Sept. 6, 1966 S. HOLY 3,271,629

CODED ELECTRIC LOCKING MECHANISM

Filed July 1, 1965

FIG. 1

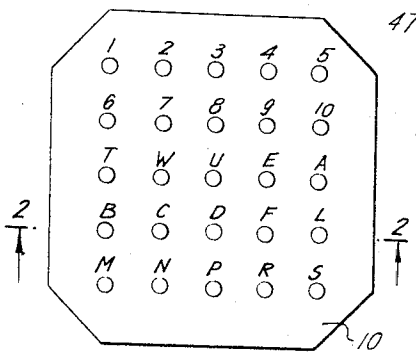
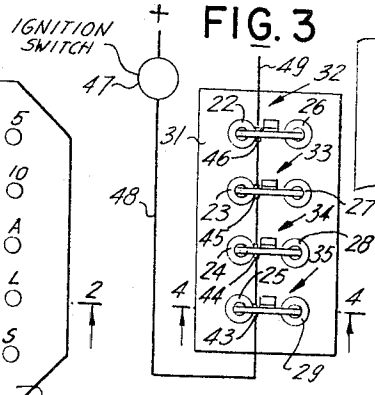


FIG. 3



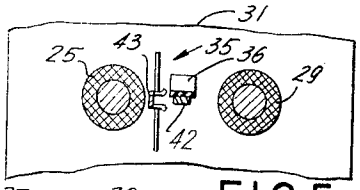


FIG. 5

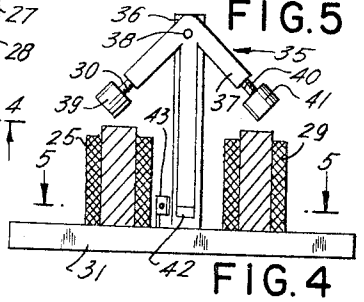


FIG. 4

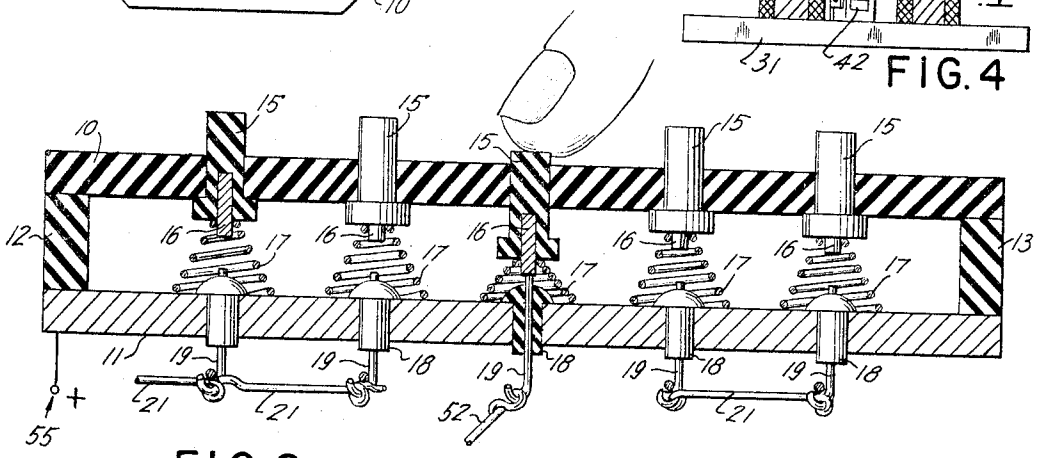


FIG. 2

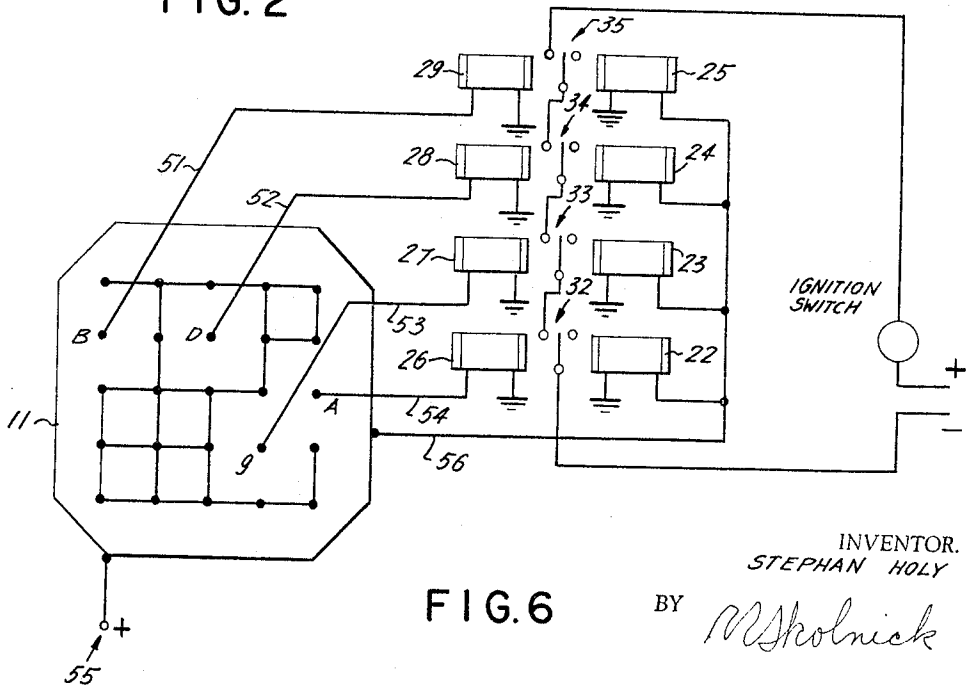


FIG. 6

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3,271,629

Patented Sept. 6, 1966

3,271,629

CODED ELECTRIC LOCKING MECHANISM

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Filed July 1, 1965, Ser. No. 468,854
1 Claim. (Cl. 317—134)

This invention relates in general to combination locks and more particularly to a coded electrical combination lock.

Heretofore, combination locks have been either of the mechanical type where a preset code is set into tumblers and the correct sequence of numbers line up the tumblers so that the lock opens up or of the electrical type which electrically line up the tumblers so that the lock can open up upon the correct sequence of buttons or pulses being pushed or generated.

It is therefore an object of the invention to provide an improved means for coding a lock.

Another object of the invention is to provide an improved coded electrical lock.

A further object of the invention is to provide a coded electrical lock which is capable of being recoded.

A still further object of the invention is to provide a coded electrical lock which is small, compact, endurable and economical to manufacture.

To these ends the invention contemplates the use of coding buttons which are mounted on a plate. The coding buttons are connected to two sets of electromagnets, one set of electromagnets being activated by the correct coding buttons and the other set being activated by any one of the incorrect coding buttons.

When an electromagnet is activated by a correct coding button it energizes a switch so that current can flow through. If the invention switch line is inserted into the ignition switch line of a car then the correct coding of the electromagnets have to be implemented before the ignition switch of a car could be energized to allow the car to be started.

The invention has other objects and advantages which will appear from the following description of a particular embodiment of the invention in conjunction with the accompanying drawing, in which:

FIGURE 1 shows a plan view of the main plate of the invention;

FIGURE 2 shows a longitudinal cross sectional view of the invention shown in FIGURE 1;

