(54) Title: SYSTEM AND METHOD FOR FORMING AN ELECTRICAL CIRCUIT USING BLOCKS

(57) Abstract

A system and method for forming an electrical circuit on a circuit board using blocks. The system includes at least one of a plurality of first type blocks and a plurality of second type blocks for supporting at least one of an electrical component and a connecting wire to form the electrical circuit. Each of the first type blocks includes at least one push-type switch for fixedly supporting the one of the electrical component and the connecting wire. Each of the second type blocks includes at least one fixing plate for fixedly supporting the one of the electrical component and the connecting wire. The system further includes at least one circuit board for supporting the one of the plurality of first type blocks and the plurality of second type blocks. The method uses an assembly system having at least one of a plurality of first type blocks, wherein each of the first type blocks has at least one push-type switch and at least one insertion hole. The method includes the steps of pressing the push-type switch of the first type block, inserting a portion of at least one of an electrical component and a connecting wire into the insertion hole of the first type block while the push-type switch is pressed, and releasing the push-type switch of the first type block. As a result, the portion of the one of the electrical component and the connecting wire is fixedly supported by the first type block.
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SYSTEM AND METHOD FOR FORMING AN ELECTRICAL CIRCUIT USING BLOCKS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a system and method for forming an electrical circuit and, more particularly, to a system and method for forming an electrical circuit on a circuit board using different types of blocks.

2. Description of Related Art

Electrical/electronic circuits are widely used in electrical and computer engineering art. At universities, colleges, companies, and other institutions, students and engineers study electrical/electronic circuits and participate in laboratories where the samples of the electrical/electronic circuits are made and tested. Different methods are used to form such electrical/electronic circuits. Some of the known methods include a soldering method, a printed circuit board (PCB) forming method, and a breadboard using method.

In a conventional soldering method which is more widely used than other methods, electrical ironing is employed to form the electrical/electronic circuits. However, the use of electrical ironing requires high precision and refined techniques as well as special tools such as an electrical iron, solder, etc. Electrical ironing also generates toxic fume which can cause gas poisoning, nausea, vomiting, and air pollution. Therefore, a specially designed room or place is required to perform the conventional soldering method.

In a conventional PCB forming method, electrical/electronic components and connecting wires are soldered onto a circuit board. Students and engineers must be extra careful to accurately position and solder the electrical/electronic components and connecting wires on the circuit board. Since the soldering is permanent, however, the soldered circuit board cannot be easily modified to change the circuitry, load, etc.
In a conventional breadboard using method, students and engineers can position desired electrical/electronic components and connecting wires on a breadboard without the use of soldering or electrical ironing. However, the students and engineers must remember the special characteristics (e.g., circuit direction) of the breadboard. Further, it is difficult to determine whether the electrical/electronic components and connecting wires have made a good contact with a grid within the breadboard. Although a separate testing can be performed to verify good connections on the breadboard, a separate test line is needed to perform such a test. Furthermore, if the test fails, it is difficult to determine if the failure is due to the breadboard itself or the composition of the electrical/electronic circuit. Moreover, the electrical/electronic components and connecting wires on the breadboard tend to pop out easily and are difficult to maintain on the breadboard, which causes frustration and confusion to the students and engineers.

In the above conventional methods that use soldering, a circuit storage case for protecting and storing the electrical/electronic circuit is often provided with the electrical kit. However, since the storage case is designed to fit only a particular electrical circuit, no other electrical/electronic circuits can be stored in the storage case. Furthermore, students and engineers cannot combine different electrical/electronic circuits that they have made, because the storage case does not support the combined electrical/electronic circuits at one time.

For the above reasons, the conventional methods of forming an electrical/electronic circuit have limitations and disadvantages which must be addressed in order to provide more efficient and effective methods and systems of forming an electrical/electronic circuit to the students, engineers, and others.

**SUMMARY OF THE INVENTION**

Accordingly, an object of the present invention is to provide a system and method for forming an electrical circuit that eliminates the above problems encountered with conventional methods and systems.

Another object of the present invention is to provide a system and method for forming an electrical circuit on a circuit board by assembling blocks and without using soldering or electrical ironing.
Another object of the present invention is to provide a system and method for forming an electrical circuit, which securely fixes and maintains the electrical circuit on a circuit board by using push-type switches and fixing plates.

Another object of the present invention is to provide a system and method for forming an electrical circuit on a circuit board without using additional tools.

A further object of the present invention is to provide a system for forming an electrical circuit that is simple, durable, safe, cost-effective, refined and easy to operate.

Briefly described, the present invention is directed to a system for forming an electrical circuit on a circuit board, comprising at least one of a plurality of first type blocks and a plurality of second type blocks for supporting at least one of an electrical component and a connecting wire to form an electrical circuit, each of the first type blocks including at least one push-type switch for fixedly supporting the one of the electrical component and the connecting wire, each of the second type blocks including at least one fixing plate for fixedly supporting the one of the electrical component and the connecting wire; and at least one circuit board for supporting the at least one of the plurality of first type blocks and the plurality of second type blocks.

The present invention is further directed to an assembling block for use on a circuit board for electrically connecting an electrical component with a connecting wire to form an electrical circuit, the assembling block comprising at least one first push-type switch having at least one groove, at least one conductive plate having a first projection to be pressed against the groove of the first push-type switch, and at least one first elastic member for elastically supporting the first push-type switch, whereby at least one of the electrical component and the connecting wire can be fixedly supported in the groove of the first push-type switch by an operation of the first push-type switch.

Furthermore, the present invention is directed to an assembling block for use on a circuit board for electrically connecting an electrical component with a connecting wire to form an electrical circuit, the assembling block comprising a block body having a plurality of grooves, at least one conductive plate formed in the block body, and at least one pressing plate, whereby at least one of the electrical component and the connecting wire is fixedly supported by the assembling block.
Moreover, the present invention is directed to a method for forming an electrical circuit using an assembly system, the assembly system including at least one of a plurality of first type blocks, each of the first type blocks having at least one push-type switch and at least one insertion hole, the method comprising the steps of pressing the push-type switch of the first type block, inserting a portion of at least one of an electrical component and a connecting wire into the insertion hole of the first type block while the push-type switch is pressed, and releasing the push-type switch of the first type block so that the portion of the one of the electrical component and the connecting wire is fixedly supported by the first type block.

Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. It should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

Fig. 1 shows a perspective view of an assembly system 100 for forming an electrical circuit according to a preferred embodiment of the present invention;

Fig. 2 is a detailed perspective view of a one-pole first type block 10 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 3 shows a cross-sectional view of the one-pole first type block 10, cut vertically along the block 10 for explaining the fixation of an electrical component A, according to the preferred embodiment of the present invention;

Fig. 4 shows a cross-sectional view of the one-pole first type block 10, cut horizontally along a second push switch 15 of the block 10 for explaining the fixation of a connecting wire B, according to the preferred embodiment of the present invention;
Fig. 5 is a detailed perspective view of a two-pole first type block 20 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 6 is a detailed perspective view of a three-pole first type block 30 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 7 is a perspective view of a first type IC chip block 40 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 8 shows a top view of conductive plates of the first type IC chip block 40 of Fig. 7 according to the preferred embodiment of the present invention;

Fig. 9 shows a cross-sectional view of the first type IC chip block 40 for explaining the fixation of an IC chip C and a connecting wire B according to the preferred embodiment of the present invention;

Figs. 10 and 11 show detailed perspective views of a two-pole second type block 50 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 12 shows a cross-sectional view of a first/second fixing plate 54/55 and a block body 57 of the two-pole second type block 50 according to the preferred embodiment of the present invention;

Fig. 13 shows a cross-sectional view of the two-pole second type block 50 of the assembly system 100 according to the preferred embodiment of the present invention;

Figs. 14 shows a detailed perspective views of a three-pole second type block 60 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 15 shows a cross-sectional view of a first/second fixing plate 64/65 and a block body 67 of the three-pole second type block 60 according to the preferred embodiment of the present invention;

Fig. 16 is a perspective view of a second type IC chip block 70 of the assembly system 100 according to the preferred embodiment of the present invention;

Fig. 17 shows a cross-sectional view of the second type IC chip block 70 for explaining the fixation of an IC chip C and a connecting wire B according to the preferred embodiment of the present invention;

Fig. 18 shows a perspective view of a circuit cover 84 of the assembly system 100 according to the preferred embodiment of the present invention;
Fig. 19 shows a perspective view of another example of the assembly system (100') according to the preferred embodiment of the present invention;

Fig. 20 shows a top view of a circuit board of the assembly systems of Figs. 1 and 19 with an enlarged sectional view of a side portion of the circuit board according to the preferred embodiment of the present invention;

Fig. 21 shows an example of two circuit boards of the assembly systems of Figs. 1 and 19, being coupled to each other, according to the preferred embodiment of the present invention;

Fig. 22 shows an example of a board connector 83 for the assembly systems of Figs. 1 and 19 according to the preferred embodiment of the present invention;

Fig. 23 shows an example of a connecting pin 82 for the assembly systems of Figs. 1 and 19 according to the preferred embodiment of the present invention; and

Fig. 24 shows another example of a circuit board of the assembly systems of Figs. 1 and 19 according to the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiment of the present invention is directed to a system and method for forming an electrical circuit using blocks. In the present invention, 'electrical circuit' encompasses, *inter alia*, an electrical circuit, an electronic circuit, a semiconductor circuit, and/or any other type of circuit used in electrical and computer engineering art. Similarly, 'electrical component' encompasses, *inter alia*, an electrical component, an electronic component, a semiconductor component, and/or any other type of component, device, or element used in electrical and computer engineering art.

Referring now in detail to the drawings for the purpose of illustrating the preferred embodiment of the present invention, Fig. 1 shows a perspective view of an assembly system 100 for forming an electrical circuit according to the preferred embodiment of the present invention. As shown in, e.g., Fig. 1, the assembly system 100 includes a circuit board 81, a plurality of first type blocks 10, 20, 30 and 40, a plurality of second type blocks 50, 60 and 70, and a circuit cover 84, all operatively connectable. In this example, the first type blocks 10, 20, 30 and 40 are push-switch type blocks that allow the fixation of electrical components and connecting wires to the first type blocks 10, 20, 30 and 40 using push switches. The second type blocks 50, 60 and 70 are
press-type blocks which secure the inserted electrical components and connecting wires using press plates. The first type blocks 10-40 include a one-pole first type block 10, a two-pole first type block 20, a three-pole first type block 30 and a first type IC chip block 40. The second type blocks 50-70 include a two-pole second type block 50, a three-pole second type block 60 and a second type IC chip block 70. Similarly, blocks capable of fixedly holding an electrical component having any number of poles or leads can be provided as part of the present invention.

Fig. 2 shows a detailed perspective view of a one-pole first type block 10 of the assembly system 100 according to the preferred embodiment of the present invention. As shown in, e.g., Fig. 2, the one-pole first type block 10 includes first and second push switches 14 and 15, first and second elastic members S1 and S2, a conductive plate 90, and a block body 17, all operatively connectable.

The block body 17 includes a testing hole 13 and a pair of through holes 17a formed on one side thereof, a pair of indents 17b formed on another side thereof, a pair of wire insertion holes 12 formed on opposite sides thereof, a component insertion hole 11 formed on a top side thereof, and a connecting portion 16 formed on a bottom side thereof. The first push switch 14 includes a groove 14a formed thereon, and the second push switch 15 includes a pair of grooves 15a formed on the sides thereof. The conductive plate 90 includes a first projection 90a, a pair of second projections 90b, and a pair of through holes 90c. The conductive plate 90 is made with any conductive material such as metal, copper, etc. The first and second elastic members S1 and S2 can be a spring, a coil, or any other type of elastic element.

The block body 17 encapsulates the first and second push switches 14 and 15, the first and second elastic members S1 and S2, and the conductive plate 90. The first projection 90a of the conductive plate 90 is pressed against the groove 14a of the first push switch 14, and the second projections 90b of the conductive plate 90 are respectively pressed against the pair of grooves 15a of the second push switch 15. Certain portions of the first and second push switches 14 and 15 project out of the block body 17 through the pairs of through holes 17a and 90c. The first and second elastic members S1 and S2 are inserted into the indents 17b and pressed against the back sides of the first and second push switches 14 and 15. The connecting portion 16 of the block body 17 can be inserted into any receiving hole 81d of the circuit board 81. The component insertion hole 11 receives the lead of an electrical component therein, and the wire insertion holes
12 receive a plurality of connecting wires for electrically connecting the electrical component to other electrical components.

Fig. 3 shows a cross-sectional view of the one-pole first type block 10, cut vertically along the block 10 for explaining the fixation of an electrical component A, according to the preferred embodiment of the present invention. The electrical component A, in this example, has one pole or lead A', but is not limited to having just one pole but can have a plurality of poles or leads.

