

Aug. 11, 1953

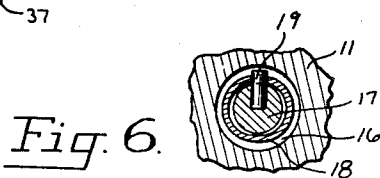
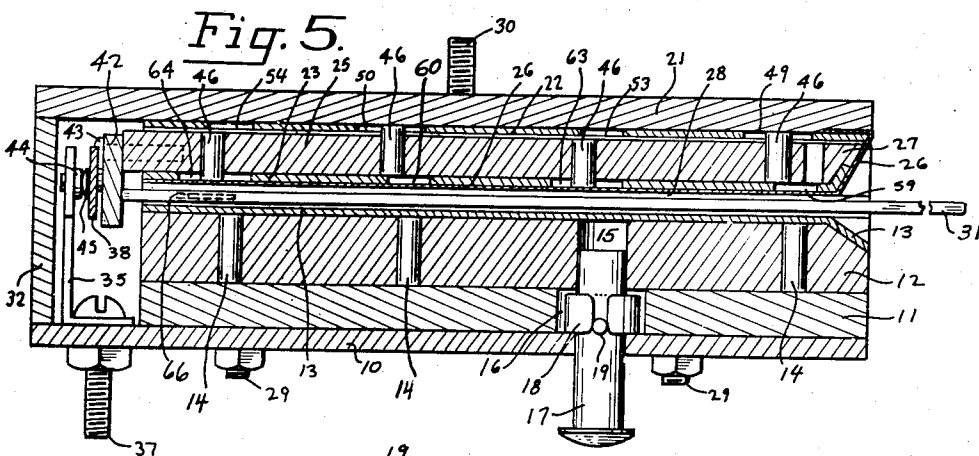
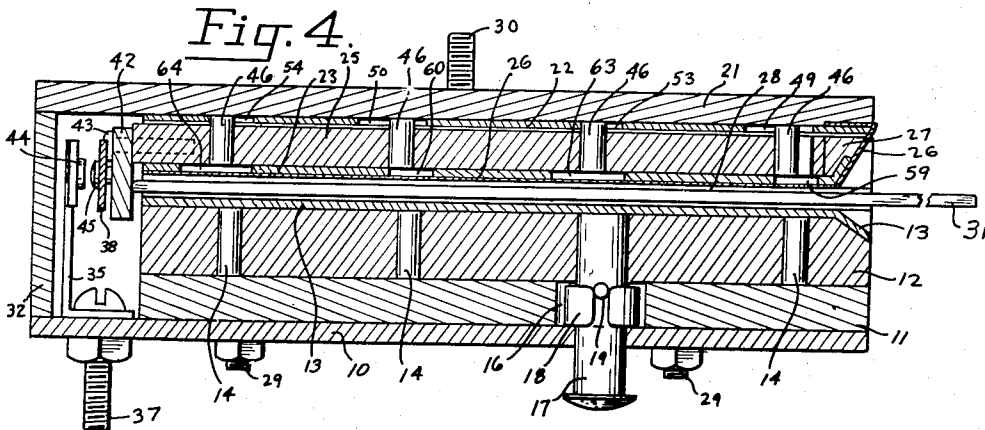
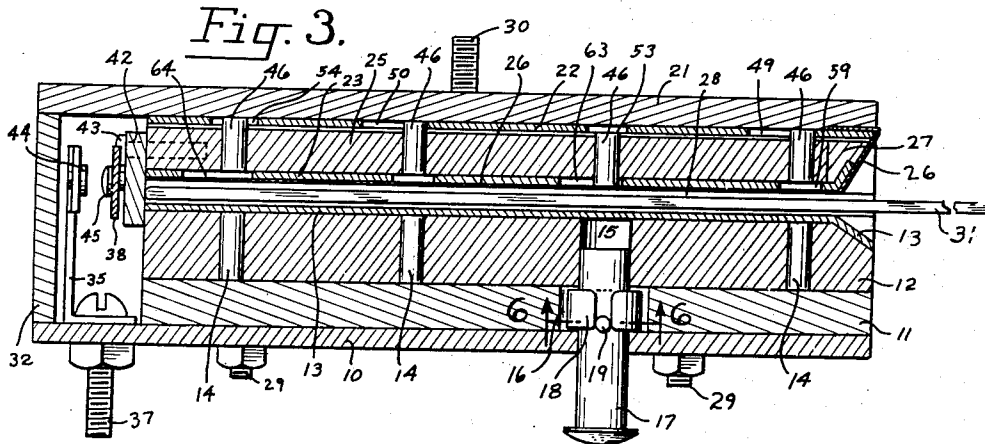
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2,648,729

