41 engages the bar 53 and moves the latter rearwardly until contact

members 43, 44 close to complete the electrical circuit of the device 51.

As stated hereinbefore the magnetic elements 61 preferably comprise small pieces of thin, flexible shim steel or similar magnetic material having an area approximately twice the area of the ends of magnets 28. When pieces of this stock are interposed between two or more layers of fibrous material which are then glued together to form a card, the resulting card is indistinguishable by ordinary inspection methods from a card not containing the magnetic elements. Hence it may be flexed, pressed between the fingers, or otherwise inspected without being able to trace the pattern of the functional elements.

From the foregoing description it is apparent that the present invention provides a versatile switch which may be used to control a variety of electrical circuits. The switch is of rugged construction to accommodate circuits carrying large current loads by virtue of the actuation of the pairs of contact members by manual pressure applied to the card key. On the other hand, the switch is capable of delicate and precise operation by virtue of the floating magnets 28 being immediately reactive to the magnetic elements carried in the key.

A large number of combinations of patterns are available by the provision of a plurality of magnets, thereby affording the use of a large number of card keys and also rendering the switch substantially pick proof. Many individual electrical circuits may be controlled from one station merely by inserting the proper key in the switch actuating section.

Various details of construction described hereinbefore may be changed or modified without departing from the scope and spirit of this invention. For example, it will be apparent that the repelling magnets 13 may be omitted by inverting the switch and utilizing gravity to hold the locking magnets 28 in their normal positions within the openings of the locking plate 15. The use of the repelling magnets is preferred, however, since the resulting floating condition of the locking magnets renders the latter more quickly and positively responsive to the attractive influence of the card key. Accordingly, it is to be understood that the foregoing description is primarily illustrative and is not to be considered in a limiting sense.

Having now described my invention and the manner in which the same may be used, what I claim as new and desire to secure by Letters Patent is:

1. An electric switch comprising, in combination, a locking pin section, a pair of electrical contacts adapted for connection to an electric circuit, locking members in the locking pin section having a cooperating pair of openings arranged therein adjacent said pair of contacts, a locking pin member reciprocative longitudinally with respect to the locking members, a locking pin magnet disposed for transverse movement in the locking pin member and arranged for registration with the openings in the locking members, said magnet being normally inserted within one of said openings, and actuator means extending from one contact of said pair of contacts into the one of the pair of openings normally unoccupied by the locking pin magnet, the locking pin magnet registering with the openings being adapted upon activation by a magnetic force to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved.

2. A multiple circuit electric switch comprising, in combination, a locking pin section, a plurality of pairs of electrical contacts adapted for connection to an electric circuit, locking members in the locking pin section having a cooperating pair of openings arranged therein adjacent each pair of contacts, a locking pin member reciprocative longitudinally with respect to the locking members, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged in the pattern of the openings in the locking members, each magnet being normally inserted within one

opening of each pair of openings, and actuator means extending from one contact of each pair of contacts into the one of each pair of openings normally unoccupied by the locking pin magnet, the locking pin magnets registering with the openings being adapted upon activation by a magnetic force to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved.

3. An electric switch comprising, in combination, a locking pin section, a pair of electrical contacts adapted for connection to an electric circuit, locking members in the locking pin section having arranged therein a cooperating pair of first openings of different sizes, the locking members having a cooperating pair of second openings arranged therein adjacent said pair of contacts, a locking pin member reciprocative longitudinally with respect to the locking members, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged for registration with the pairs of openings in the locking members, each magnet being normally inserted within one opening of each pair of openings, the magnet associated with the pair of first openings functioning when inserted in the smaller of said openings to lock the locking pin member against movement and when inserted in the larger of said openings to unlock the locking pin member for movement, and actuator means extending from one contact of said pair of contacts into the one opening of the second pair of openings normally unoccupied by the locking pin magnet, the locking pin magnet registering with the pair of first openings being adapted upon activation by a magnetic force to be drawn out of the locking member opening in which it is normally inserted, the locking pin magnet registering with the pair of second openings being adapted upon activation by a magnetic force to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved.

