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Lee

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[54] **EASILY OPERABLE UNIVERSAL ADAPTER**

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[51] **Int. Cl.**[6] **H01R 29/00**

[52] **U.S. Cl.** **439/172**; 439/103; 439/651

[58] **Field of Search** 439/131, 169–173, 439/103, 651, 652

[56] **References Cited**

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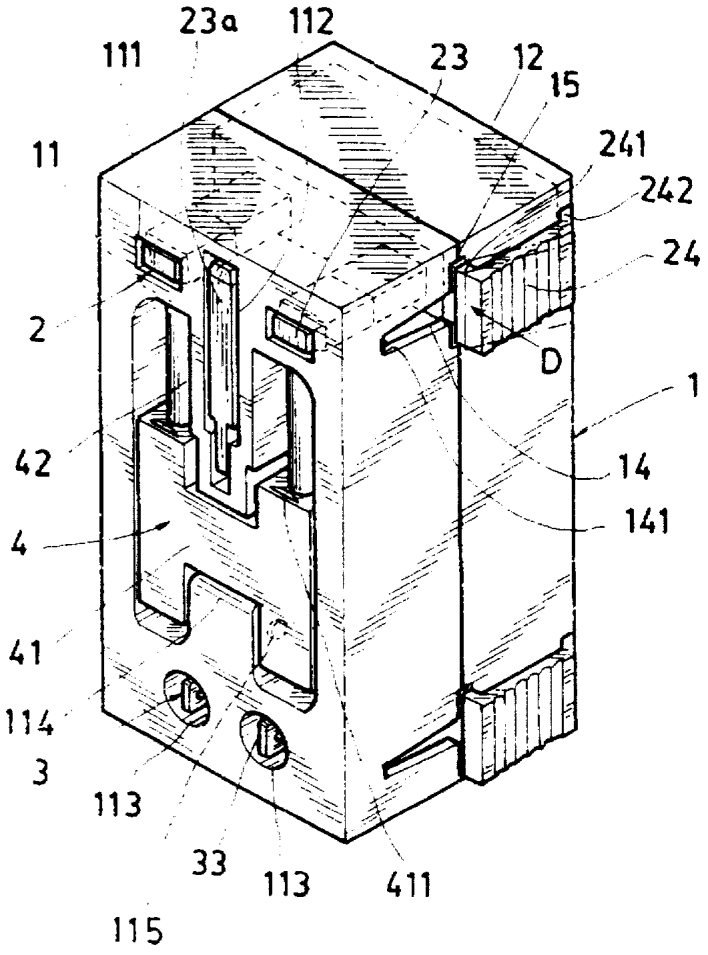
Primary Examiner—Hien Vu

[57] **ABSTRACT**

A universal adapter includes: a casing combinable with a front cover and a rear cover having a pair of outlet sockets formed in the rear cover to output power, a first plug having a pair of rectangular-shaped pins slidably held in an upper chamber in the casing and operatively pushed or pulled by a pair of first seesaw buttons pivotally secured on two opposite sides of the first plug for a convenient extending or retraction of the first plug, whereby upon extending of the first plug, a rectangular-shaped pin of "grounding pin" will be simultaneously biased for its forward extending to form triple rectangular-shaped pins for connecting municipal power such as in England or Africa to be output through the pair of outlet sockets in the rear cover; a second plug having a pair of flat blades slidably held in a lower chamber in the casing and operatively pushed or pulled by a pair of second seesaw buttons for a convenient extension or retraction for connecting municipal power to the two outlet sockets; and a third plug having a pair of round pins pivotally mounted on the front cover to be horizontally extended for power connection use and vertically received into the front cover when not in use.