LOCK RELEASE OPERATED SWITCH

Filed Aug. 9, 1950

3 Sheets-Sheet 2



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LOCK RELEASE OPERATED SWITCH

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3 Sheets-Sheet 1

Fig. 1.

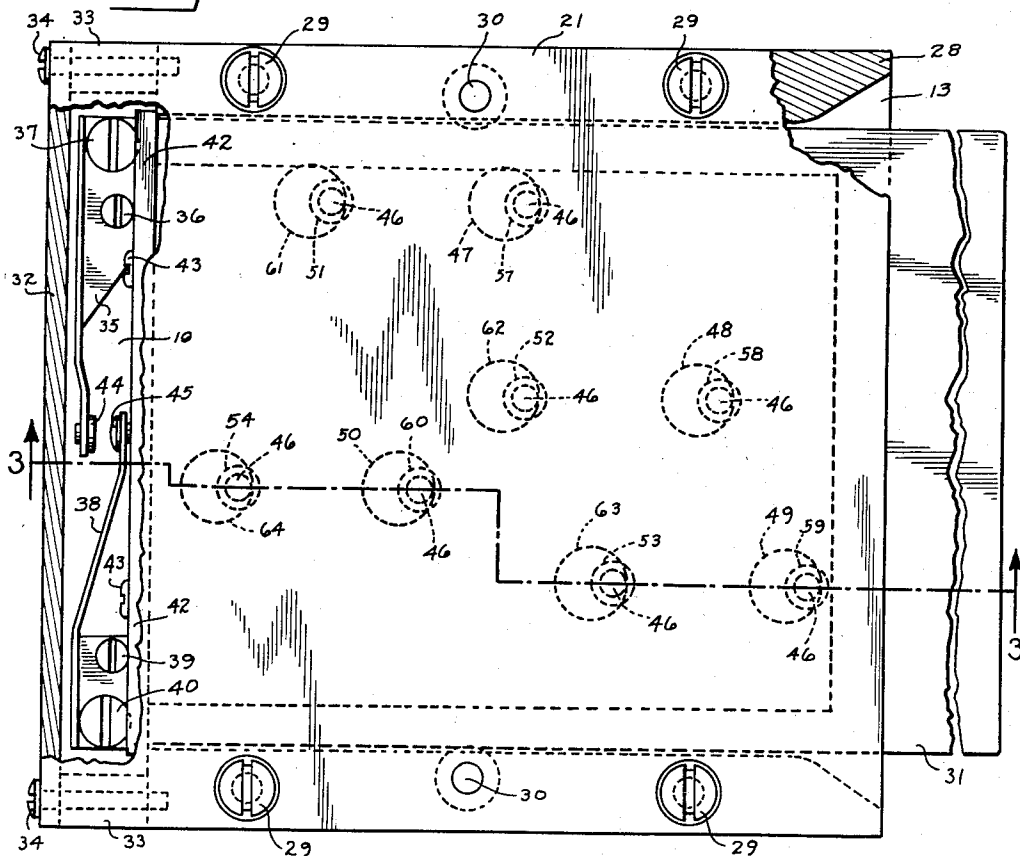
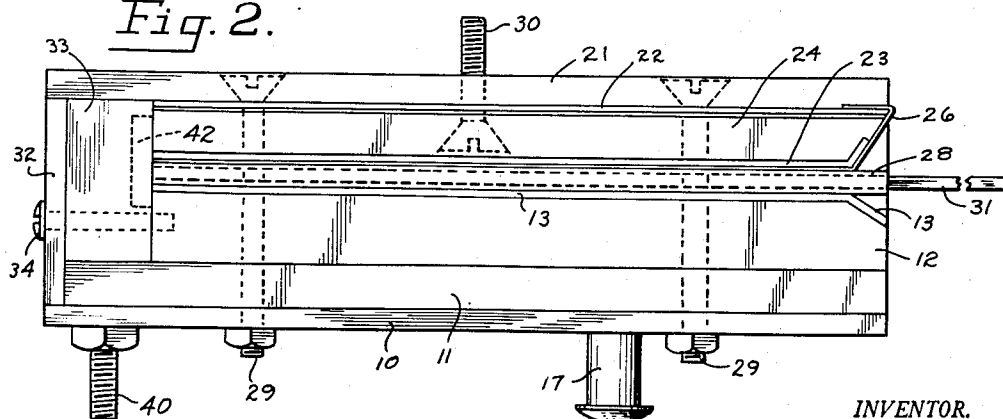