As shown in, e.g., Fig. 3, to fixedly position the electrical component A in the one-pole first type block 10, the first push switch 14 is pushed in (e.g., by a user) towards the block body 17 as indicated by the arrow sign, causing the first push switch 14 to move towards the first elastic member S1. This creates a gap G1 between the first projection 90a of the conductive plate 90 and the groove 14a of the first push switch 14. The lead A' of the electrical component A is then inserted into the gap G1 and is securely fixed in the groove 14a by the first projection 90a due to the elasticity of the first elastic member S1 as the first push switch 14 is released. As a result, the electrical component A is securely connected to the conductive plate 90 for electrical connection.

Fig. 4 shows a cross-sectional view of the one-pole first type block 10, cut horizontally along the second push switch 15 of the block 10 for explaining the fixation of the connecting wire B, according to the preferred embodiment of the present invention. As shown in, e.g., Fig. 4, the one-pole first type block 10 can receive at most two connecting wires through the wire insertion holes 12 of the block 10. To fixedly position the connecting wire B for electrically connecting electrical components, the second push switch 15 is pushed in (e.g., by the user) as indicated by the arrow sign. This creates gaps G2 between the second projections 90b of the conductive plate 90 and the grooves 15a of the second push switch 15. The lead portion B' of the connecting wire B is then inserted into any one of the wire insertion holes 12 and is secured in one of the gaps G2. Then as the second push switch 15 is released, the second push switch 15 is moved back to its original position by the elasticity of the second elastic member S2 and the lead potion B' of the connecting wire B is securely fixed in one of the gaps G2 by the corresponding second projection 90b. This electrically connects the connecting wire B to the conductive plate 90. In this example, the lead portion B' of the connecting wire B may be smaller or thinner than the lead A' of the electrical component A.
Accordingly, the one-pole first type block 10 fixedly holds a one-pole electrical component, connecting wires, and the electrical connection between the electrical component and the connecting wires by the operation of the first and second push switches 14 and 15. At any time, the testing hole 13 of the one-pole first type block 10 can be used to easily and selectively test the connection and operability of the electrical component and the connecting wires.

Fig. 5 is a detailed perspective view of a two-pole first type block 20 of the assembly system 100 according to the preferred embodiment of the present invention. As shown in, e.g., Fig. 5, the two-pole first type block 20 includes first, second and third push switches 24, 25 and 25', first, second and third elastic members S21, S22 and S22', first and second conductive plates 110 and 120, and a block body 27, all operatively connectable.

The block body 27 includes a pair of testing holes 23 and a plurality of through holes 27a formed on one side thereof, a plurality of indents 27b formed on another side thereof, a pair of wire insertion holes 22 formed on the opposite sides thereof, a pair of component insertion holes 21 formed on a top side thereof, and a connecting portion 26 formed on a bottom side thereof.

The first push switch 24 includes a pair of grooves 24a formed thereon and separated by a short circuit preventing portion 24b for preventing electrical short circuits. The second push switch 25 includes a groove 25a formed thereon and the third push switch 25' includes a groove 25a' formed thereon.

The first conductive plate 110 includes first and second projections 110a and 110b, and a through hole 110c. Similarly, the second conductive plate 120 includes first and second projections 120a and 120b, and a through hole 120c. The first and second conductive plates 110 and 120 are made with any conductive material such as metal, etc.

The block body 27 encapsulates the first, second and third push switches 24, 25 and 25', the first, second and third elastic members S21, S22 and S22', and the first and second conductive plates 110 and 120. The first projections 110a and 120a are respectively pressed against the grooves 24a of the first push switch 24, and the second projections 110b and 120b are respectively pressed against the grooves 25a and 25a' of the second and third push switches 25 and 25'. Certain portions of the first, second and third push switches 24, 25 and 25' project out of the block body 27 through the through holes 110c, 120c, and 27a.
The first, second and third elastic members S21, S22 and S22' are inserted into the indents 27b and pressed against the back sides of the first, second and third push switches 24, 25 and 25'. The first, second and third elastic members S1, S2 and S3 can be a spring, a coil, or any other type of elastic element. The connecting portion 26 of the block body 27 can be inserted into any receiving hole 81d of the circuit board 81. The component insertion holes 21 receive the leads of an electrical component therein, and the wire insertion holes 22 receive connecting wires therein.

The fixation of an electrical component to the two-pole first type block 20 is similar to that of the one-pole first type block 1, except that the two-pole first type block 20 can receive an electrical component having at most two poles or leads (e.g., diode, resistor, conductors, etc.) through the component insertion holes 21 of the block 20. For example, to fixedly position the electrical component, the first push switch 24 is pushed in towards the block body 27, causing the first push switch 24 to move towards the first elastic member S21. This creates gaps between the first projections 110a and 120a and the grooves 24a of the first push switch 24. The lead(s) of the electrical component are then inserted into the gaps and are securely fixed in the grooves 24a by the first projections 110a and 120a due to the elasticity of the first elastic member S21 as the first push switch 24 is released. As a result, the electrical component is securely connected to the conductive plate 90 by the operation of the first push switch 24.

The fixation of a connecting wire to the two-pole first type block 20 is similar to that of the one-pole first type block 10. The two-pole first type block 20 receives at most two connecting wires through the wire insertion holes 22 of the block 20. To fixedly position the connecting wire for electrically connecting electrical components, the second push switch 25 is pushed in towards the two-pole second type block 20. This creates a gap between the second projection 110b and the corresponding groove 25a of the second push switch 25. The lead portion of the connecting wire is then inserted into one of the wire insertion holes 22 and positioned in the gap. As the second push switch 25 is released, the second push switch 25 is moved back towards the second projection 110b due to the elasticity of the second elastic member S22, whereby the lead potion of the connecting wire is securely fixed in the groove 25a of the switch 25 by the second projection 110b of the conductive plate 110. The operation of the third push switch 25' is the same as or similar to the above-described operation of the second push switch 25.
Accordingly, the two-pole first type block 20 fixedly holds an electrical component having at most two-poles, a plurality of connecting wires, and the electrical connection between the electrical component and the connecting wires by the operation of the first, second and third push switches 24, 25 and 25'. At any time, the testing holes 23 of the two-pole first type block 20 can be used to easily and selectively test the connection and operability of the electrical component and the connecting wires.

Fig. 6 is a detailed perspective view of a three-pole first type block 30 of the assembly system 100 according to the preferred embodiment of the present invention. As shown in, e.g., Fig. 6, the three-pole first type block 30 includes first, second and third push switches 34, 35 and 35', first, second and third elastic members S31, S32 and S32', a conductive plate 130, and a block body 37, all operatively connectable. The first push switch 34 includes a plurality of grooves 34a formed thereon and separated by a short circuit preventing portion 34b for preventing electrical short circuits. The second push switch 35 includes a pair of grooves 35a formed thereon and separated by a short circuit preventing portion 35b for preventing electrical short circuits. The third push switch 35' also includes a pair of grooves 35a' formed thereon and separated by a short circuit preventing portion 35b'.

