July 17, 1962 N. FRANTZ ET AL 3,045,080

TWIN ELECTRICAL DEVICES

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FIG. 1

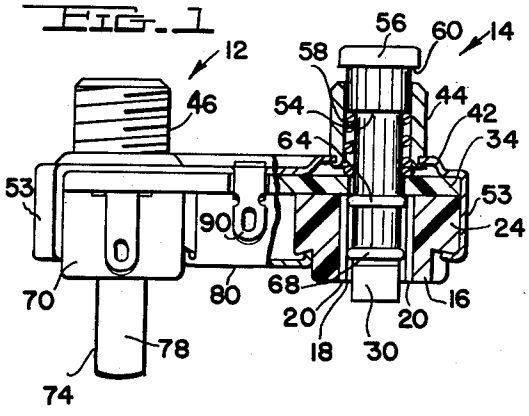


FIG. 2

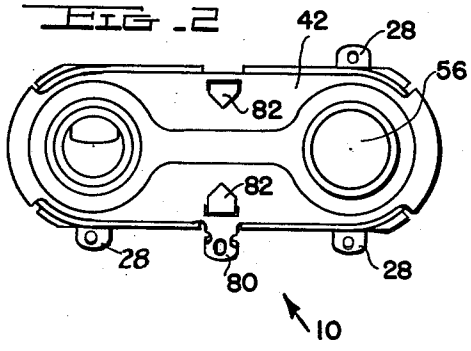


FIG. 5

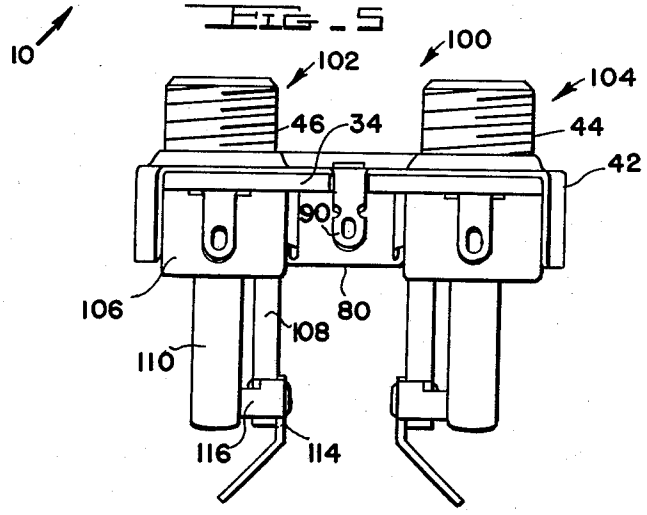
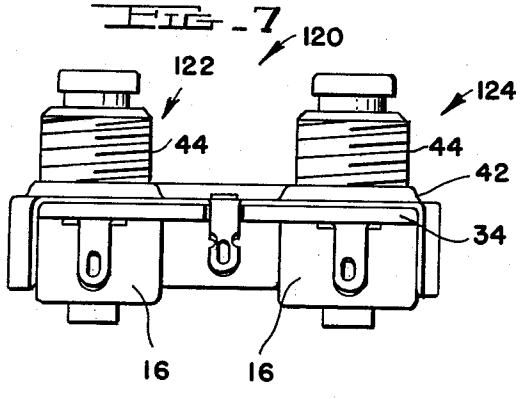