Fig. 2.



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3 Sheets-Sheet 3

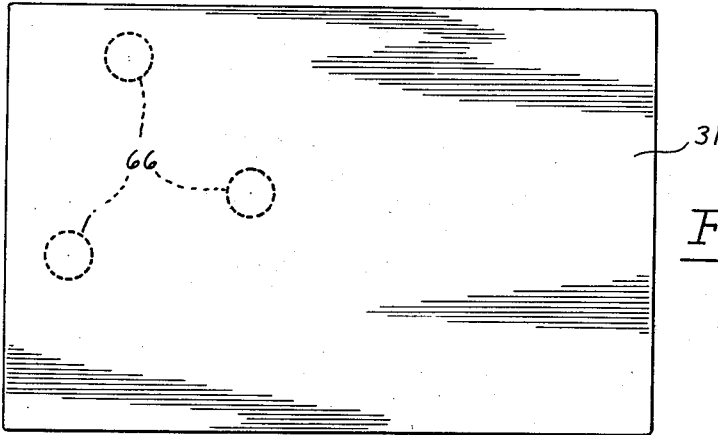


Fig. 7.

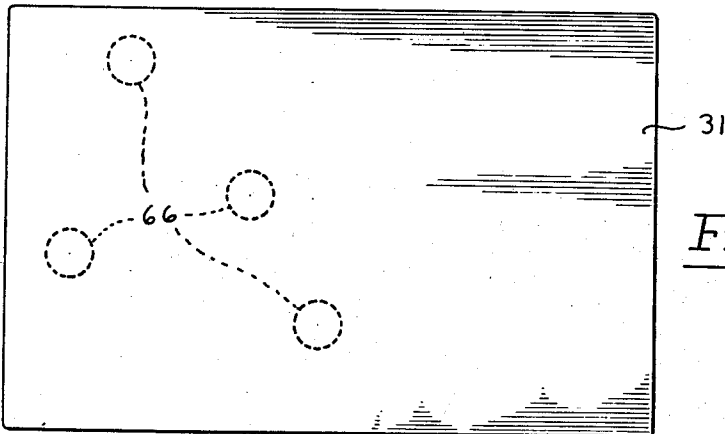


Fig. 8.

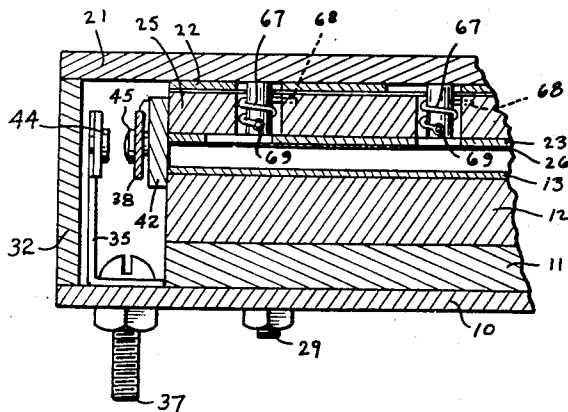


Fig. 9.

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UNITED STATES PATENT OFFICE

2,648,729

LOCK RELEASE OPERATED SWITCH

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Application August 9, 1950, Serial No. 178,504

18 Claims. (Cl. 200—45)

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The present invention relates to a switch for making and breaking an electric circuit and, more particularly, pertains to a switch of the class wherein the contact points are actuated by a slide, the movement of which is controlled by the proper displacement of magnetic locking pins.