The block body 37 is divided into three parts AA, BB, and CC. Each of the parts AA and BB includes a pair of testing holes 33, a through hole 37c, and a pair of wire insertion holes 32. The part AA further includes another through hole 37a for receiving a portion of the first push switch 34 therethrough. The part BB includes an indent 37b for receiving the first elastic member S31 therein. The parts AA and BB together include a plurality of component insertion holes 31 for receiving at most three leads of an electrical component. The part CC includes a pair of indents 37d for receiving the second and third elastic members S32 and S32' therein, and a connecting portion 36 formed on a bottom surface thereof.

The conductive plate 130 includes a plurality of first projections 130a for correspondingly pressing against the grooves 34a of the first push switch 34, a plurality of second projections 130b for correspondingly pressing against the grooves 35a and 35a' of the second and third push switches 35 and 35', a first through hole 130c for receiving a portion of the first push switch 34 therethrough, and a pair of second through holes 130d for respectively receiving portions of the second and third push switches 35 and 35' therethrough. The conductive plate 130 is made with
any conductive material such as metal, etc. The first, second and third elastic members S31, S32 and S32' can be a spring, a coil, or any other type of elastic element.

The block body 37 encapsulates the first, second and third push switches 34, 35 and 35', the first, second and third elastic members S31, S32 and S32', and the conductive plate 130. Certain portions of the first and second push switches 34 and 35 project out of the part AA of the block body 37 through the holes 37a and 37c. A portion of the third push switch 35' projects out of the part BB of the block body 37 through the hole 37c located on the part BB. The first elastic member S31 is inserted into the indent 37b of the part BB, and the second and third elastic members S32 and S32' are inserted into the indents 37d of the part CC of the block body 37. The first, second and third elastic members S31, S32 and S32' also press against the back sides of the first, second and third push switches 34, 35 and 35', respectively. The connecting portion 36 of the block body 37 can be inserted into any receiving hole 81d of the circuit board 81. The component insertion holes 31 receive the leads of an electrical component therein, and the wire insertion holes 32 receive a plurality of connecting wires.

The fixation of an electrical component to the three-pole first type block 30 is similar to that of the two-pole first type block 20, except that the three-pole first type block 30 can receive an electrical component having at most three poles or leads (e.g., transistors, etc.) through the component insertion holes 31 of the block 30. For example, to fixedly position the electrical component, the first push switch 34 is pushed in towards the block body 37, causing the first push switch 34 to move towards the first elastic member S31. This creates gaps between the first projections 130a and the grooves 34a of the first push switch 34. The leads of the electrical component are then inserted into the gaps and are securely fixed in the grooves 34a by the first projections 130a due to the elasticity of the first elastic member S31 as the first push switch is released. As a result, the electrical component is securely connected to the conductive plate 130 by the operation of the first push switch 34.

The fixation of a connecting wire to the three-pole first type block 30 is similar to that of the two-pole first type block 20, except that the three-pole first type block 30 can receive at most four connecting wires through the wire insertion holes 32. To insert a connecting wire into the three-pole first type block 30, the second push switch 35 is pushed downwardly. This creates gaps between the second projections 130b and the grooves 35a of the second push switch 35. The
connecting wire is then inserted into any one of the wire insertion holes 32 so that the lead portion of the connecting wire is positioned in one of the gaps. As the second push switch 35 is released, the second push switch 35 is moved upwardly due to the elasticity of the second elastic member S32, whereby the lead potion of the connecting wire is securely fixed in the groove 35a of the second push switch 35 by the second projections 130b of the conductive plate 130. It is understood that the connecting wire can also be inserted into other wire inserting holes 32 by the same operation of the second and third push switches 35 and 35' and the second and third elastic member S32 and S32'. The short circuit preventing portions 35b and 35b' separate and insulate the lead potions of the connecting wires inserted into the wire insertion holes 32 to prevent electrical short circuits.

Accordingly, the three-pole first type block 30 fixedly holds an electrical component having at most three poles, a plurality of connecting wires, and the electrical connection between the electrical component and the connecting wires by the operation of the first, second and third push switches 34, 35 and 35’. At any time, the testing holes 33 on the parts AA and BB of the three-pole first type block 30 can be used to easily and selectively test the connection and operability of the electrical component and the connecting wires.

Fig. 7 is a perspective view of a first type IC chip block 40 of the assembly system 100, Fig. 8 shows a top view of conductive plates of the IC chip block 40, and Fig. 9 shows a cross-sectional view of the IC chip block 40 for explaining the fixation of an IC chip and a connecting wire, all according to the preferred embodiment of the present invention.

As shown in, e.g., Figs. 7-9, the first type IC (integrated circuit) chip block 40 includes a plurality of push switches 45, a plurality of elastic members S4 for correspondingly interacting with the push switches 45, a plurality of conductive plates 140, and a block body 47, all operatively connectable.

The block body 47 includes a plurality of lead insertion holes 41 formed on a center top surface thereof, a plurality of testing holes 43, a plurality of through holes 47a formed on the center top surface thereof for receiving portions of the push switches 45 therethrough, a plurality of wire insertion holes 42, a plurality of indents 47b for receiving the elastic members S4 therein, and a connecting portion 46 formed on a bottom surface thereof.
Each of the push switches 45 includes a pair of grooves 45a formed thereon and separated by a short circuit preventing portion 45b. Each of the push switches 45 also supports two adjacent conductive plates 140 thereon, and is supported by one of the elastic members S4. Each of the conductive plates 140 includes a first projection 140a for fixedly holding a lead of an IC chip inserted through one of the lead insertion holes 41, and a second projection 140b for pressing against one of the grooves 45a of a corresponding one of the push switches 45. Each of the conductive plate 140 is made with any conductive material such as metal, etc. The elastic members S4 can be a spring, a coil, or any other type of elastic element.

The block body 47 encapsulates the push switches 45, the elastic members S4, and the conductive plates 140. Each of the elastic members S4 is pressed against the corresponding indent 47b of the block body 47. These elastic members S4 also press against the back sides of the corresponding push switches 45. The connecting portion 46 of the block body 47 can be inserted into any receiving hole 81d of the circuit board 81. The lead insertion holes 41 receive the leads of an electrical component such as an IC chip C having eight leads, and the wire insertion holes 42 receive a plurality of connection wires for electrically connecting the IC chip C with other electrical components.