7 Claims, 6 Drawing Sheets



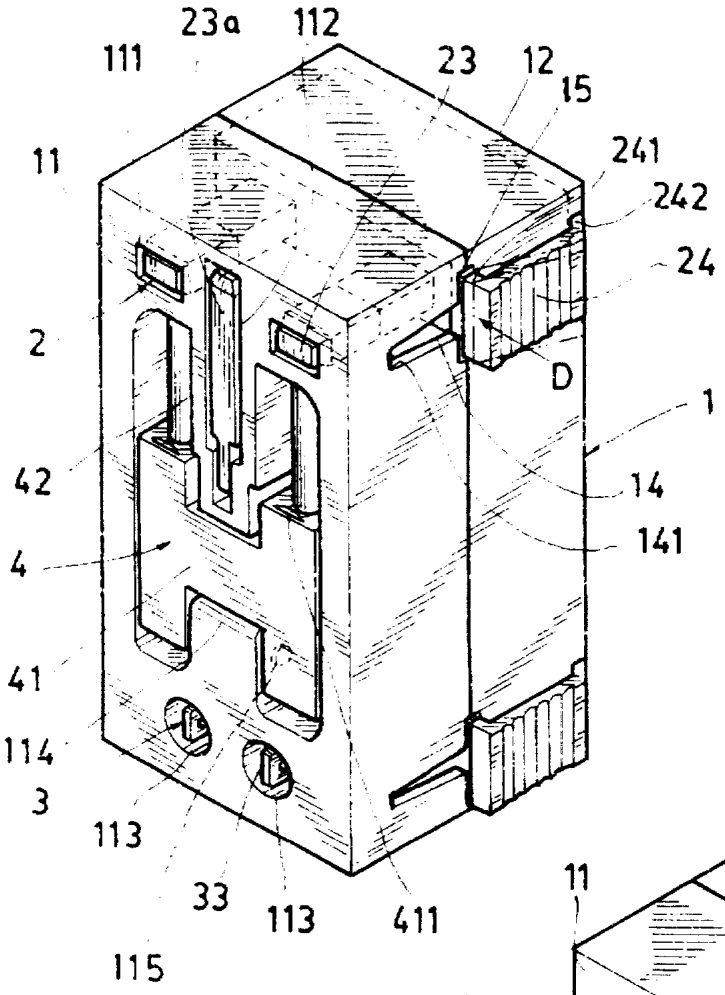

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FIG. 1

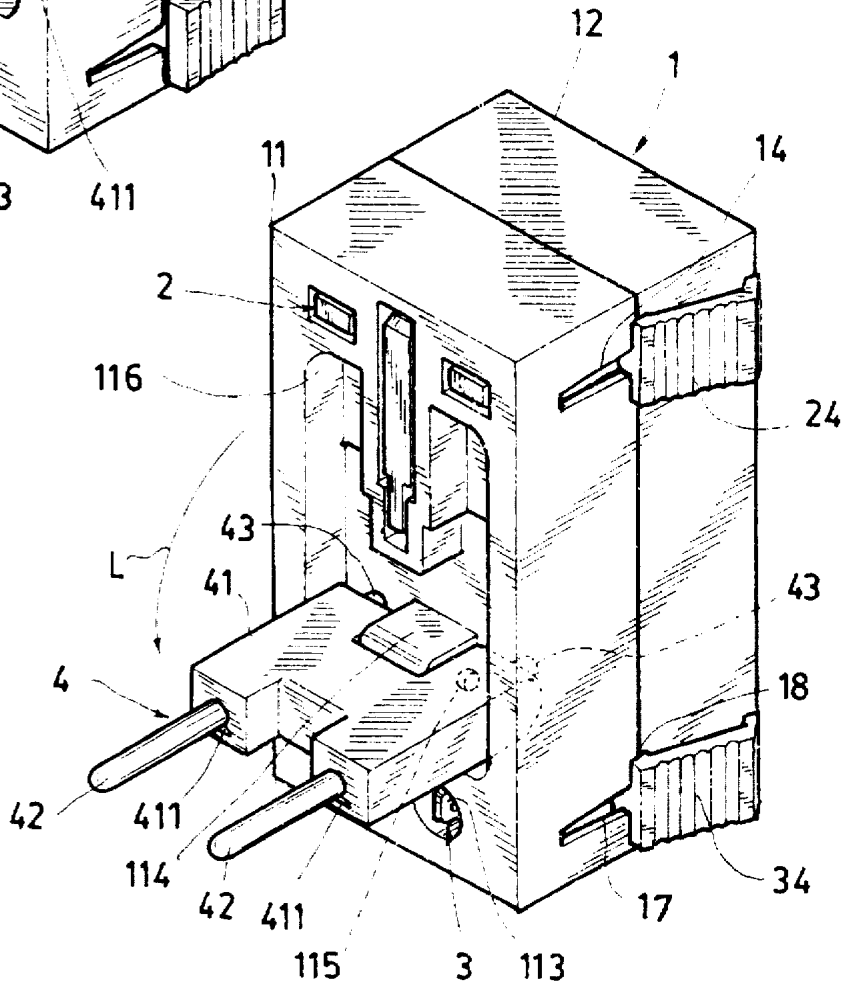
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FIG. 10

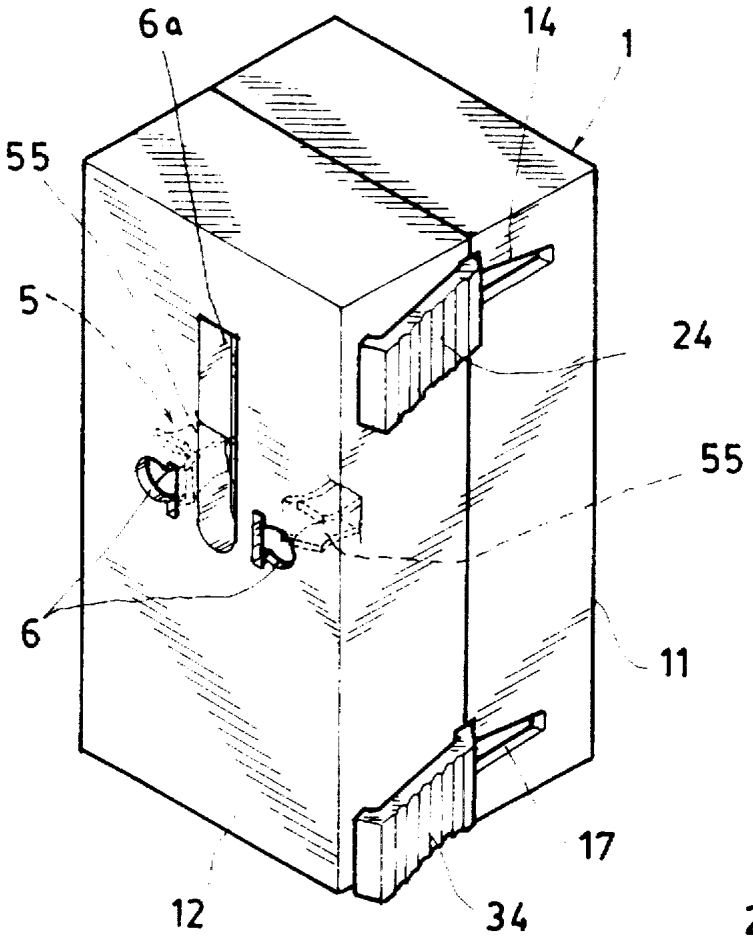
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FIG. 11