The present invention represents an improved modification of the electric switch disclosed and claimed in my copending application, Serial No. 116,930, filed September 21, 1949, wherein a switch is described in which one of the contact points is mounted on a resilient arm, which preferably is of conducting material, and which normally holds the contact point on the arm separated from the other contact point of the switch. The resilient arm carries a magnet and, when this is activated, the contact point on the resilient arm is drawn against the other contact point of the switch thereby closing the circuit. Then, when the magnet is deactivated, the resilient member returns the contact to its original position spaced apart from the other contact of the pair, thus closing the circuit.

In the present invention, the resilient arm carrying one of the contact points is actuated by the application of physical pressure exerted by a card which functions as a key, as described in detail hereinafter. In this manner, the electrical contact is made by manually applied forces which are of substantially greater magnitude than the magnetic forces employed in my former devices. As a consequence, the contact points may be of heavy construction whereby to accommodate the usual 110 volt circuit without burning the points and without the necessity of making delicate adjustments when installing and operating the switch.

In the present invention, the card key performs the dual function of first unlocking a slide and then moving the slide and the abutting resilient arm toward the fixed contact point to complete the circuit of the switch. The first function is effected by bringing magnetic elements disposed in prearranged pattern in the card key into proper registration with magnetic locking pins arranged in cooperative pattern in the slide, as described in detail hereinafter.

When the switch of the present invention is applied to the operation of an electromagnetic door latch, the system thus lends itself admirably for attachment to club doors. The key comprises in this case the club membership card in which are concealed the pattern of magnetic elements required for operation of the switch.

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A problem attending this use, however, is that arising from the fact that many clubs issue membership on a monthly, quarterly, or semi-annual basis. In such a case, it obviously would be desirable to issue membership cards for terms determined by a simple adjustment made on the switch, itself. This adjustment may be made at monthly, quarterly, or semi-annual intervals as desired, thereby rendering ineffective the cards which were issued for such terms only, while not inactivating those cards which were issued for a longer term.

In the switch construction of the present invention, adjustability is provided by means of a manually operated magnetic plug which may be moved into the field of one of the locking pins. The plug and pin are disposed with like poles adjacent, whereby the locking pin is moved into locking position by the repulsive force of the plug. Those membership cards which are issued for a short term only are not provided with a magnetic element which will draw this locking pin out of locking position. On the other hand, cards which are issued for a longer term are provided with such a magnetic element. Thus, at the end of the short term, the plug is manipulated to place the magnetic pin in locking position, whereby to render ineffective the membership cards issued for the short term.

The switch embodying the novel features of the present invention and its manner of operation and use will now be described in detail with particular reference to the accompanying drawings wherein:

Figure 1 is a plan view of the switch in one of its embodiments with parts thereof broken away to show details of construction;

Figure 2 is a side elevation of the switch shown in Figure 1;

Figure 3 is a sectional view taken along the line 3—3 in Figure 1 and showing the relative positions of magnetic locking pins when unattracted;

Figure 4 is a sectional view similar to Figure 3 and showing the function of the adjusting plug;

Figure 5 is a sectional view similar to Figure 3 and showing the operation of a card key in actuating the switch;

Figure 6 is a fragmentary sectional view taken along the line 6—6 in Figure 3;

Figures 7 and 8 are plan views of two forms of card keys for use with the switch of the present invention; and

Figure 9 is a fragmentary sectional view showing a modified form of repulsion means for re-

turning the locking pins to locking position upon removal of the card key.

Referring to the drawings, the switch comprises two main sections, namely the base section and the locking pin section. The base section includes the base plate 10, the subbase 11, the fixed magnet housing 12 and the shield 13, arranged in superimposed relation in the order recited. The elements 19-13, inclusive, are constructed of non-magnetic materials. The housing 12 is perforated transversely to accommodate a number of magnets 14 fixed therein in a predetermined pattern.

An additional transverse hole 15 is provided in the housing 12 and registers with the larger hole 16 provided in the subbase 11. A magnetic plug 17 extends slidably through a hole in the face plate 10 through the hole 16 and into the hole 15. A nonmagnetic spring clip member 18 frictionally engages the plug in the area of hole 18. A pin 19 projects laterally from the plug for frictional engagement in the slot formed between the ends of the clip 18, whereby the plug may be secured releasably in retracted or projected position, for purposes described in detail hereinafter.