More particularly, as shown in Fig. 9, the IC chip C is fixedly positioned on the first type IC chip block 40 by inserting leads C' of the IC chip C into the lead insertion holes 41 of the block body 47 as indicated by the arrow sign. The shape and configuration of the first projections 140a of the conductive plates 140 capture the leads C' of the IC chip, securely. In lieu of the shown shape and configuration of the first projections 140a, other shapes and configurations can be used to capture the leads C' of the IC chip C.

The fixation of a connecting wire B to the first type IC chip block 40 is similar to that of the first type blocks 10, 20 and 30. In this example, the IC chip block 40 receives at most eight connecting wires through the wire insertion holes 42. To fix the connecting wire B to the IC chip block 40, one of the push switches 45 is pushed downwardly as indicated by the arrow sign. This creates gaps between the grooves 45a and the second projections 140b of the conductive plates 140 corresponding to the pushed one of the push switches 45. The lead portion B' of the connecting wire B is then inserted into one of the corresponding wire insertion holes 42 and is fixed to the corresponding conductive plate 140 by the second projections 140b due to the
elasticity of the corresponding elastic member S4 as the pushed one of the push switches 45 is released, whereby the connecting wire B is electrically connected to the conductive plate 140. The short circuit preventing portion 45b of each of the push switches 45 separates and insulates the lead potions of the two adjacent connecting wires inserted into the two adjacent insertion holes 42, whereby electrical short circuits are prevented.

Accordingly, the first type IC chip block 40 fixedly holds an IC chip, a plurality of connecting wires, and the electrical connection between them by the operation of the push switches 45. Although the first type IC chip block 40 supports an IC chip having at most eight leads in this example, modifications can be made to the IC chip block 40 so that it supports IC chips having a different number of leads, e.g., 16 leads, 32 leads, 72 leads, etc. Similarly, modifications can be made to the IC chip block 40 to receive a different number of connecting wires at one time. Further, each of the push switches 45 can support a different number of conductive plates 140. At any time, the testing holes 43 can be used to easily and selectively test the connections and operability of the IC chip and the connecting wires.

Figs. 10 and 11 show detailed perspective views of a two-pole second type block 50 of the assembly system 100 according to the preferred embodiment of the present invention. As shown in, e.g., Figs. 10 and 11, the two-pole second type block 50 includes first and second fixing plates 54 and 55, a pair of conductive plates 150, and a block body 57, all operatively connectable.

The block body 57 includes a pair of testing holes 53 formed on one side thereof, at least four indents 57a, a pair of component insertion holes 51 formed on a top portion thereof, a pair of wire insertion holes 52 formed on a front portion thereof, a pair of first grooves 54b formed on opposite sides thereof, a pair of second grooves 55b formed on opposite sides thereof, and a connecting portion 56 formed on a bottom side thereof. The connecting portion 56 of the block body 57 can be inserted into any receiving hole 81d of the circuit board 81. The component insertion holes 51 receive the leads of an electrical component, and the wire insertion holes 52 receive a plurality of connecting wires for electrically connecting the electrical component to other electrical components.

The block body 57 encapsulates the pair of conductive plates 150 therein. Each of the conductive plates 150 is fit in two of the indents 57a, and can have a configuration as shown in, e.g., Fig. 11. For example, each of the conductive plates 150 can include a curved portion 150a
defining a gap G3. The conductive plates 150 are made with any conductive material such as metal, etc.

Fig. 12 shows a cross-sectional view of the first/second fixing plate 54/55 and the block body 57 of the two-pole second type block 50 according to the preferred embodiment of the present invention. As shown in, e.g., Fig. 12, the first fixing plate 54 includes a pair of release handle portions 54a and a pair of securing projections 54a' formed on opposite ends thereof, and a pair of pressing projections 54c formed between the release handle portions 54a. Similarly, the second fixing plate 55 includes a pair of release handle portions 55a and a pair of securing projections 55a' formed on opposite ends thereof, and a pair of pressing projections 55c formed between the release handles 55a. The pair of securing projections 54a' of the first fixing plate 54 interlock with the pair of first grooves 54b, and the pair of securing projections 55a' of the second fixing plate 55 interlock with the pair of second grooves 55b of the block body 57.

Fig. 13 shows a cross-sectional view of the two-pole second type block 50 of the assembly system 100 for explaining the fixation of the electrical component A and the connecting wire B according to the preferred embodiment of the present invention. In this example, the electrical component A is a two-pole component having at most two leads A'. As shown in, e.g., Figs. 12 and 13, to fix the electrical component A to the two-pole second type block 50, the leads A' of the electrical component A are pushed in downwardly as indicated by the arrow through the component insertion holes 51 and are fixedly positioned in the gaps G3 of the pair of conductive plates 150. Then the first fixing plate 54 is pressed against an upper portion of the block body 57 such that the securing projections 54a' of the first fixing plate 54 are interlocked into the first grooves 54b of the block body 57. This securely fixes the leads A' of the electrical component A to the conductive plates 150 as the pressing projections 54c are pressed against the leads A' and the conductive plates 150. To release the leads A' of the electrical component A, the release handle portions 54a of the first fixing plate 54 are pressed.

The fixation of the connecting wire B is similar to that of the electrical component A. The lead portion B' of the connecting wire B is pushed into any one of the wire insertion holes 52. Then to securely fix the inserted connecting wire B, the second fixing plate 55 is pressed against a lower portion of the block body 57 such that the securing projections 55a' of the second fixing plate 55 are interlocked into the second grooves 55b of the block body 57. This securely fixes the
lead portion B' of the connecting wire B to the corresponding one of the conductive plates 150 as the pressing projections 55c are pressed against the lead portion B' and the conductive plates 150. In fact, the second fixing plate 55 can secure up to two connecting wires B at one time. To release the connecting wires B, the release handle portions 55a of the second fixing plate 55 are pressed.

Accordingly, the two-pole second type block 50 securely fixes an electrical component having at most two-poles, a plurality of connecting wires, and the electrical connection between the electrical component and the connecting wires by the operation of the first and second fixing plates 54 and 55. At any time, the pair of testing holes 53 of the two-pole second type block 50 can be used to easily and selectively test the connection and operability of the electrical component and the connecting wires.

Figs. 14 shows a detailed perspective views of a three-pole second type block 60 of the assembly system 100 and Fig. 15 shows a cross-sectional view of a first/second fixing plate and a block body of the three-pole second type block 60, all according to the preferred embodiment of the present invention. In this example, the configuration and operation of the three-pole second type block 60 are similar to those of the two-pole second type block 50, except that the three-pole second type block 60 can fixedly hold up to three connecting wires and an electrical component having up to three poles or leads at one time.