4. A multiple circuit electric switch comprising, in combination, a locking pin section, a plurality of pairs of electrical contacts adapted for connection to an electric circuit, locking members in the locking pin section having arranged therein cooperating pairs of first openings of different sizes, the locking members having a cooperating pair of second openings arranged therein adjacent each pair of contacts, a locking pin member reciprocative longitudinally with respect to the locking members, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged in the pattern of the pairs of openings in the locking members, each magnet being normally inserted within one opening of each pair of openings, each magnet associated with each pair of first openings functioning when inserted in the smaller of said openings to lock the locking pin member against movement and when inserted in the larger of said openings to unlock the locking pin member for movement, and actuator means extending from one contact of each pair of contacts into the one opening of each second pair of openings normally unoccupied by the locking pin magnet, the locking pin magnets registering with the pairs of first openings being adapted upon activation by a magnetic force to be drawn out of the locking member openings in which they are normally inserted, the locking pin magnets registering with the pairs of second openings being adapted upon activation by a magnetic force to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved.

5. The switch of claim 4 including key means carrying magnetic elements arranged in the pattern of the locking pin magnets normally held within the smaller opening of the pairs of first openings and also at least one magnetic element arranged for registration with at least one of the locking pin magnets registering with one of the pairs of second openings.

6. An electric switch comprising, in combination, a locking pin section, a pair of electrical contacts adapted for connection to an electric circuit, electrically conductive locking members in the locking pin section having arranged therein a cooperating pair of first openings of different sizes, the locking members having a cooperating pair of second openings arranged therein adjacent said pair of contacts, an electrically conductive locking pin member reciprocative longitudinally with respect to the locking members, electrically non-conductive means separating one of the locking members and the locking pin member, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged for registration with the pairs of openings in the locking members, each magnet being normally inserted within one opening of each pair of openings, the magnet associated with the pair of first openings functioning when inserted in the smaller of said openings to lock the locking pin member against movement and when inserted in the larger of said openings to unlock the locking pin member for movement, actuator means extending from one contact of said pair of contacts into the one opening of the second pair of openings normally unoccupied by the locking pin magnet, the locking pin magnet registering with the pair of second openings being adapted upon activation by a magnetic force to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved, and means for connecting an electric circuit to the electrically separated locking member and the locking pin member, the magnet associated with the pair of first openings being adapted in one position of movement to electrically interconnect the electrically separated locking member and locking pin member, whereby said electrically separated members and associated magnet form an additional electric switch which is controlled by said magnet.

7. The switch of claim 6 wherein the means for connecting an electric circuit to the locking pin member comprises the actuator means which is constructed of electrically conductive material and is disposed in sliding electrical contact with the locking pin member.

8. A multiple circuit electric switch comprising, in combination, a locking pin section, a plurality of pairs of electrical contacts adapted for connection to an electric circuit, electrically conductive locking members in the locking pin section having arranged therein cooperating pairs of first openings of different sizes, the locking members having a cooperating pair of second openings arranged therein adjacent each pair of contacts, an electrically conductive locking pin member reciprocative longitudinally with respect to the locking members, electrically non-conductive means separating one of the locking members and the locking pin member, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged in the pattern of the pairs of openings in the locking members, each magnet being normally inserted within one opening of each pair of openings, and magnet associated with each pair of first openings functioning when inserted in the smaller of said openings to lock the locking pin member against movement and when inserted in the larger of said openings to unlock the locking pin member for movement, actuator means extending from one contact of each pair of contacts into the one opening of each second pair of openings normally unoccupied by the locking pin magnet, the locking pin magnets registering with the pairs of second openings being adapted upon activation by a magnetic force to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved, and means for connecting an electric circuit to the electrically separated locking member and the locking pin member, the magnet associated with at least one pair of first openings being adapted in one position of movement to electrically interconnect the electrically separated

locking member and locking pin member, whereby said electrically separated members and associated magnet form an additional electric switch which is controlled by said magnet.

9. An electric switch comprising, in combination, a body including a base section and a locking pin section and having a longitudinal slot therebetween, a pair of electrical contacts adapted for connection to an electric circuit, locking members in the locking pin section having a cooperating pair of openings arranged therein adjacent said pair of contacts, a locking pin member reciprocative longitudinally with respect to the locking members, a locking pin magnet disposed for transverse movement in the locking pin member and arranged for registration with the pair of openings in the locking members, said magnet being normally inserted within one of said openings, actuator means extending from one contact of said pair of contacts into the one of the pair of openings normally unoccupied by the locking pin magnet, and key means proportioned for insertion in the said longitudinal slot and carrying a magnetic element arranged to register with the locking pin magnet associated with the pair of openings, the locking pin magnet registering with the pair of openings being adapted upon activation by the magnetic key element to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved.