The locking pin section includes the face plate 21, the locking plates 22 and 23 supported in spaced relation by the laterally spaced guide bars 24, the locking pin plate 25 and the shield 26. The plate 25 is mounted for longitudinal reciprocation in the slot formed between the lateral bars 24 and the locking plates 22, 23. If desired, an abutment 27 may be provided at the forward end of the device to restrict the forward movement of the plate 25. The elements 21-27, inclusive, are formed of nonmagnetic materials.

The base section and the locking pin section are arranged in superimposed relation with their respective shields 13 and 26 facing each other but separated by the laterally disposed spacer plates 28. The entire assembly is secured together detachably by means of the bolts 29. Bolts 29 project laterally from the locking pin section for purposes of securing the switch to a suitable support (not shown).

The spacer plates 28 are slightly thicker than the thickness of the card key 31 and the spacing between the plates is slightly greater than the width of the card key. In this manner, the card key is receivable in the slot formed between the plates 28 and the shields 13, 26. It is to be observed that the forward ends of the plates 28 and shields 13, 26 are cut obliquely to form an enlarged entrance for facilitating the insertion of the card key into the slot.

The face plates 10 and 21 extend rearwardly from the remaining elements of the assembly previously described, the area extending therebetween being enclosed by the back wall 32 and side walls 33 secured detachably to the magnet housing 12 by screws 34. Within the enclosed area is disposed a fixed electrical contact member 35 secured to plate 10 by screw 36. Electrical connection with the member 35 is provided by post 37 which extends through the plate 10. In similar manner, the resilient contact member 38 is secured to plate 10 by screw 39, with electrical connection being provided by post 40.

The resilient contact member 38 rests against an abutment bar 42 secured to the rearward end of the reciprocating locking pin plate 25 by screws 43. The abutment bar projects downwardly across the rearward end of the slot formed between the shields 13, 26 for engagement by the end of card key 31. In this manner, rearward movement of the card key causes the plate 25 and

bar 42 to move rearwardly and bring together the contact points 44, 45 of the respective electrical contact members 35 and 38.

Transverse holes are formed in the plate 25 in the pattern of and for cooperative registration with the magnets 14 and 17 provided in plate 12. Magnetic locking pins 46 are disposed for sliding movement in the holes in plate 25 and are of length substantially equal to the combined thickness of plate 25 and one of the locking pin plates 22 or 23. Each of the locking pins 46 and its cooperating magnet 14 or plug 17 are arranged with like poles facing each other across the shields 13, 26. In this manner, the magnetic forces of repulsion maintain the pins 46 normally at their farthestmost position from the magnets 14, 17 when a magnetic element is not disposed in the slot between the shields 13, 26.

The locking pin plates 22, 23 are provided with transverse openings disposed in cooperating pairs in the pattern of the movable locking pins 46. The openings comprising each pair are of different diameters, the smaller opening of one pair being provided in plate 22 while the smaller opening of another pair is located in plate 23, as desired. Thus, in the pattern illustrated, the larger openings 47, 48, 49 and 50 and the smaller openings 51, 52, 53 and 54 are provided in locking plate 22, while the cooperating smaller openings 57, 58, 59 and 60, and larger openings 61, 62, 63 and 64, respectively, are provided in locking plate 23. In all cases, however, the larger opening is arranged with its periphery closer to the rearward, or electrical contact end than is the periphery of the smaller opening of the same pair. In all cases, additionally, the smaller opening of each pair functions to receive a locking pin 46 for securing the plate 25 against rearward movement, while the larger opening receives the locking pin to release the plate 25 for said movement, as explained in detail hereinafter.

The key 31 employed to operate the switch described hereinbefore may comprise a card made of fibrous layers in the interior of which are placed a plurality of magnetic elements 66. 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 corresponds with the pattern of the smaller openings in the locking plate 22 from which it is desired to remove the locking pins 46. Thus, referring to Figures 3, 5 and 7 of the drawings, the magnetic elements 66 are arranged in the pattern of the magnetic locking pins registering with the smaller openings 51, 52 and 54 in plate 22. Since, in this instance, plug 17 is insufficient to keep the latter in the opening 53, a magnetic element 66 is not required at this position.