As shown in, e.g., Figs. 14 and 15, the three-pole second type block 60 includes first and second fixing plates 64 and 65, three conductive plates 160, and a block body 67, all operatively connectable. The block body 67 includes three testing holes 63 formed on one side thereof, at least six indents 67a, three component insertion holes 61 formed on a top portion thereof, three wire insertion holes 62 formed on a front portion thereof, a pair of first grooves 64b formed on opposite sides thereof, a pair of second grooves 65b formed on opposite sides thereof, and a connecting portion 66 formed on a bottom side thereof. The connecting portion 66 of the block body 67 can be inserted into any receiving hole 81d of the circuit board 81. The component insertion holes 61 receive an electrical component having at most three poles or leads, and the wire insertion holes 62 receive a plurality of connecting wires for electrically connecting the electrical component with other electrical components.
The block body 67 encapsulates the three conductive plates 160 therein. Each of the conductive plates 160 is fit in two of the indents 67a, and has a configuration as shown in, e.g., Fig. 14. For example, each of the conductive plates 160 includes a curved portion 160a for defining a gap G4. The conductive plates 160 are made with any conductive material such as metal, etc.

The first fixing plate 64 includes a pair of release handle portions 64a and a pair of securing projections 64a' formed on opposite ends thereof, and three pressing projections 64c formed between the release handle portions 64a. Similarly, the second fixing plate 65 includes a pair of release handle portions 65a and a pair of securing projections 65a' formed on opposite ends thereof, and three pressing projections 65c formed between the release handle portions 65a.

The insertion of the leads of an electrical component and a connecting wire into the three-pole second type block 60 is similar to that of the two-pole second type block 50. To electrically connect the electrical component with the connecting wire, the leads of the electrical component are inserted into the gaps G4 of the conductive plates 160 through the component insertion holes 61 and securely held in the gaps G4 by the shape of the conductive plates 160. Then the first fixing plate 64 is pressed against an upper portion of the block body 67 such that the securing projections 64a' are interlocked into the first grooves 64b of the block body 67. This securely fixes the leads of the electrical component to the conductive plates 160 as the pressing projections 64c are pressed against the leads of the electrical component and the conductive plates 160. To release the leads of the electrical component, the release handle portions 64a of the first fixing plate 64 are pressed.

The insertion of the connecting wire B into the three-pole second type block 60 is similar to that of the two-pole second type block 50. The lead portion of the connecting wire is inserted into any one of the wire insertion holes 62. Then to securely fix the inserted connecting wire, the second fixing plate 65 is pressed against a lower portion of the block body 67 such that the securing projections 65a' are interlocked into the second grooves 65b of the block body 67. This securely fixes the lead portion of the connecting wire to the conductive plates 160 as the pressing projections 65c are pressed against the lead portion of the connecting wire and the conductive plates 160. To release the connecting wire, the release handle portions 65a of the second fixing plate 65 are pressed.
Accordingly, the three-pole second type block 60 fixedly holds an electrical component having at most three-poles, a plurality of connecting wires, and the electrical connection between the electrical component and the connecting wires by the operation of the first and second fixing plates 64 and 65. At any time, the testing holes 63 of the three-pole second type block 60 can be used to easily and selectively test the connection and operability of the electrical component and the connecting wires.

Fig. 16 shows a perspective view of a second type IC chip block 70 of the assembly system 100 and Fig. 17 shows a cross-sectional view of the IC chip block 70 for explaining the fixation of an IC chip C and a connecting wire B, all according to the preferred embodiment of the present invention. As shown in, e.g., Figs. 16-17, the second type IC chip block 70 includes at least one of a plurality of fixing plates 75, a plurality of conductive plates 170, and a block body 77, all operatively connectable.

The block body 77 includes a plurality of lead insertion holes 71 formed on a center surface thereof for receiving the leads of an electrical component such as the IC chip C, a plurality of testing holes 73 for testing connections between the IC chip C and the connecting wires, a plurality of indents 77a for supporting the corresponding conductive plates 170 therein, a plurality of holes 77b for receiving the fixing plates 75, a plurality of wire insertion holes 72 for receiving the connecting wires therein, and a connecting portion 76 formed on a bottom surface thereof.

The block body 77 encapsulates the conductive plates 170 therein. Each of the conductive plates 170 is fit in one of the indents 77a, and is separated and insulated from the others by projecting portions of the block body 77 functioning as short circuit preventing portions. Each of the conductive plates 170 has, e.g., a curved portion 170a defining a gap G5 and is made with any conductive material such as metal, etc. The connecting portion 76 of the block body 77 can be inserted into any receiving hole 81d of the circuit board 81.

Each of the fixing plates 75 includes a handle portion 75a and four pressing projections 75c. The pressing projections 75c are fixedly fit into the holes 77b of the block body 77. In this example, each of the fixing plates 75 covers four adjacent holes 77b of the block body 77 to fix four connecting wires at one time. However, each of the fixing plates 75 can be modified to cover a different number of holes 77b. Furthermore, although the block body 77 is shown to have at least sixteen lead insertion holes 71, sixteen wire insertion holes 72 and sixteen testing holes 73, a
different number of lead insertion holes 71, wire insertion holes 72 and testing holes 73 are contemplated as part of the present invention to support an IC chip having a different number of leads, e.g., 8 leads, 14 leads, 20 leads, 22 leads, etc.

The fixation of the IC chip C to the second type IC chip block 70 is similar to that of the first type IC chip block 40. The leads C’ of the IC chip C is inserted into the lead insertion holes 71 of the body block 77 as indicated by the arrow sign. The shape and configuration of the curve portions 170a of the conductive plates 170 capture the leads C’ of the IC chip C, securely.

To fixedly position a connecting wire B in the block 70, the lead portion B’ of the connecting wire B is inserted into any one of the wire insertion holes 72. Then one of the fixing plates 75 is pressed downwardly into the holes 77b so that the pressing projections 75c of the one of the fixing plates 75 press the lead portion B’ against one of the conductive plates 170. Because of the teeth-like shape of the one of the fixing plates 75, this securely fixes the lead portion B’ of the connecting wire B against the one of the conductive plates 170. To release the connecting wire B, the handle portion 75a of one of the fixing plates 75 is lifted upwardly away from the connecting wire B. Up to sixteen connecting wires can be electrically connected to the leads C’ of the IC chip C through the sixteen wire insertion holes 72 of the block body 77. Because of the teeth-like portion of the block body 77 that interlocks with the teeth-like shape of each of the fixing plates 75, electrical short circuits due to the intermingling of the connecting wires are effectively prevented.

In this example, although an IC chip having up to sixteen leads can be fixed to the second type IC chip block 70, modifications, if needed, can be made to fix IC chips having a different number of leads. Similarly, modifications can be made to receive a different number of connecting wires at one time.

