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3,564,480

TOY ELECTRONIC CONNECTOR KIT

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Fig. 1

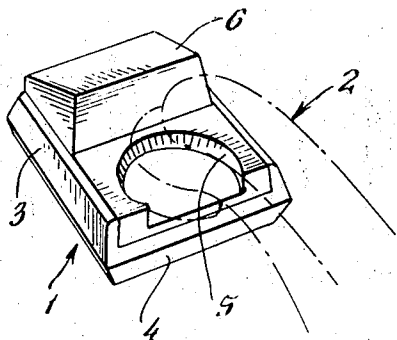


Fig. 2

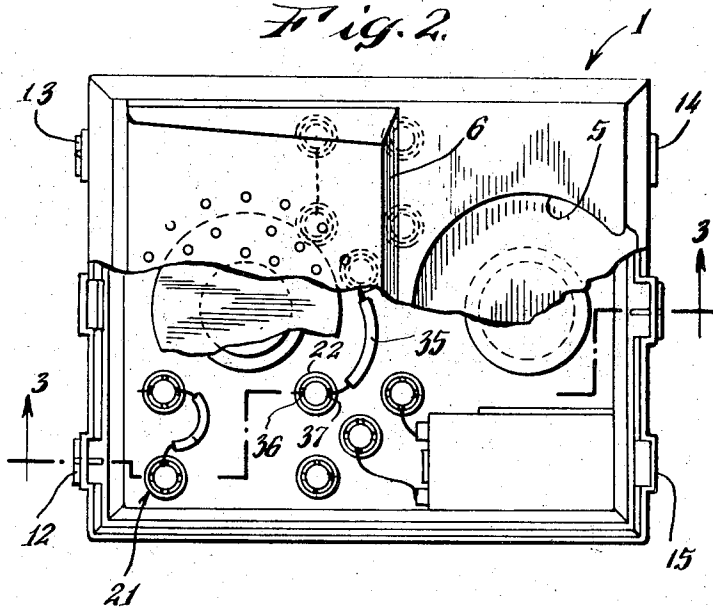


Fig. 4

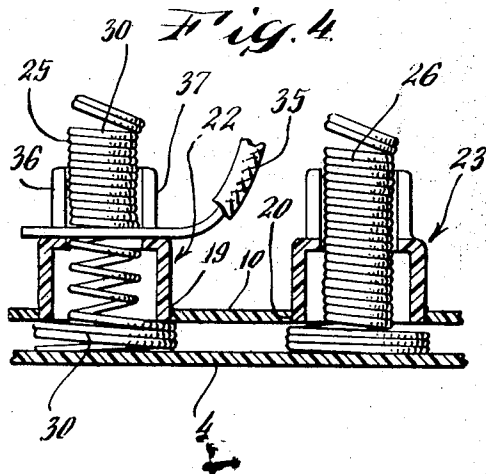


Fig. 3

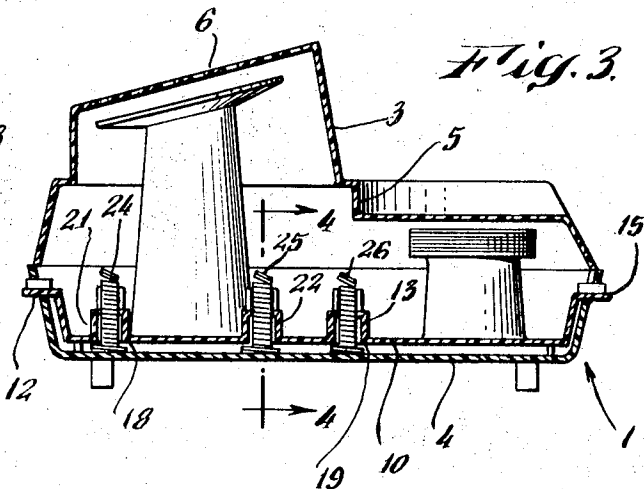
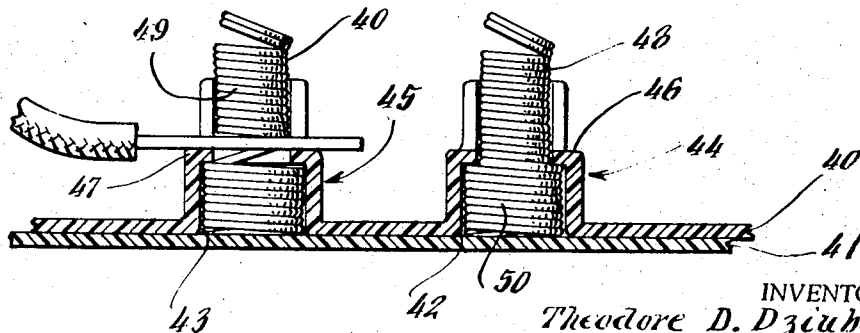


Fig. 5



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1

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TOY ELECTRONIC CONNECTOR KIT

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6 Claims

ABSTRACT OF THE DISCLOSURE

A toy solderless connector kit is provided for temporary or permanent wiring of electronic devices. The connector kit includes a wiring plate having therein a plurality of openings. A wire-retaining spring having an enlarged lower end is mounted in each opening and is secured in position by a base plate mounted below the wiring plate and pressing against the lower end of the spring. Wires are interconnected by placing them between the coils of a spring when in tension and then releasing the spring.