On the other hand, when plug 17 is projected inwardly to the shield 13, as shown in Figure 4, the cooperating locking pin 46 is held within the opening 53. In this case, the card key provided with the pattern of magnetic elements 66 as shown in Figure 8 is required for releasing the locking pins from the smaller openings 51, 52, 53 and 54.

It is apparent that the locking pins 46 disposed for registration with the smaller openings 57, 58, 59 and 60 in plate 23 will be drawn into the latter whenever a magnetic element is disposed in the card key slot in proximity with said openings. When this occurs, however, the rearward movement of the sliding plate 25 is restricted and clos-

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ing of the contact points 44, 45 is prevented. Thus, the provision of these pins and openings effectively obviates the possibility of picking the lock by inserting a magnetic object, such as a knife blade, into the card key slot. This arrangement further obviates the possibility of actuating the lock with an obsolete or forged card key for, even if magnetic elements were by chance arranged properly to operate the unlocking pins, it is equally probable that other magnetic elements will be present to draw one or more of the locking pins into one or more of the smaller locking openings 57, 58, 59 or 60.

In the operation of the switch of the present invention, a card key constructed as described hereinbefore with magnetic elements 66 properly patterned for cooperation with the arrangement of locking pins 46 is inserted in the slot between the shields 13, 26. The card thus comes in contact with the abutment bar 42 at the end of the slot. As the card is pushed further in the slot, the abutment bar and attached plate 25 move rearwardly, bringing the electrical contact point 45 into engagement with contact point 44. The electrical circuit (not shown) is thereby completed.

As indicated hereinbefore, the switch of the present invention may be incorporated in any suitable electrical circuit. It is particularly adaptable, however, for use with a solenoid-actuated lock mechanism employed in locking and unlocking a door. A circuit for such mechanism is illustrated and described in the copending application referred to hereinbefore. Specifically, the switch is employed to particular advantage with solenoid-actuated locks on the doors of club rooms. In this case, the membership card is conveniently provided with magnetic elements 66 concealed therein and arranged in the pattern of the locking pins as previously described. As stated hereinbefore, the magnetic elements preferably comprise small pieces of thin, flexible shim steel or similar magnetic material having an area approximately equal to or slightly greater than the area of the magnet ends. When pieces of this stock are interposed between two or more plies of fibrous material which then are glued together to form a card, the resulting card is indistinguishable by ordinary inspection methods from a card not containing the magnetic pieces. Hence it may be flexed, pressed between the fingers, or otherwise inspected without being able to trace the pattern of the pieces.

Referring to Figures 7 and 8 of the drawings, the pattern illustrated in the former may conveniently be incorporated in a membership card intended, for example, to be valid for a period of six months, while a membership card containing the magnetic elements in the pattern shown in Figure 9 may be valid for one year. Thus, for the first six months, the magnetic plug 17 will be retracted to the position shown in Figures 3 and 5 whereby to render its cooperating locking pin 46 ineffective as a locking pin by removing it from engagement with opening 53, as explained hereinbefore. Upon expiration of the first six months, the plug 17 is projected inwardly to shield 13, thereby forcing its cooperating locking pin 46 into the opening 53. Since the card key shown in Figure 7 is not provided with the magnetic element required to draw said locking pin out of opening 53, it is rendered ineffective for actuating the circuit of the solenoid lock. It is evident, on the other hand, that the card key shown in Figure 8 is effective for actuating the

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switch with plug 17 in either retracted or projected positions. Accordingly, the said card key is valid for the entire year.

Other variations of the card keys herein described are described in detail in the aforementioned copending application, the same being applicable by proper selection to the switch of this invention.

Referring now to Figure 9 of the drawings, there is shown a modified form of means for normally maintaining the locking pins 46 within the openings provided in locking plate 22. In this construction, a coil spring 67 surrounds each pin 46 within the transverse hold in plate 25. One end 68 of the spring is secured to plate 25, while the opposite end is secured to the pin 46. Thus, when the pin is drawn toward a magnetic element inserted in the card key slot, the coil spring becomes elongated and is placed under tension. Then, when the magnetic element is withdrawn from the slot, the coil spring returns to its shortened, relaxed position, moving the pin back to its normal position in the opening in plate 22. The coil springs may thereby function as a substitute for the magnets 14. Accordingly, the term "repelling means" as recited in the appended claims is intended to include the fixed magnets 14, the coil springs 67 and other devices which function to repel the movement of the locking pins 46 into the openings in plate 23 when magnetic means is absent from the card key slot.