FIG. 7



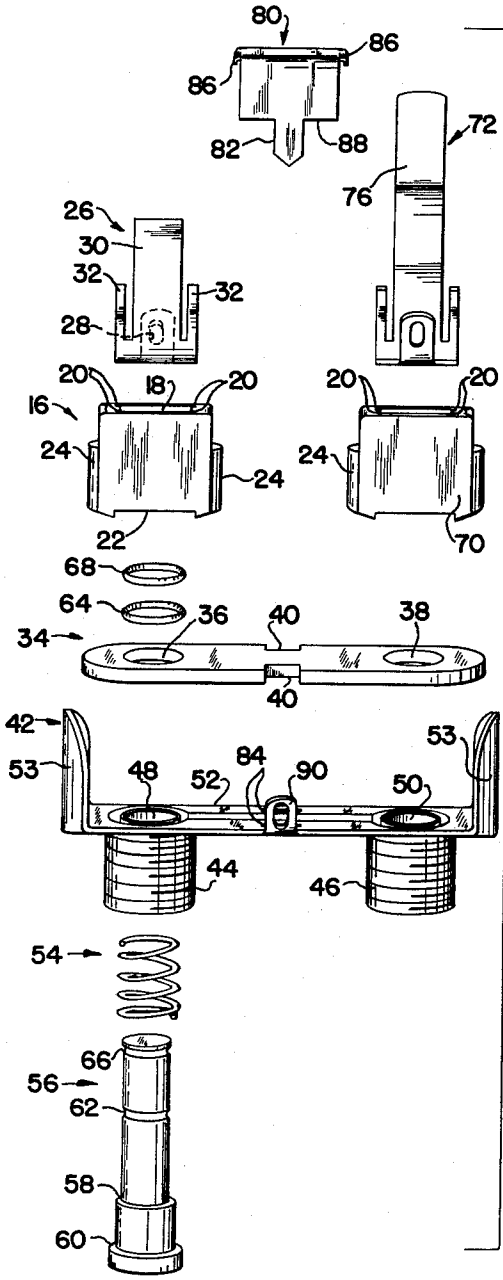
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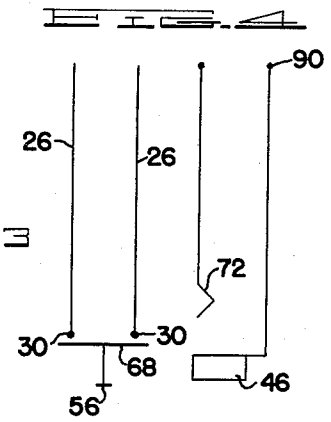
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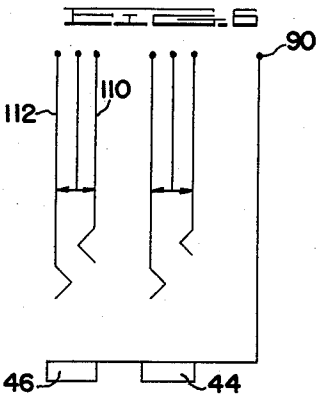
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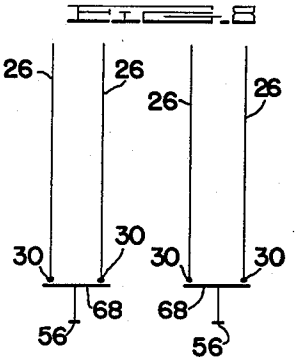
TWIN ELECTRICAL DEVICES

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TWIN ELECTRICAL DEVICES

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1 Claim. (Cl. 200—51.02)

The present invention relates to electrical devices, such as electrical jacks, push button switches and the like, and more particularly to improvements therein wherein multiple jacks, switches, or combinations thereof, can be assembled as a twin unit.

In using devices such as jacks, push button switches and the like, it is sometimes desired to use intricate circuits which include more than one such device and wherein the devices are interconnected and use common connections. It is therefore the principal object of the present invention to provide a multiple electrical device which is constructed and arranged to include as a part thereof a plurality of jacks, push button switches, or combinations thereof, which are assembled as a single unit and employ common parts and common connections.

It is another object of the present invention to provide a twin electrical device adapted to include either two jacks, two push button switches, or a combination of each which is characterized by its simplicity, and the relatively few parts that are employed, and by the ease with which such parts can be assembled, thereby assuring a relatively low cost item.

It is another object of the present invention to provide a twin electrical device of the foregoing character which is constructed and arranged so that the component parts of the individual jacks or push button switches include common supporting and clinching elements thereby simplifying the assembly operation and assuring a rigid device wherein the various elements are retained in prescribed position relative to one another.

It is another object of the present invention to provide a twin electrical device of the foregoing character which is characterized by the smallness of dimensions of the component parts that may be used and the relative ease with which such parts can be assembled.

It is another object of the present invention to provide a twin electrical device of the foregoing character wherein the clinching elements include a terminal clamp which includes a common ground terminal and a spacer clamp positioned between the bodies of the individual devices and attached to the terminal clamp, said clamps engaging opposite sides of said bodies to secure them in a fixed position in close proximity.