Accordingly, the second type IC chip block 70 fixedly holds an IC chip, a plurality of connecting wires, and the electrical connection between the IC chip and the connecting wires by the operation of the pressing plates 75. At any time, the testing holes 73 can be used to easily and selectively test the connection and operability of the IC chip and the connecting wires.

Fig. 18 shows a perspective view of the circuit cover 84 of the assembly system 100 according to the preferred embodiment of the present invention. As shown in, e.g., Figs. 1 and 18, the circuit cover 84 includes a plurality of locking projections 84a to be inserted into a plurality of
locking holes 81a of the circuit board 81 for securely protecting the electrical circuit formed on
the circuit board 81. The circuit cover 84 can be made with a transparent material for viewing the
electrical circuit formed on the circuit board 81, and has big open holes on the sides thereof for
easy wire connections.

Fig. 19 shows a perspective view of another example of the assembly system according to
the preferred embodiment of the present invention, and Fig. 20 shows a top view of a circuit
board of the assembly system of Fig. 19 with an enlarged sectional view of a side portion of the
circuit board according to the preferred embodiment of the present invention. As shown in, e.g.,
Figs. 19 and 20, an assembly system 100' according to the preferred embodiment of the present
invention is the same as the assembly system 100 of Fig. 1 except that a modified circuit board
81', instead of the circuit board 81 of Fig. 1, is used. Similarly, the circuit board 81 of Fig. 1 can
be substituted with the circuit board 81' of Fig. 19.

The circuit board 81' includes the plurality of locking holes 81a for receiving the locking
projections 84a of the circuit cover 84, a plurality of board connecting grooves 81b each formed
on a side of the circuit board 81', a plurality of fastener receiving holes 81c formed within each of
the board connecting grooves 81b, and the plurality of receiving holes 81d for receiving the
connecting portions 16, 26, 36, 46, 57, 67 and 77 of the blocks 10, 20, 30, 40, 50, 60 and 70.
Although the blocks 10-70 are not shown, any combination of the blocks 10-70 can be securely
positioned on the circuit board 81'.

The locking holes 81a of the circuit board 81' securely position the circuit cover 84 on the
circuit board 81'. The receiving holes 81d can be spaced apart at any distance. For example, the
circuit board 81' can have the receiving holes 81d close to each other such that a maximum
number of receiving holes 81d can be compactly formed on the circuit board 81' for a maximum
designing of an electrical circuit on the circuit board 81'. The board connecting grooves 81b and
the fastener receiving holes 81c allow a plurality of the circuit boards 81', 81', 81'... to be
connected to each other.

For example, as shown in Fig. 20 and 21, two circuit boards 81' and 81' can be securely
and evenly connected to each other as the sides of the two circuit boards 81' and 81' abut each
other and fastened by fasteners through the board connecting grooves 81b and 81b and the
fastener receiving holes 81c and 81c. More specifically, a fastener such as a board connector 83 as
shown in, e.g., Fig. 22 can be inserted into the board connecting grooves 81b and 81b of the two circuit boards 81 and 81'. The board connector 83 includes a plurality of through holes 83a. Then fasteners such as connecting pins 82 as shown in, e.g., Fig. 23 are inserted into the fastener receiving holes 81c through the through holes 83a of the board connector 83 to secure the connection. Each of the connecting pins 82 can have a handle portion 82a and a screw portion 82b for manually screwing the connecting pin 82 without any tools. In the alternative, other types of fasteners such as bolts, teeth-shaped locking fastener, etc. can be used to connect the plurality of circuit boards 81', 81', 81'... to each other.

Therefore, a plurality of circuit boards 81', 81', 81'... can be securely and stably connected to each other, so that the electrical circuits formed on these circuit boards 81', 81', 81'... can be effectively combined, or an additional circuit board space can be provided to expand the existing electrical circuit. Further, it is possible to provide projections 81e on the circuit boards 81 and 81' as shown in, e.g., Fig. 24, instead of the receiving holes 81d, and to provide receiving holes on the bottom sides of the blocks 10, 20, 30, 40, 50, 60 and 70, instead of the connecting portions 16, 26, 36, 46, 56, 66 and 76. This allows the blocks 10-70 to be securely positioned on the projections 81e of the circuit boards 81 and 81'. It is also possible to provide other connecting mechanisms for the blocks 10-70 for being fixedly placed on the circuit boards 81 and 81'. Moreover, each of the wire connecting holes 12, 22, 32, 42, 52, 62 and 72 of the blocks 10-70 can receive more than one connecting wire at a time.

Accordingly, the present invention provides a system and method of forming an electrical circuit on a circuit board using different types of blocks and without the use of soldering and/or electrical ironing. These blocks include push-type switches and fixing plates for enhancing the secure fixation of electrical components and connecting wires to each other, and short circuit preventing portions for preventing electrical short circuits between the electrical components and the connecting wires. The present invention ensures that the electrical contact between the electrical components and the connecting wires are securely and safely maintained on the circuit board. Furthermore, the present invention allows a plurality of circuit boards to be easily and securely connected to each other so that any electrical circuit formed on the circuit boards can be combined. Moreover, the present invention provides a housing for safely storing and viewing the electrical circuits formed on the circuit boards.
The invention being thus described it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included in the scope of the following claims.
WHAT IS CLAIMED IS:

1. A system for forming an electrical circuit on a circuit board, comprising:
   at least one of a plurality of first type blocks and a plurality of second type blocks for
   supporting at least one of an electrical component and a connecting wire to form an electrical
   circuit, each of the first type blocks including at least one push-type switch for fixedly supporting
   the one of the electrical component and the connecting wire, each of the second type blocks
   including at least one fixing plate for fixedly supporting the one of the electrical component and
   the connecting wire; and
   at least one circuit board for supporting the at least one of the plurality of first type blocks
   and the plurality of second type blocks.

2. The system of claim 1, wherein the plurality of first type blocks include a one-pole first
   type block, a two-pole first type block, a three-pole first type block, and a first type IC (integrated
   circuit) chip block, and the plurality of second type blocks include a two-pole second type block,
   a three-pole second type block, and a second type IC chip block.

3. The system of claim 2, wherein the one-pole first type block includes:
   a first push-type switch having a groove,
   a conductive plate having a first projection to be pressed against the groove of the first
   push-type switch, and
   a first elastic member for elastically supporting the first push-type switch,
   whereby the electrical component can be fixedly supported in the groove of the first push-
   type switch by an operation of the first push-type switch.