From the foregoing description, it is apparent that the present invention provides a versatile switch which may be used to operate a variety of electrical circuits. The switch is of rugged construction to accommodate circuits carrying large current loads by virtue of the actuation of a single pair of contact points by manual pressure applied to the card key. On the other hand, the switch is capable of delicate and precise operation because of the absence of contact-carrying springs operated by the movement of the locking pins. This feature also renders the switch substantially pick proof since the locking pins are more easily actuated. The switch is of simplified construction, thereby affording economical production and reducing the possibility of faulty operation and wear of parts to a minimum. The switch also accommodates the cancellation of card keys at any desired time simply by the manipulation of a magnetic plug which forms a part of the switch.

Various details of construction described hereinbefore may be changed or modified without departing from the scope and spirit of the present invention. For example, although it is preferred to arrange the elements of the switch with the contact points 44 and 45 normally separated from each other, and to place the magnets in the switch and the magnetic shims in the card key, the arrangement of these elements may be reversed, the contact points normally being maintained closed, and the magnets being placed in the card key. Furthermore, a plurality of adjustment plugs 17 may be provided to increase the number of combinations for operating the switch. The number of locking pins and cooperating openings and repelling means may also be varied, as desired. Accordingly, the foregoing description is to be considered as illustrative only, the scope of the invention being defined by the appended claims.

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 body including a base section and a locking pin section, a pair of contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, and a plurality of locking pin magnets disposed for transverse movement in the locking plate and arranged in the pattern of the openings in the locking plates, the locking pin magnets being adapted upon activation by a magnetic force to be drawn out of the locking plate openings in which they are normally inserted.

2. An electric switch comprising, in combination, a body including a base section and a locking pin section, a pair of contacts adapted for series connection to an electrical circuit, spaced locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, the periphery of each larger opening extending closer to the said contacts than the periphery of its cooperating smaller opening, a locking pin plate reciprocative longitudinally between the locking plates for opening and closing the said contacts, and a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, the locking pin magnets being adapted upon activation by a magnetic force to be drawn out of the locking plate openings in which they are normally inserted.

3. An electric switch comprising, in combination, a body including a base section and a locking pin section, a pair of contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, and repelling means normally urging the locking pin magnets into the openings of one of the locking plates, the locking pin magnets being adapted upon activation by a magnetic force to overcome the force of the repelling means and be drawn out of the locking plate openings in which they are normally inserted.

4. An electric switch comprising, in combination, a body including a base section and a locking pin section, a pair of contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, and a plurality of magnets mounted in the base section and arranged in the pattern of the locking pin magnets for repelling the latter, the locking pin magnets being adapted upon activation by a magnetic force to overcome the force of the repelling magnets and be drawn

out of the locking plate openings in which they are normally inserted.

5. An electric switch comprising, in combination, a body including a base section and a locking pin section, a pair of contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, and a plurality of magnets mounted in the base section and arranged in the pattern of the locking pin magnets for repelling the latter, at least one of the repelling magnets being mounted for space adjustment relative to its cooperating locking pin magnet whereby selectively to establish and remove the repelling force therebetween, the locking pin magnets being adapted upon activation by a magnetic force to overcome the force of the repelling magnets and be drawn out of the locking plate openings in which they are normally inserted.

6. 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 contacts adapted for series connection to an electrical circuit, spaced locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, the periphery of each larger opening extending closer to the said contacts than the periphery of its cooperating smaller opening, a locking pin plate reciprocative longitudinally between the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, and key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of the locking pins normally held within the smaller openings of the locking plates.

7. 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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, repelling means normally urging the locking pin magnets into the openings of one of the locking plates, and key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of the locking pins normally held within the smaller openings of the locking plates.

8. 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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative lon-

gitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, and means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter.

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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter, and resilient means engaging the locking pin plate for returning the latter to normal position.

10. 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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, repelling means normally urging the locking pin magnets into the openings of one of the locking plates, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, and means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter.