FIGURE 3 shows a plan view of the electromagnets assembled on their plate;

FIGURE 4 shows a cross sectional view of the electromagnets and switch of the invention shown in FIGURE 3;

FIGURE 5 shows a plan cross sectional view of the invention shown in FIGURE 4; and

FIGURE 6 shows a schematic representation of the invention.

With reference to the drawing FIGURE 2 shows a top plate **10** and a bottom plate **11**. The top plate can be made of either a nonelectrical conductive material or material such as stainless steel for hardness and wearability, whereas the bottom plate is made of an electrical conductive material. The two plates are separated by two side pieces **12** and **13** which are made of non-electrical conductive materials. Mounted within the top plate **10** are movable buttons **15**. Each button is given a code letter or number which is marked onto the top plate adjacent to the button. The buttons have pins **16** inserted therein, the pins protruding from the bottom part of the buttons **15**. The pins are made of electrical conductive materials.

The buttons **15** are supported by conical springs **17**. The springs are mounted between the buttons **15** and the bottom plate **11** so as to bias the buttons against the top plate **10** thereby returning the buttons to their original position whenever they are depressed therefrom. The springs **17** are made from electrical conductive materials.

Mounted on the bottom plate **11** are rivets **18**. These rivets are axially aligned with the buttons **15** of the top plate. The rivets are made of non-electrical conductive materials. Pins **19** are inserted through the center of the rivets so that they are axially aligned with the pins **16**. The pins protruding from each end of the rivets **18**. Each of the pins **19** are connected to each other by means of a wire **21**.

Referring to FIGURES 3, 4 and 5 there is shown thereon eight (8) electromagnets **22**, **23**, **24**, **25**, **26**, **27**, **28** and **29**. The electromagnets **22** and **26**, **23** and **27**, **24** and **28**, and **25** and **29** there is respectively mounted switching means **32**, **33**, **34** and **35**.

The switching means is comprised of a mounting block **36**, an anchor shaped connecting bar **37** pivotally mounted by means of a pivot pin **38** on the mounting block **36**. The connecting bar is made of non-electrical conducting material except that there are permanent magnets **39** and **41** mounted at the ends of each arm.