BACKGROUND OF THE INVENTION

In manufacturing toys having electrical wiring, it is necessary to provide electrical connections which are simple and inexpensive, and yet reliable and durable. Otherwise, the toy connections will be unsatisfactory and of little use.

Various types of connectors for electrical wires are used in toys. These connectors generally are the type which employ a solder material to connect the wire to a metal contact. Another type may have a hook on the end of a wire, which is slid around a post or has a small bolt running through it to make a contact.

There have also been coil springs used to provide wire connectors in toys. Generally, these connectors have the springs horizontally mounted on a support plate with wires inserted in between its coils. The contact with the wires being as firm as the spring. That is, if the spring was loose and flimsy, the connection provided for the wires would be poor and consequently the wires would not be satisfactorily interconnected. Also, with a sudden jar of the toy, the wires would not remain secure and thus there would be little or no connection provided for the wires. Springs secured at one end have also been used. Often, however, this creates a mounting problem for a child.

SUMMARY OF THE INVENTION

The present invention relates to toy electrical connections. More particularly, it relates to a toy solderless electronic connector kit including two plates arranged with one placed over the other and secured together. In the top plate there are a plurality of openings. Within each opening there is a coil spring having an enlarged lower end portion which lies outside and below the opening and so prevents the spring from passing upwardly through the opening. The lower end portion is secured in between the abutting shoulder and the lower plate.

When a spring is pulled in tension, wires can be inserted between the coils of the spring. Then, when the spring is released from tension, the wires are interconnected.

The various features, aspects, and advantages of the toy electronic connector kit of the present invention will be more fully understood from a consideration of the following description of the preferred embodiments of the invention, when considered in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a perspective view of a telephone receiver

2

placed on a toy amplifying unit embodying the present invention;

FIG. 2 is a plan view partially broken away of the unit shown in FIG. 1;

FIG. 3 is a side sectional elevation view of the amplifying unit taken along line 3—3 of FIG. 2;

FIG. 4 is a view partially in section of the amplifying unit shown taken along line 4—4 of FIG. 3. A pair of connectors are shown having coil springs inserted in the cylindrical sleeves mounted in openings in the mounting plate;

FIG. 5 shows a modified structure of the connectors shown in FIG. 4. Here the base plate is contiguous to the wiring plate.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is illustrative of one use to which the present invention has been put. It is a toy amplifier 1 to amplify the voices received on a telephone 2. The unit is purchased by a child in kit form, and has an upper shell 3 and a lower base 4. The upper shell 3 includes a receiving portion 5 for the telephone and a loudspeaker section 6.

The particular wiring and interconnection of the parts for the actual receipt and amplification of sound do not constitute part of this invention and so will not be further described.

As shown in FIGS. 2 and 3 there is a plate 10 parallel to and above lower shell 4 and fitted between shells 3 and 4. Shells 3 and 4 are interconnected at their edges by a releasable latch, indicated by the numerals 12, 13, 14, and 15. Preferably, shells 3 and 4 and plate 10 are made of plastic or other non-conducting substance, and the latch may be of any desirable type usable with such materials.

Plate 10 includes a series of openings therein, such as openings 18, 19 and 20. Preferably the openings have cylindrical sleeves 21, 22 and 23 rising from them to receive springs 24, 25 and 26. These springs, as will be described below, are used for making interconnections between the various elements of the circuit.

The arrangement of the springs is best shown in FIG. 4, and is similar for both springs shown in that figure.

Spring 25, for example, consists of the body section 30 and an enlarged base portion 31. Body 30 is of small enough diameter to pass through hole 19; enlarged base 31 is not. Consequently, when the spring is inserted through hole 19 in plate 10 from the bottom, the body portion will pass through the hole but the base portion will not. Then, when lower plate 4 is then snapped into position adjacent plate 10, the spring 25 will be held in position, base 31 of spring 25 being secured between shell 4 and plate 10. The same locking effect is obtained with the other springs in their respective openings.

Normally, the respective springs are dimensioned to extend above the cylinders in which they are mounted. For example, spring 25 extends above cylinder 22. This enables the spring to be more readily used as a connector.