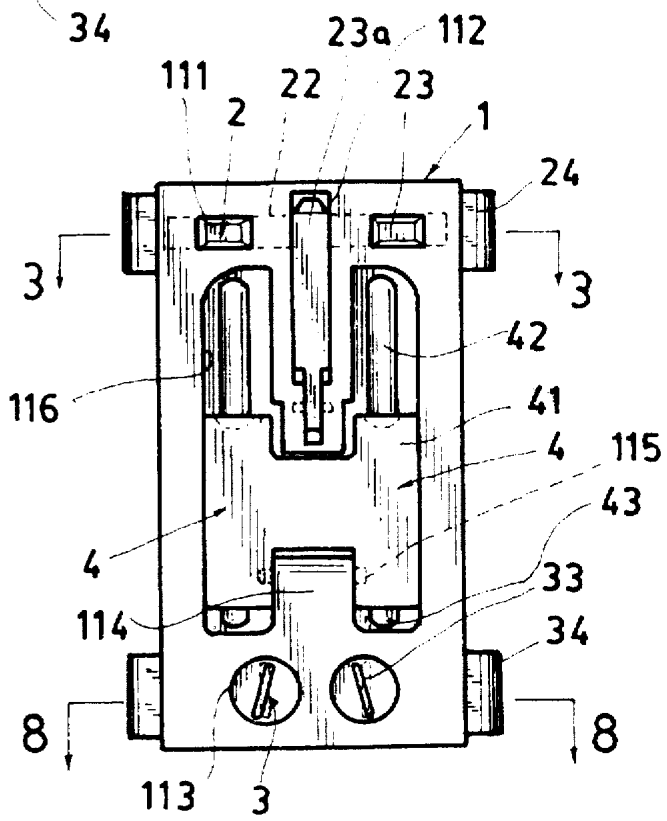
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FIG. 2

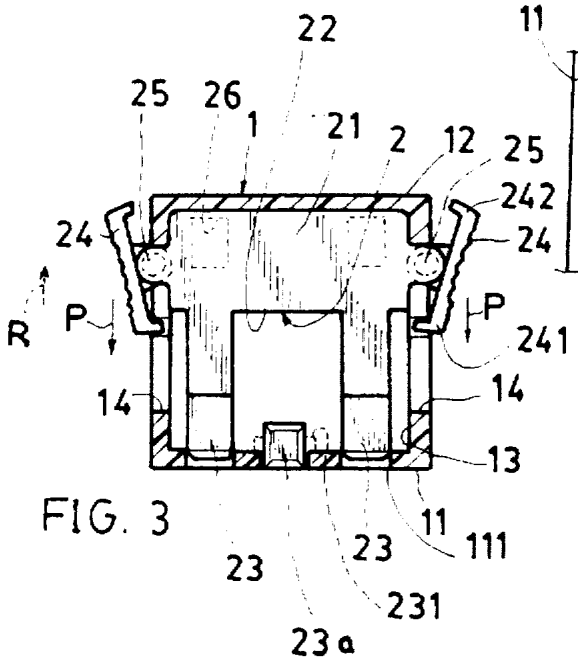


FIG. 3

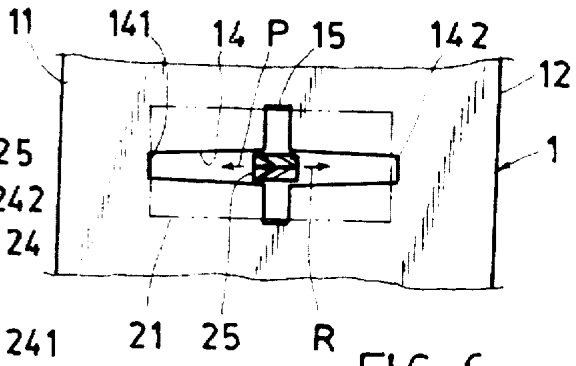


FIG. 6

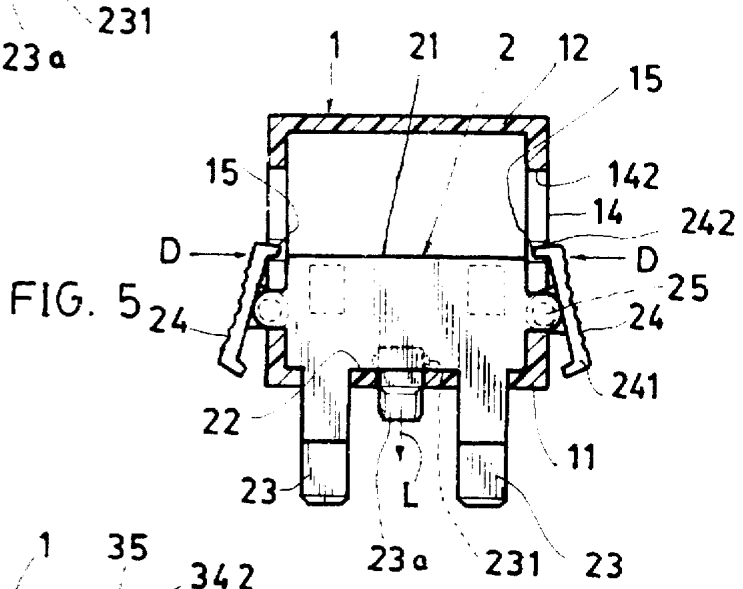
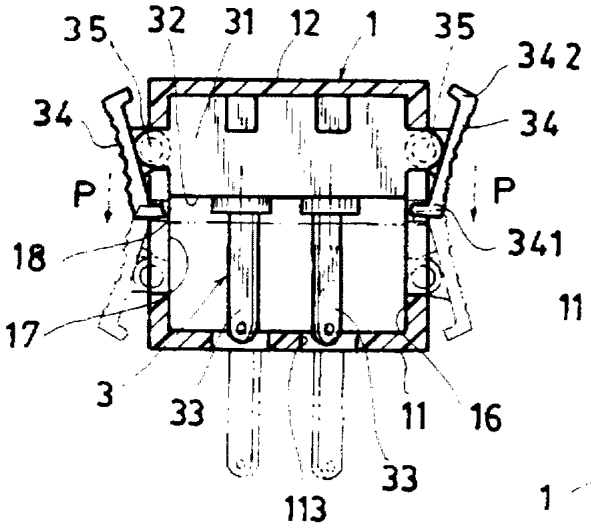