The magnets **39** and **41** can be regulated as to their distance from the electromagnets by means of regulating screws **30** and **40** respectively. The bottom of the body of the connecting rod is covered with copper **42** or some other good electrical conducting material. In juxtaposition with the copper bottom **42** of the connecting rod **37** is clip **43**. Clips **46**, **45** and **44** being juxtapositioned respectively with switching means **32**, **33** and **34**. The clips are series connected with an ignition switch **47** by means of wire leads **48** and **49**.

The operation of the coded electrical combination lock will now be explained more fully. Assuming one were to select the code BD9A as the code desired to be placed into the combination lock. Then the wires **21** connected to pins **19** of coded position BD9A are cut off, thereby isolating those particular pins. Referring to FIGURE 6 it is schematically shown that pin **19** of code B is connected to electromagnet **29** by means of lead **51**; pin **19** of code D is connected to electromagnet **28** by means of lead **52**; pin **19** of code **9** is connected to electromagnet **27** by means of lead **53**; and pin **19** of code A is connected to electromagnet **26** by means of lead **54**.

Electric current is supplied to the invention and it may either be A.C. or D.C. depending upon the invention's contemplated use. In the described mode we contemplate the use of D.C. current. The D.C. current is supplied to the invention through plate **11** at point **55**. The return of the D.C. current is to ground as shown in FIGURE 6 by the ground leads coming from the electromagnets.

When button **15** of code B is depressed the D.C. current from point **55** goes through plate **11**, spring **17**, pin **16**, pin **19** and through lead **51** to electromagnet **29** to ground. As the electromagnet **29** is energized it attracts the permanent magnet **41** on connecting bar **37** of switching means **35**. The copper coated bottom **42** of the bar **37** is pushed into the clip **43** of switching means **35** completing the electrical connection across the clip. This is schematically represented in FIGURE 6 as a relay switch. The connecting bar will remain in this position even after the button is released cutting off the D.C. current to the electromagnet as the permanent magnet remains attracted to the iron core of the electromagnet.

When button **15** of code D is depressed the D.C. current from point **55** goes through plate **11**, spring **17**, pin **16**, pin **19**, and through lead **52** to electromagnet **28** to ground. As the electromagnet **28** is energized it attracts the permanent magnet **41** on connecting bar **37** of switch-

ing means **34**. The copper coated bottom **42** of the bar **37** is pushed into the clip **43** of switching means **34** completing the electrical connection across the clip.

When button **15** of code **9** is depressed the D.C. current from point **55** goes through plate **11**, spring **17**, pin **16**, pin **19**, and through lead **53** to electromagnet **27** to ground. As the electromagnet **27** is energized it attracts the permanent magnet **41** on connecting bar **37** of switching means **33**. The copper coated bottom **42** of the bar **37** is pushed into the clip **43** of switching means **33** completing the electrical connection across the clip.

When button **15** of code A is depressed the D.C. current from point **55** goes through plate **11**, spring **17**, pin **16**, pin **19**, and through lead **53** to electromagnet **26** to ground. As the electromagnet **26** is energized it attracts the permanent magnet **41** on connecting bar **37** of switching means **32**. The copper coated bottom **42** of the bar **37** is pushed into the clip **43** of switching means **32** completing the electrical connection across the clip.

When all the connections across the clips of switching means **32**, **33**, **34** and **35** have been completed the circuit across the ignition switch or any other type of switch or connection which requires an electrical circuit, can be utilized.

Should someone unfamiliar with the code try to operate the device it is readily seen and shown that any button, which does not belong to the coded group, is depressed it immediately energized the electromagnets **25**, **24**, **23** and **22** by means of the D.C. current from point **55**, plate **11**, spring **17**, pin **16**, pin **19** and through lead **56** to electromagnets **25**, **24**, **23** and **22** to ground.

As these electromagnets are energized they attract the permanent magnets **39** on connecting bars **37** of switching means **35**, **34**, **33** and **32** respectively.

Therefore, even though three of the four coded buttons were correctly pushed touching a wrong button immediately decodes the entire device.

Although I have described particular embodiments of the invention, it is understood that the present disclosure has been made by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

A coded electrical combination lock comprising, a plurality of electromagnetic relays each having first and second energization coils and each having first and second electrical contacts, said relays being of the type having a pivotal bar whereby energization of the first coil will cause said pivotal bar to close first and second contacts and energization of said second coil will open said contacts, said relays including holding means whereby the pivotal bar will remain in the condition associated with the energization of each respective coil until the subsequent energization of the opposite coil, all of said first and second contacts being in series with a utilization circuit, a plurality of push buttons each having a first and second contact, a first group of said push buttons electrically arranged in such a manner so that to depress any one would energize all of said second relay coils, a second group of said push buttons electrically arranged so that each one will energize a respective first coil of each of the plurality of said relays so that when every one of said second group of push buttons is depressed the utilization circuit is complete, and if any one of said first group of push buttons is depressed before all of said second group of push buttons, all of said second coils will be energized and the utilization circuit will be opened.

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