To connect one of the wires to the springs, the upper end of the spring is grasped between the fingers and pulled upwardly, separating the convolutions of the spring. A wire, such as wire 35, may then be placed between the convolutions and the tension taken off the spring. The spring then presses the wire downwardly against cylinder 22 and so holds it in place. By putting more than one wire within the same or different convolutions of the spring, the wires are electrically connected.

If desired, the upper portion of the cylinders surrounding the spring may have one or more vertical slots, such as slots 36 and 37 in cylinder 22. When this is done the wire can fit within the slot and is even more securely held by the spring.

FIG. 4 shows one spring not being used as a connector,

3

spring 26, and the other spring, spring 25, holding one electrical wire 35.

FIG. 5 shows a modification of my invention in which the cylinders surrounding the spring have a shoulder. The enlarged base of the spring fits under the shoulder and so the outer shell of the unit can be pressed tightly against the plate to retain the spring in place. FIG. 5 shows a base plate 40 similar to base plate 10 and an outer shell 41 similar to outer shell 4. Plate 40 has openings therein 42 and 43 each surrounded by cylinders such as 44 and 45 respectively, the cylinders having inwardly turned shoulders 46 and 47. Each cylinder has a spring therein 48 and 49.

The two connectors in FIG. 5, represented by springs 48 and 49, are similar and operate similarly, so only one will be described further. Spring 48 has an enlarged base portion 50 of a size to fit in the lower portion of cylinder 44 but too large to extend upwardly beyond the shoulder 46 in cylinder 44. Base 50 preferably has a height just equal to the height of cylinder 44 from its bottom portion, where it contacts base 40, to the shoulder 46.

When spring 48 is inserted through opening 42 and upwardly, it just fits under the shoulder. Bottom shell 44 can then be secured to base plate 40 holding the spring in place. Utilization of the spring for interconnection of wires is the same as with the unit of FIG. 4.

It will be noted that the structure of this invention enables a child to assemble a wiring board with a series of spring connectors for use in any form of electronic kit. One kit for example, is a telephone amplifier shown here. Other kits may enable the assembly and disassembly readily of a plurality of different circuits as may be desired.

What is claimed:

1. A toy solderless connector kit for temporary wiring of electronic devices, said kit comprising a non-conducting wiring plate having at least one opening therein, a wire retaining spring contact element having an enlarged lower portion, the upper portion of said spring contact element being dimensioned to fit within said opening, and positioned to extend through said opening when said spring contact element is unextended, and the lower portion of said spring element being enlarged so that it will not pass within said opening, said spring element being normally removable from said opening, a non-conductive retaining base mounted below said wiring plate and operatively associated with said wiring plate through said enlarged lower portion of said spring, said base pressing against the lower portion of said spring element to hold said spring element in said opening preventing removal therefrom with said upper portion of said spring projecting upwardly above said wiring plate, and said spring element being maintained in an unextended position for receiving at least one wire within said upper portion thereof when said spring is externally tensioned upwardly whereby the convolutions of said spring separate sufficiently for reception of the wire and retain the wire therebetween when the external tension is removed.

2. A toy connector kit as set forth in claim 1 wherein

4

there is a cylindrical collar mounted on said wiring plate and about said opening, said collar surrounding said upper portion of said spring but not extending as high as the full length of said spring element.

3. A toy connector kit as set forth in claim 2 wherein said collar includes an upper portion having at least one axial slit therein to guide a wire therein and to retain the wire secured between the convolutions of said upper portion of said spring element and said slit so that a portion of said spring remains extended when the external tension is removed.

4. A toy connector kit as set forth in claim 2 wherein said cylindrical collar includes a shoulder therein, the internal diameter of said shoulder being less than the diameter of said lower portion of said spring but greater than the diameter of said upper portion of said spring.

5. A toy solderless connector kit for temporary wiring of electronic devices, said kit including a non-conducting wiring plate having at least one opening therein, a cylindrical collar mounted about said opening and extending upwardly therefrom, an inwardly extending shoulder on said collar reducing the diameter of said collar, a wire retaining spring having an enlarged base portion, said base portion having a diameter greater than the internal diameter of the collar at said shoulder, said spring being mounted within said cylindrical collar with the upper portion of said spring extending above and out of said collar and means cooperating with said shoulder for retaining said base portion of said spring within said cylindrical collar, said means including a non-conductive retaining base covering at least a portion of said opening so that the spring may not move downwardly and out of said collar.

6. A toy solderless connector kit for temporary wiring of electronic devices, said kit comprising a non-conducting wiring plate having a plurality of openings therein, springs normally positioned within said openings, said springs having enlarged base portions, collars associated with said openings to limit the travel of said enlarged base portions of said springs upwardly through said openings, a removable supporting plate mounted beneath said openings in contact with said wiring plate for preventing downward motion of said springs out of said openings whereby a plurality of wires are capable of interconnecting at least some of said springs, the wires passing between convolutions of said springs.

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