FIG. 5

FIG. 8



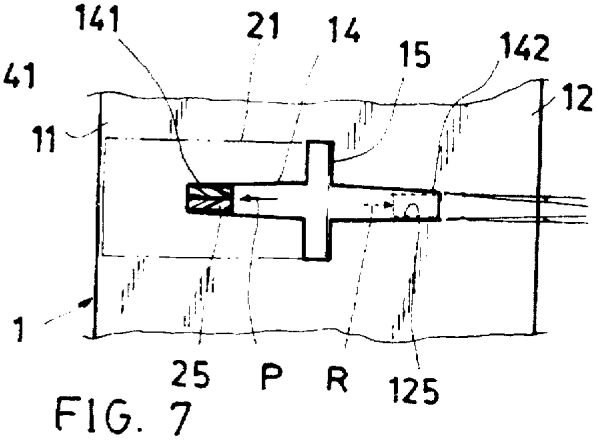
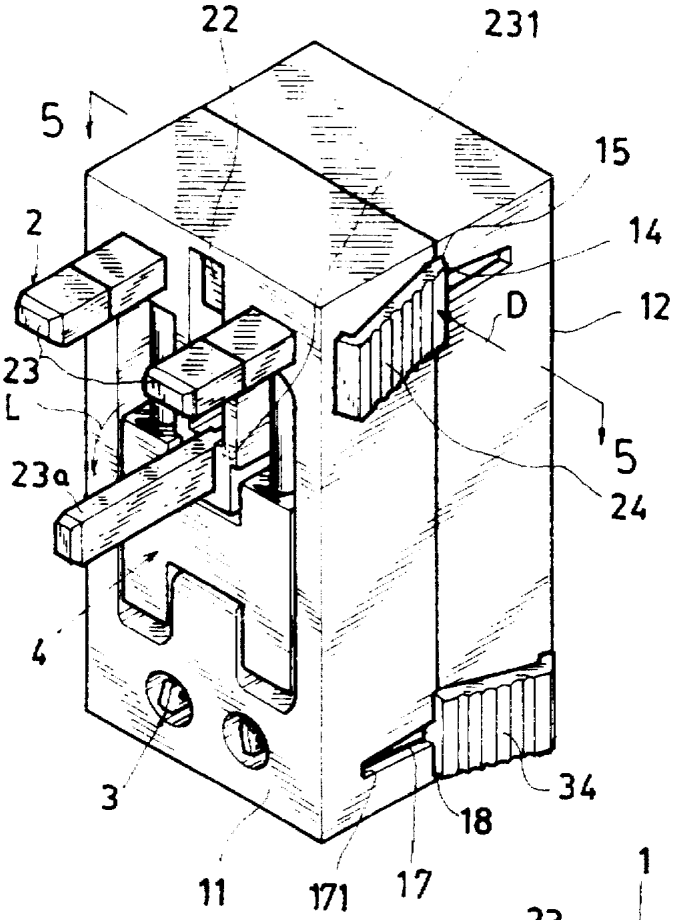


FIG. 7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231
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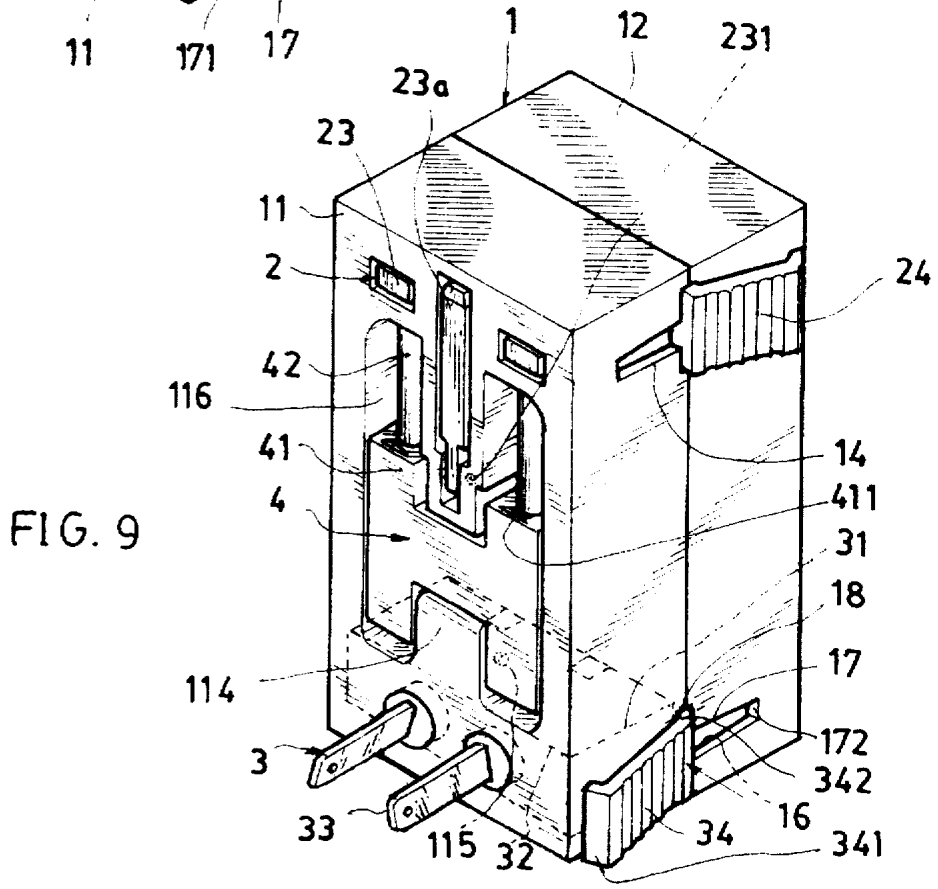
FIG. 4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341