11. 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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, a plurality of magnets mounted in the base section and arranged in the pattern of the locking pin magnets for repelling the latter, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, and means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter.

12. 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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates for opening and closing the said contacts, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, a plurality of magnets mounted in the base section and arranged in the pattern of the locking pin magnets for repelling the latter, at least one of the repelling magnets being mounted for space adjustment relative to its cooperative locking pin magnet whereby selectively to establish and remove the repelling force therebetween, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, and means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter.

13. 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 contacts adapted for series connection to an electrical circuit, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, the periphery of each larger opening extending closer to the said contacts than the periphery of its cooperating smaller opening, a locking pin plate reciprocative longitudinally with respect to the locking plates, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, a plurality of magnets mounted in the base section and arranged in the pattern of the locking pin magnets for repelling the latter, at least one of the repelling magnets being mounted for space adjustment relative to its cooperating locking pin magnet whereby selectively to establish and remove the repelling force therebetween, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of the locking pins normally held within the smaller openings of the locking plates, means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter, and resilient means engaging the locking pin plate for returning the latter to normal position.

14. 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 contacts adapted for series connection to an electrical circuit, a resilient conductor supporting one of said contacts, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin plate reciprocative longitudinally with respect to the locking plates, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, and

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means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter, the locking pin plate being adapted to engage the resilient conductor for opening and closing the contacts, the resilient conductor functioning to return the locking pin plate to normal position.

15. 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 contacts adapted for series connection to an electrical circuit, a resilient conductor supporting one of said contacts, spaced locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, the periphery of each larger opening extending closer to the said contacts than the periphery of its cooperating smaller opening, a locking pin plate reciprocative longitudinally between the locking plates, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, repelling means normally urging the locking pin magnets into the openings of one of the locking plates, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of the locking pins normally held within the smaller openings of the locking plates, and means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter, the locking pin plate being adapted to engage the resilient conductor for opening and closing the contacts, the resilient conductor functioning to return the locking pin plate to normal position.

16. 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 contacts adapted for series connection to an electrical circuit, a resilient conductor supporting one of said contacts, locking plates in the locking pin section having arranged therein cooperating pairs of openings of different sizes, the periphery of each larger opening extending closer to the said contacts than the periphery of its cooperating smaller opening, a locking pin plate reciprocative longitudinally with respect to the locking plates, a plurality of locking pin magnets disposed for transverse movement in the locking pin plate and arranged in the pattern of the openings in the locking plates, a plurality of magnets mounted in the base section and arranged in the pattern of the locking pin magnets for repelling the latter, at least one of the repelling magnets

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being mounted for space adjustment relative to its cooperating locking pin magnet whereby selectively to establish and remove the repelling force therebetween, key means proportioned for insertion in the said longitudinal slot and carrying magnetic elements arranged in the pattern of some of the locking pins, and means interengaging the locking pin plate and the key means, whereby manually to move the former with the latter, the locking pin plate being adapted to engage the resilient conductor for opening and closing the contacts, the resilient conductor functioning to return the locking pin plate to normal position.

17. A switch comprising, in combination, a body including a locking pin section, locking members in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin member reciprocative longitudinally with respect to the locking members, and a plurality of magnetic locking pin means disposed for transverse movement in the locking pin member and arranged in the pattern of the openings in the locking members, the magnetic locking pin means being adapted upon activation by a magnetic force to be drawn out of the locking member openings in which they are normally inserted.

18. An electric switch comprising, in combination, a body including a base section and a locking pin section, a pair of contacts adapted for series connection to an electrical circuit, locking members in the locking pin section having arranged therein cooperating pairs of openings of different sizes, a locking pin member reciprocative longitudinally with respect to the locking members for opening and closing the said contacts, and 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 member, the locking pin magnets being adapted upon activation by a magnetic force to be drawn out of the locking member openings in which they are normally inserted.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,981,987	Bryce	Nov. 27, 1934
2,116,246	MacDonald	May 3, 1938
2,121,301	Ractliffe	June 21, 1938
2,256,675	Higbee	Sept. 23, 1941
2,384,208	Stroud	Sept. 4, 1945
2,393,428	Stroud	Jan. 22, 1946