10. A multiple circuit electric switch comprising, in combination, a body including a base section and a locking pin section and having a longitudinal slot therebetween, a plurality of pairs of electrical contacts adapted for connection to an electric circuit, locking members in the locking pin section having arranged therein cooperating pairs of first openings of different sizes, the locking members having a cooperating pair of second openings arranged therein adjacent each pair of contacts, a locking pin member reciprocative longitudinally with respect to the locking members, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged in the pattern of the pairs of first and second openings in the locking members, each magnet being normally inserted within one opening of each pair of openings, each magnet associated with each pair of first openings functioning when inserted in the smaller of said openings to lock the locking pin member against movement and when inserted in the larger of said openings to unlock the locking pin member for movement, actuator means extending from one contact of each pair of contacts into the one opening of each second pair of openings normally unoccupied by the locking pin magnet, and key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of the locking pin magnets normally held within the smaller opening of each pair of first openings and also at least one magnetic element arranged for registration with at least one of the locking pin magnets registering with one of the pairs of second openings, the locking pin magnets registering with the pairs of first openings being adapted upon activation by the magnetic key elements to be drawn out of the locking member openings in which they are normally inserted, the locking pin magnets registering with the second openings being adapted upon activation by the magnetic key element to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved.

11. A multiple circuit electric switch comprising, in combination, a body including a base section and a locking pin section and having a longitudinal slot therebetween, a plurality of pairs of electrical contacts adapted for connection to an electric circuit, electrically conductive locking members in the locking pin section having arranged therein cooperating pairs of first openings of different sizes, the locking members having a cooperating pair of second openings arranged therein adjacent each

pair of contacts, an electrically conductive locking pin member reciprocative longitudinally with respect to the locking members, electrically non-conductive means separating one of the locking members and the locking pin member, a plurality of locking pin magnets disposed for transverse movement in the locking pin member and arranged for registration with the pairs of openings in the locking members, each magnet being normally inserted within one opening of each pair of openings, each magnet associated with each pair of first openings functioning when inserted in the smaller of said openings to lock the locking pin member against movement and when inserted in the larger of said openings to unlock the locking pin member for movement actuator means extending from one contact of each pair of contacts into the one opening of each second pair of openings normally unoccupied by the locking pin magnet, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of the locking pin magnets normally held within the smaller opening of the pairs of first openings and also at least one magnetic element arranged for registration with at least one of the locking pin magnets registering with one of the pairs of second openings, the locking pin magnets registering with the pairs of first openings being adapted upon activation by the magnetic key elements to be drawn out of the locking member openings in which they are normally inserted, the locking pin magnets registering with the pairs of second openings being adapted upon activation by the magnetic key element to be drawn into engagement with the actuator means whereby to move the latter and actuate the contacts as the locking pin member is moved, and means for connecting an electric circuit to the electrically separated locking member and the locking pin member, the magnet associated with at least one

pair of first openings being adapted in one position of movement to electrically interconnect the electrically separated locking member and locking pin member, whereby said electrically separated members and associated magnet form an additional electric switch which is controlled by said magnet.

12. An electric switch comprising, in combination, a locking pin section, electrically conductive locking members in the locking pin section having arranged therein a cooperating pair of openings, an electrically conductive locking pin member reciprocative longitudinally with respect to the locking members, electrically non-conductive means separating one of the locking members and the locking pin member, a locking pin magnet disposed for transverse movement in the locking pin member and arranged for registration with the pair of openings in the locking members, the magnet normally being inserted within one of said openings and being adapted upon activation by a magnetic force to be drawn into the other of said openings, and means for connecting an electric circuit to the electrically separated locking member and locking pin member, the magnet being adapted in one position of movement to electrically interconnect the electrically separated locking member and locking pin member, whereby said electrically separated members and magnet form an electric switch which is controlled by said magnet.

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