FIG. 9

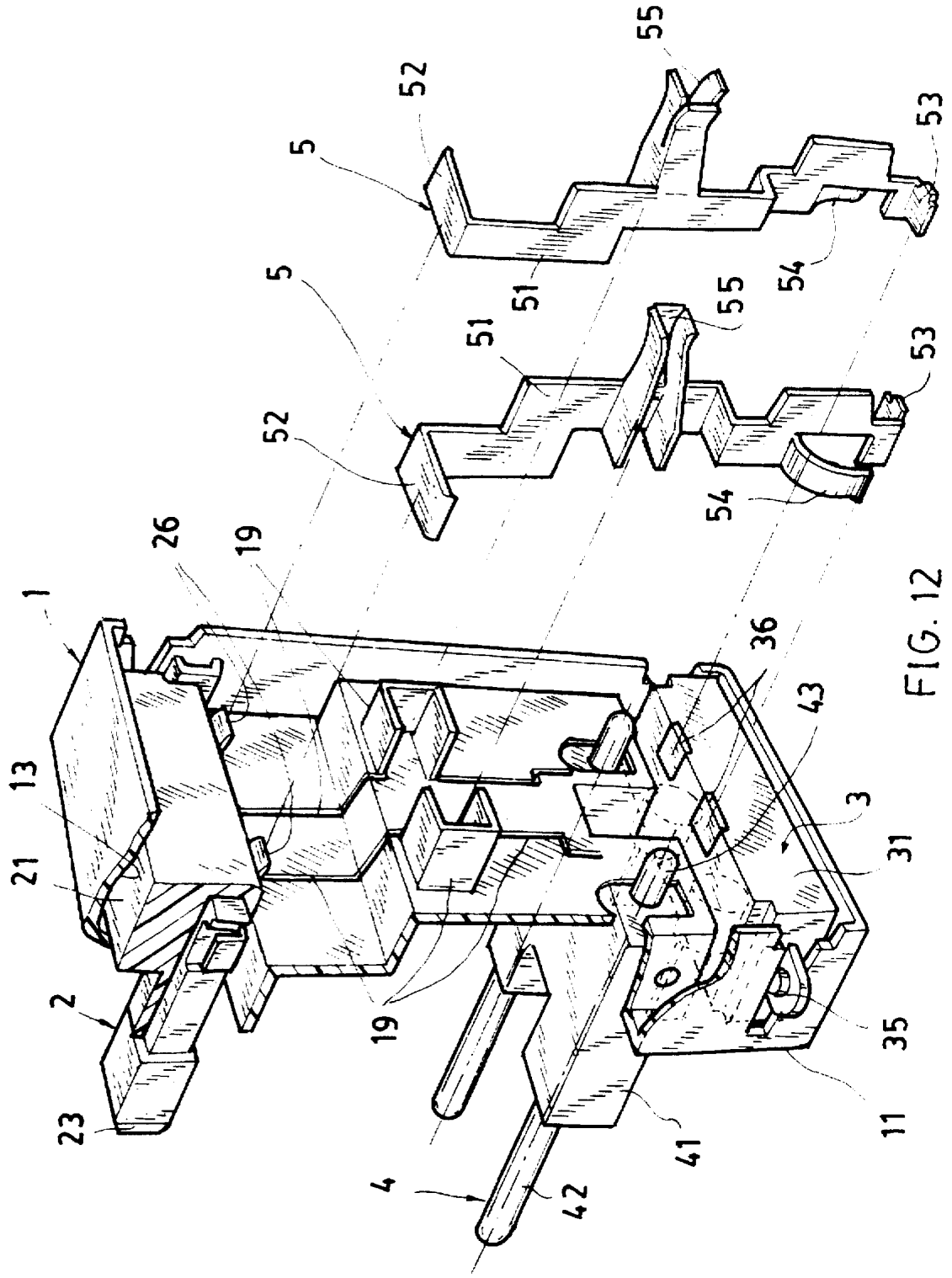
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FIG. 12

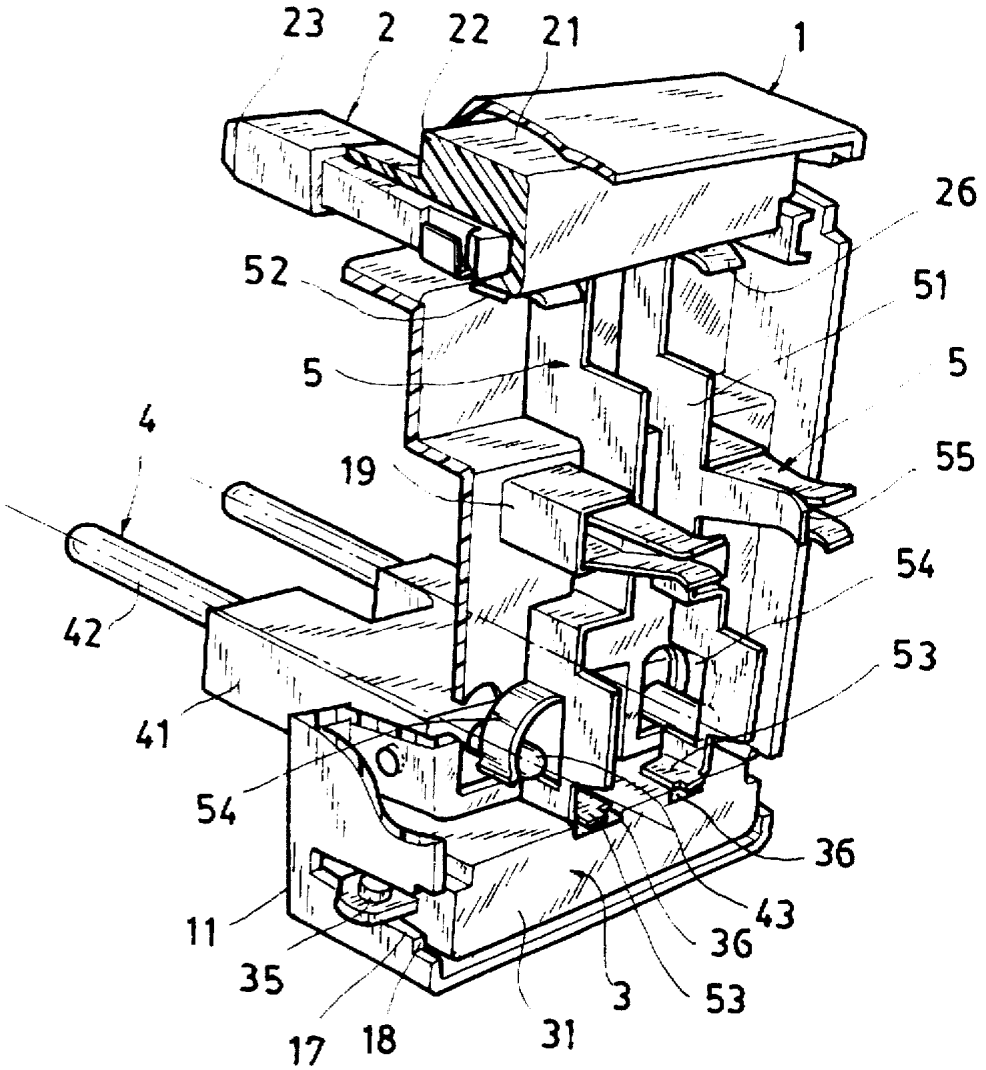
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FIG. 13