4. The system of claim 3, wherein the one-pole first type block further includes:
   a second push-type switch having a pair of grooves,
   the conductive plate further having a pair of second projections to be pressed against the
   pair of grooves of the second push-type switch, and
   a second elastic member for elastically supporting the second push-type switch,
whereby at most two connecting wires can be fixedly supported in the pair of grooves of
the second push-type switch by an operation of the second push-type switch.

5. The system of claim 2, wherein at least one of the two-pole first type block and the three-
pole first type block includes:
   a first push-type switch having a plurality of grooves separated by a short circuit
   preventing portion,
   at least one conductive plate having a first projection to be pressed against one of the
   grooves of the first push-type switch, and
   a first elastic member for elastically supporting the first push-type switch,
   whereby the electrical component can be fixedly supported in the one of the grooves of
   the first push-type switch by an operation of the first push-type switch.

6. The system of claim 5, wherein the at least one of the two-pole first type block and the
three-pole first type block further includes:
   at least one second push-type switch having a groove,
   the conductive plate further having a second projection to be pressed against the groove of
   the second push-type switch, and
   at least one second elastic member for elastically supporting the second push-type switch,
   whereby the connecting wire can be fixedly supported in the groove of the second push-
type switch by an operation of the second push-type switch.

7. The system of claim 2, wherein the first type IC block includes:
   a plurality of push-type switches, each of the push-type switches having a pair of grooves,
   a plurality of elastic members for elastically supporting the plurality of push-type switches,
   and
   a plurality of conductive plates, each of the conductive plates having first and second
   projections, the second projections of two of the plurality of conductive plates pressing against
   the pair of grooves of one of the push-type switches,
whereby at least one of the electrical component including an IC chip and a plurality of connecting wires can be securely fixed to the first type IC block by an operation of the push-type switches.

8. The system of claim 2, wherein at least one of the two-pole second type block and the three-pole second type block includes:
   a block body having a pair of first grooves,
   a plurality of conductive plates, each of the conductive plates having a curved portion, and
   a first pressing plate having a pair of securing projections,
   wherein the electrical component can be supported in the curve portions of the conductive plates and can be further secured by engaging the securing projections of the first pressing plate in the first grooves of the block body.

9. The system of claim 8, wherein the two-pole second type block further includes:
   the each of the conductive plates further having an indent portion,
   the block body further having a pair of second grooves, and
   a second pressing plate having a pair of securing projections,
   wherein at most two connecting wires can be fixedly supported in the indent portions of the conductive plates by engaging the securing projections of the second pressing plate in the second grooves of the block body.

10. The system of claim 2, wherein the second type IC chip block includes:
    a block body having a plurality of holes and a plurality of indents,
    a plurality of conductive plates formed in the indents of the block body, each of the conductive plates having a curved portion and an indent portion, and
    at least one pressing plate having four pressing projections,
    wherein at least one of the electrical component including an IC chip and a plurality of connecting wires can be securely fixed to the block body by the pressing plate.
11. The system of claim 1, wherein each of the first and second type blocks includes a connecting portion for manually connecting the each of the first and second type blocks onto the circuit board.

12. The system of claim 1, wherein each of the first and second type blocks includes at least one testing hole for selectively testing an electrical connection of the electrical circuit.

13. The system of claim 1, further comprising:
   a circuit cover for selectively engaging with the circuit board to cover the circuit board and any electrical circuit formed on the circuit board,
   wherein the circuit board includes a board connector and a fastener for selectively connecting the circuit board to another circuit board.

14. The system of claim 13, wherein the circuit cover is made with a transparent material so as to view the electrical circuit formed on the circuit board.

15. An assembling block for use on a circuit board for electrically connecting an electrical component with a connecting wire to form an electrical circuit, the assembling block comprising:
   at least one first push-type switch having at least one groove;
   at least one conductive plate having a first projection to be pressed against the groove of the first push-type switch; and
   at least one first elastic member for elastically supporting the first push-type switch,
   whereby at least one of the electrical component and the connecting wire can be fixedly supported in the groove of the first push-type switch by an operation of the first push-type switch.

16. The assembling block of claim 15, further comprising:
   at least one second push-type switch having at least one groove;
   the conductive plate further having a second projection to be pressed against the groove of the second push-type switch; and
   at least one second elastic member for elastically supporting the second push-type switch,
whereby the connecting wire can be fixedly supported in the groove of the second push-type switch by an operation of the second push-type switch.

17. An assembling block for use on a circuit board for electrically connecting an electrical component with a connecting wire to form an electrical circuit, the assembling block comprising:

- a block body having a plurality of grooves;
- at least one conductive plate formed in the block body; and
- at least one pressing plate,

whereby at least one of the electrical component and the connecting wire is fixedly supported by the assembling block.

18. A method for forming an electrical circuit using an assembly system, the assembly system including at least one of a plurality of first type blocks, each of the first type blocks having at least one push-type switch and at least one insertion hole, the method comprising:

- pressing the push-type switch of the first type block;
- inserting a portion of at least one of an electrical component and a connecting wire into the insertion hole of the first type block while the push-type switch is pressed; and
- releasing the push-type switch of the first type block so that the portion of the one of the electrical component and the connecting wire is fixedly supported by the first type block.

19. The method of claim 18, wherein the assembly system further includes at least one of a plurality of second type blocks, each of the second type blocks having at least one fixing plate, at least one insertion hole and a plurality of grooves, the method further comprising:

- inserting a portion of at least one of another electrical component and another connecting wire into the insertion hole of the second type block; and
- pressing the fixing plate against the grooves of the second type block so that the portion of the one of another electrical component and another connecting wire is fixedly supported by the second type block.
20. The method of claim 19, further comprising:

fixedly positioning the first type block and the second type block on a circuit board; and

covering the circuit board with a circuit cover so as to protect the first and second type
blocks formed on the circuit board.
[fig1]

[Drawings]
[fig 4]
[fig 7]
[fig 9]
[fig 23]
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H01R 13/514

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 H01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975, Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td>A</td>
<td>KR 95-9700 U (NICO CORP.) 21 APRIL 1995</td>
<td>1-9</td>
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<tr>
<td>A</td>
<td>JP 8-069830 A (SUNX LTD.) 12 MARCH 1996</td>
<td>1-9</td>
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<tr>
<td>A</td>
<td>JP 60-12274 U 28 JANUARY 1985</td>
<td>1-9</td>
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Further documents are listed in the continuation of Box C.

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* Special categories of cited documents:
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Name and mailing address of the ISA/KR
Korean Industrial Property Office
Government Complex-Taejon, Dunsan-dong, So-ku, Taejon Metropolitan City 302-701, Republic of Korea

Authorized officer
YOON, Byung Sam

Facsimile No. 82-42-472,7140

Telephone No. 82-42-481,5758