EASILY OPERABLE UNIVERSAL ADAPTER

BACKGROUND OF THE INVENTION

U.S. Pat. No. 5,159,545 entitled "Universal Adapter" to the same inventor of this application includes a plurality of plugs slidably held in a casing having different-shaped plug pins adapted to be plugged in different sockets of multiple nations in the world for a convenient universal electrical connection.

However, this universal adapter has the following drawbacks:

1. All the plugs are slidably mounted in a recess (**121**) recessed in a rear portion of the casing. Whenever using a specific plug, the user's fingers should be deeply inserted into the recess (**121**) in order to protrude the plug forwardly beyond the front cover (**11**), causing inconvenience for the user.

2. After protruding the plug pins, the locking member (**16**) should be vertically slid to stop the extended plug pins, increasing the operating steps for using the adapter.

3. When withdrawing the round plug pins (**211**) from an extended position, the two wedge snap members (**214**) should be squeezed for retracting the snap members (**214**) and the plug (**21**) rearwardly to be received in the casing. To squeeze the snap members (**214**) within a narrow space between the two extended plug pins (**211**) will be very difficult and inconvenient.

The present inventor has improved the drawbacks of the inventor's previous U.S. Pat. No. 5,159,545 and invented this easily operable universal adapter.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a universal adapter including: a casing combinable with a front cover and a rear cover having a pair of outlet sockets formed in the rear cover to output power, a first plug having a pair of rectangular-shaped pins slidably held in an upper chamber in the casing and operatively pushed or pulled by a pair of first seesaw buttons pivotally secured on two opposite sides of the first plug for a convenient extending or retraction of the first plug, whereby upon extending of the first plug, a rectangular-shaped pin of "grounding pin" will be simultaneously biased for its forward extending to form triple rectangular-shaped pins for connecting municipal power such as in British or African areas to be output through the pair of outlet sockets in the rear cover; a second plug having a pair of flat blades slidably held in a lower chamber in the casing and operatively pushed or pulled by a pair of second seesaw buttons for a convenient extension or retraction for connecting municipal power to the two outlet sockets; and a third plug having a pair of round pins pivotally mounted on the front cover to be horizontally extended for power connection use and vertically received into the front cover when not in use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the present invention with the plug pins retracted in the casing.

FIG. **2** is a front view of the present invention.

FIG. **3** is a cross sectional view of the present invention when viewed from **3**—**3** direction of FIG. **2**.

FIG. **4** is an illustration showing an extension of the first plug according to the present invention.

FIG. **5** is a cross sectional drawing showing the extension of the first plug of the present invention.

FIG. **6** is a partial side view of the seesaw button located at a middle position of the guiding groove of the casing.

FIG. **7** shows a stopping button as moved from FIG. **6**.

FIG. **8** is a cross sectional view of the present invention when viewed from **8**—**8** direction of FIG. **2**.

FIG. **9** is an illustration showing the extension of a second plug of the present invention.

FIG. **10** shows an extension of the third plug of the present invention.

FIG. **11** is a rear view of the present invention.

FIG. **12** is an exploded view of the present invention showing the electrically conductive plates.

FIG. **13** is a perspective view of the present invention when assembled from FIG. **12**.

DETAILED DESCRIPTION

As shown in the drawing figures, a preferred embodiment of the universal adapter of the present invention comprises: a casing **1** combinable with a front cover **11** and a rear cover **12**, a first plug **2** slidably held in an upper chamber **13** in the casing **1**, a second plug **3** slidably held in a lower chamber **16** of the casing **1**, a third plug **4** pivotally mounted on a front cover **11** of the casing **1**, a pair of electrically conductive plates **5** juxtapositionally secured in an internal retaining portion **19** between the front and rear covers **11**, **12** of the casing **1**; and a pair of outlet sockets **6** corresponding to two output receptacles **55** of the two conductive plats **5** for outputing power transmitted from the plugs **2**, **3**, **4**.

The casing **1**; the bases **21**, **31**, **41** for connecting the pins; and the buttons **24**, **34** are made of electrically insulative materials. The locations, arrangements and shapes of the elements of the present invention may be modified and not limited in this invention. Even though there is not provided any transformer in this invention such as for converting an input 220 volts to an output 110 volts, the transformer may also be incorporated in this invention as modified.

The first plug **2** includes: a first plug base **21** slidably held in an upper chamber **13** in the casing **1**; a pair of rectangular-shaped plug pins **23** protruding forwardly from a shoulder portion **22** formed on a front portion of the first plug base **21**; a pair of first seesaw buttons **24** disposed on two opposite sides of the first plug base **21** each first seesaw button **24** pivotally secured to the first plug base **21** by a first pivoting device **25** which may be a pivot secured to the base **21** and a pivot holder secured to the button **24**, but not limited in this invention; and a pair of first contactors **26** electrically connected with the two rectangular-shaped plug pins **23** and respectively formed on a rear portion of the first plug base **21** to be slidably contacted with the pair of electrically conductive plats **5**, **5**, whereby upon a forward pushing of the first plug base **21** by pushing the pair of first seesaw buttons **24**, the pair of rectangular-shaped plug pins **23** can be extended forwardly through a pair of first pin holes **111** formed in the front cover **11** of the casing **1** in cooperation with a grounding pin **23***a* pivotally mounted in a pin recess **112** recessed in the front cover **11** by a pivot **231** and operatively biased by the shoulder portion **22** when forwardly pushing the first plug base **21** to be gravitationally horizontally extended (L) to form triple rectangular-shaped pins **23**, **23***a* as shown in FIGS. **3**–**5** for connecting a municipal power such as in England, Africa, etc.

Each first seesaw button **24** as pivotally connected with the first plug base **21** by a first pivoting device **25** has a front lug **241** and a rear lug **242** respectively disposed on two ends of the first seesaw button and bent inwardly towards the

casing **1**, with the first pivoting device **25** slidably held in a first guiding groove **14** horizontally cut through an upper side portion of the casing **1** for guiding a forward or a rearward sliding movement of the first pivoting device **25** in the first guiding groove **14** and for reciprocating the first plug base **21** in the upper chamber **13** for extending or retracting the rectangular-shaped plug pins **23**.

A first vertical slot **15** is vertically formed in a middle portion of the first guiding groove **14** to communicate with the first guiding groove **14** for engaging a front lug **241** of the first seesaw button **24** when inwardly depressed (D) when the first plug **2** is retracted (R) in the casing **1** as shown in FIGS. **1**, **3**; or for engaging a rear lug **242** of the first seesaw button **24** when depressed (D) and when the first plug **2** is extended (P) as shown in FIGS. **4**, **5**.

The first guiding groove **14** has a width equal to a height of the first pivoting device **25** and is tapered forwardly to form a front tapered end portion **141** and also tapered rearwardly to form a rear tapered end portion **142** for stably frictionally holding the first pivoting device **25** when stopped at a front end or rear end of the first guiding groove **14** as shown in FIGS. **6**, **7**.

Upon disengagement of the front lug **241** of the first seesaw button **24**, the first seesaw button **24** can be pushed (P) forwardly to extend the plug pins **23** forwardly to bias the grounding pin **23***a* downwardly. After pushing the first plug **2** to the front position of the casing **1**, the rear lug **242** can be inwardly depressed (D) to engage the vertical slot **15** for locking the first plug **2** for its stable power connection.

For withdrawing the first plug **2** into the casing **1**, the seesaw button **24** is unlocked and retracted rearwardly (R) until stopped at the rear end of the guiding groove **14** and the front lug **241** can be depressed to engage the vertical slot **15** as shown in FIG. **3** for retracting the pair of rectangular-shaped pins **23**. The grounding pin **23***a* can be vertically received into the recess **112** in the front cover. The grounding pin **23***a* is an auxiliary pin in cooperation with the two rectangular-shaped pins **23** in order to be plugged into the triple sockets as used in England. Since the outlet sockets **6** are provided only for two poles output connection, the grounding pin **23***a* is not made electrically conductive in this invention.

The pair of outlet sockets **6** are formed through the rear cover **12** of the casing **1** to be corresponding to a pair of output receptacles **55** formed on the two electrically conductive plates **5** juxtapositionally secured, embedded or adhered in the interior of the casing **1** for connecting an external plug having a pair of round pins or flat blades of an electrical appliance such as a mini iron, a coffee heater or other electrical equipments which are carried for uses when travelling around the world. If the plug has three pins including a grounding pin, the grounding pin may be inserted into the recess **6***a* recessed in the rear cover **12** while the other two pins inserted in the two sockets **6** (FIG. **11**).

The second plug **3** as shown in FIGS. **8–10** includes: a second plug base **31** slidably held in a lower chamber **16** in the casing **1**; a pair of flat blades **33** protruding forwardly from a front portion **32** of the second plug base **31**; a pair of second seesaw buttons **34** disposed on two opposite sides of the second plug base **31** each second seesaw button **34** pivotally secured to the second plug base **31** by a second pivoting device **35** which may be a pivot secured to the base **31** and a pivot holder secured to the button **34**, but not limited in this invention; and a pair of second contactors **36** electrically connected with the two flat blades **33** and respectively formed on a rear portion of the second plug base **31** to be slidably contacted with the pair of electrically conductive plats **5**, **5**, whereby upon a forward pushing of the second plug base **31** by pushing the pair of second seesaw buttons **34**, the pair of flat blades **33** can be extended forwardly through a pair of second pin holes **113** formed in the front cover **11** of the casing **1** for connecting a municipal power such as in USA, Taiwan, etc. Each flat blade **33** may be rotated to a desired angle.

Each second seesaw button **34** as pivotally connected with the second plug base **31** by a second pivoting device **35** has a front lug **341** and a rear lug **342** respectively disposed on two ends of the seesaw button and bent inwardly towards the casing **1**, with the second pivoting device **35** slidably held in a second guiding groove **17** horizontally cut through a lower side portion of the casing **1** for guiding a forward or a rearward sliding movement of the second pivoting device **35** in the guiding groove **17** and for reciprocating the plug base **31** in the lower chamber **16** for extending or retracting the flat blades **33**.

A second vertical slot **18** is vertically formed in a middle portion of the second guiding groove **17** to communicate with the second guiding groove **17** for engaging a front lug **341** of the second seesaw button **34** when inwardly depressed (D) when the second plug **3** is retracted (R) in the casing **1**; or for engaging a rear lug **342** of the seesaw button **34** when depressed (D) and when the plug **3** is forwardly extended (P).

The second guiding groove **17** has a width equal to a height of the second pivoting device **35** and is tapered forwardly to form a front tapered end portion **171** and also tapered rearwardly to form a rear tapered end portion **172** for stably frictionally holding the second pivoting device **35** when stopped at a front end or rear end of the second guiding groove **17**.

The third plug **4** as shown in FIGS. **10**, **1** includes: a third plug base **41** pivotally mounted on a holding portion **114** formed on the front cover **11** by a pivot **115**, a pair of round pins **42** protruding from the third plug base **41**, and a pair of rear pin portions **43** each connected with each round pin **42** to be electrically connected with two electrically conductive plates **5** for outputing power as input from the two round pins **42** when connected to a municipal power as provided in Europe and middle east areas, with the third plug **4** normally received in a H-shaped recess **116** recessed in the front cover **11**.

The third plug base **41** is recessed with at least a snap notch **411** for an easy biasing of the round pins **42** downwardly to be horizontally extended for power connection.

Each electrically conductive plate **5** as shown in FIGS. **12**, **13** includes: an elongated strip **51** such as made of copper fixed in an interior in the casing **1**, an upper edge portion **52** formed on an upper end of the elongated strip **51** to be slidably contacted with each first contactor **26** of the first plug **2**, a lower edge portion **53** formed on a lower end of the elongated strip **51** to be slidably contacted with the second contactor **36** of the second plug **3**, a clip **54** branched from the elongated strip **5** for clamping a rear pin portion **43** of each round pin **43** of the third plug **4** when downwardly biased for horizontally extending the round pins **43** for power connection, and an output receptacle **55** protruding rearwardly from the elongated strip **51** to be corresponding to each outlet socket **6** formed in the rear cover **12** of the casing **1** for connecting an external plug pin from an electric appliance insertable into the outlet socket **6**.

The present invention is superior to the U.S. Pat. No. 5,159,545 because an easier forward pushing and rearward

retraction of the first and second plugs **2**, **3** can be manipulated just by depressing and moving the seesaw buttons **24**, **34**. After moving the buttons to a front or rear end of the guiding groove **14**, **17**, the seesaw buttons **24**, **34** may also be directly depressed to be locked on the casing **1** for a stable and convenient locking of the plugs **2**, **3**. The plug **4** of round pins may also be conveniently operated just by pivoting the plug base **41** either horizontally or vertically.

The present invention may be modified without departing from the scope and spirit of the present invention.

I claim:

1. A universal adapter comprising:

a casing;

a first plug having a grounding rectangular-shaped pin pivotally mounted in a front portion of said casing, and including: a first plug base slidably held in an upper chamber formed in the casing; a pair of rectangular-shaped plug pins protruding forwardly from a shoulder portion formed on a front portion of the first plug base; a pair of first seesaw buttons disposed on opposite sides of the first plug base each first seesaw button pivotally secured to the first plug base by a first pivoting device; and a pair of first contactors electrically connected with the two rectangular-shaped plug pins and respectively formed on a rear portion of the first plug base to be slidably contacted with the pair of electrically conductive plats, whereby upon a forward pushing of the first plug base by pushing the pair of first seesaw buttons, the pair of rectangular-shaped plug pins are extended forwardly through a pair of first pin holes formed in the front cover of the casing in cooperation with said grounding rectangular-shaped pin which is pivotally mounted in a pin recess recessed in the front cover by a pivot and operatively biased by the shoulder portion of said first plug base when forwardly pushing the first plug base to be gravitationally horizontally extended to form triple rectangular-shaped pins for connecting the first minicipal power;

a second plug having a pair of flat blades formed on said second plug slidably held in a second portion of said casing and reciprocatively moved in said casing by at least a second button slidably held in said casing, said flat blades on said second plug operatively extended beyond the front portion of said casing for connecting a second municipal power;

a third plug having a third plug base pivotally mounted on a front portion of said casing, a pair of round pins secured on said third plug base and operatively extended pivotally horizontally beyond the front portion of said casing for connecting a third municipal power;

a pair of electrically conductive plates juxtapositionally secured in an interior in said casing for respectively electrically connecting two poles of said first, second and third plugs for inputing each municipal power; and

a pair of outlet sockets formed in a rear portion of said casing for corresponding to two output receptacles formed on said pair of electrically conductive plate for outputing a two-pole power as input from said plugs.

2. A universal adapter according to claim **1**, wherein said second plug includes: a second plug base slidably held in a lower chamber in the casing; a pair of flat blades protruding forwardly from a front portion of the second plug base; a pair of second seesaw buttons disposed on opposite sides of the second plug base, each second seesaw button pivotally secured to the second plug base by a second pivoting device; and a pair of second contactors electrically connected with the two flat blades and respectively formed on a rear portion of the second plug base to be slidably contacted with the pair of electrically conductive plats, whereby upon a forward pushing of the second plug base by pushing the pair of second seesaw buttons, the pair of flat blades are extended forwardly through a pair of second pin holes formed in the front cover of the casing.

3. A universal adapter according to claim **2**, wherein each said seesaw button as pivotally connected with the plug base by said pivoting device has a front lug and a rear lug respectively disposed on two ends of the seesaw button and bent inwardly towards the casing, with the pivoting device slidably held in a guiding groove horizontally cut through a side portion of the casing for guiding a forward or a rear sliding movement of the pivoting device in the guiding groove and for reciprocating the plug base in a chamber of the casing for extending or retracting the blades in the casing.

4. A universal adapter according to claim **3**, wherein said casing is formed with a vertical slot vertically formed in a middle portion of the guiding groove to communicate with the guiding groove for engaging the front lug of the seesaw button inwardly depressed when the plug is retracted in the casing; or for engaging a rear lug of the seesaw button when inwardly depressed and when the plug is extended.

5. A universal adapter according to claim **3**, wherein said guiding groove has a width equal to a height of the pivoting device and is tapered forwardly to form a front tapered end portion and tapered rearwardly to form a rear tapered end portion on said guiding groove for stably frictionally holding the pivoting device when stopped at a front end or a rear end of the guiding groove.

6. A universal adapter according to claim **1**, wherein said third plug base is recessed with at least a snap notch therein for an easy biasing of the round pins downwardly to be horizontally extended for power connection.

7. A universal adapter according to claim **1**, wherein each said electrically conductive plate includes: an elongated strip fixed in an interior in the casing, an upper edge portion formed on an upper end of the elongated strip to be slidably contacted with a first contactor of the first plug, a lower edge portion formed on a lower end of the elongated strip to be slidably contacted with a second contactor of the second plug, a clip branched from the elongated strip for clamping a rear pin portion of each said round pin of the third plug when downwardly biased for horizontally extending the round pins for power connection, and one said output receptacle protruding rearwardly from the elongated strip to be corresponding to each said outlet socket formed in a rear cover of the casing for connecting an external plug pin from an electric appliance insertable into the outlet socket.

* * * * *