It is another object of the present invention to provide a twin electrical device of the foregoing character which is characterized by the number of parts which can be used interchangeably in twin jacks, twin push button switches, or combinations thereof, as well as in single units of jacks or push button switches, thereby allowing standard parts to be manufactured so as to reduce the cost of production of such items.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIGURE 1 is a front elevational view, partly in section, of a twin electrical device illustrating one embodiment of the present invention comprising a jack and push button switch combination;

FIGURE 2 is a top plan view of the embodiment illustrated in FIGURE 1;

FIGURE 3 is an exploded view of the embodiment illustrated in FIGURE 1;

FIGURE 4 is a schematic diagram illustrating portions of the circuits that can be made when using the embodiment illustrated in FIGURE 1;

FIGURE 5 is a front elevational view of a twin electrical device illustrating another embodiment of the present invention comprising twin jacks;

FIGURE 6 is a schematic diagram illustrating circuits that can be made when employing the twin jack illustrated in FIGURE 5;

FIGURE 7 is a front elevational view of a twin electrical device illustrating still another embodiment of the present invention comprising twin push button switches; and

FIGURE 8 is a schematic diagram illustrating circuits that can be made when using the embodiment illustrated in FIGURE 7.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to the drawings, a more detailed description of the present invention will be given. Attention is directed first to FIGURES 1 to 3, inclusive, which illustrate the twin electrical device **10** having as one of its electrical devices the electrical jack **12** and as its other electrical device the push button switch **14**. The electrical jack **12** is one of a number of different electrical jacks that can be mounted in this electrical device **10**, and it is to be understood that the invention is not limited to this specific type of jack. Illustrations of other types of electrical jacks that can be used are disclosed in copending application Serial No. 682,332, now Patent No. 3,011,035, filed September 6, 1957. Likewise, the present embodiment of the invention is not restricted to the use of a push button switch of the type disclosed in FIGURES 1 to 3, but it may use other push button switches, such as are shown, for example, in copending application Serial No. 720,898, now Patent No. 2,903,540, filed March 21, 1958. For the purposes of describing this embodiment of the invention, the push button switch will be described first, after which a brief description of the jack will be given.

The push button switch **14** has a body or insulator **16** which is a molded phenolic, and has a central opening **18** with slots **20** formed in the walls of said central opening. The upper end of the insulator **16** has a pair of diametrically opposed notches **22**, only one of which can be seen in FIGURE 3, extending transversely between the opening **18** and the outer surface of the insulator **16**. The opposite sides of the insulator **16** have shoulders **24** thereon for purposes to be described hereafter.

A pair of inverted U-shaped spring contact elements **26** straddle the end of the insulator **16** with the intermediate portion of each spring contact element **26** fitting respectively into the diametrically opposed notches **22**, only one of which can be seen in FIGURE 3. Only one of the spring contact elements **26** will be described in detail, since they may be constructed the same. The one side of element **26** extends externally of the insulator **16** and has an apertured end **28** to which an electric conductor can be connected. The other side of element **26** extends into the opening **18** and converges toward the axis of such opening so that its end portion **30** will be in position to be engaged

by a push button element, to be described, when the latter is depressed through the insulator **16**.

It is to be observed that the intermediate portion of spring contact element **26** is sufficiently wide so that it substantially fills the notch **22**. This assures that the element **26** will not shift laterally. Also, this wide portion extends on into the opening **18** until substantially to the bottom of insulator **16**. The wide portion is split longitudinally into three longitudinal segments. The center one, identified by the number **30** forms the spring contact arm engageable by the push button element, to be described. The side segments **32** fit into the slots **20** in the inner wall of insulator **16**. This assembled position is obtained by sliding the segments **32** down into slots **20** from the top of insulator **16**. The side segments of **32**, if desired, may have a crimped portion to assure that opposite sides of the segments engage the opposite walls of the slots **20** thereby assuring a stable mounted position. Thus, when the spring contact element **26** is fully inserted into place, only the free end of the spring contact arm **30** can be moved and the contact element **26** is retained in a very stable position.

The spring contact element **26** is retained against removal from the insulator **16** by the insulating element **34** which is seated on the top wall of insulator **16** and blocks the upper open side of the notch **22** in which the spring contact element **26** is fitted. The insulating element **34** is formed from dielectric material and is a one piece unit having a pair of apertures **36** and **38** therein. The aperture **36** is in registry with the opening **18** in the insulator **16**. The insulating element also has a pair of notches **40** between the apertures **36** and **38** for a purpose to be described hereafter.

Positioned above the insulating element **34** is a terminal clamp **42** which includes a pair of spaced sleeves **44** and **46**. The sleeves are mounted over apertures **48** and **50** and are attached to the edges thereof in the sheet metal portion **52**. The sheet metal portion **52** is sufficiently wide to overlie the insulating element **34**, and tongues **53** on opposite sides thereof are adapted to extend beyond the insulating element **34** and to be clinched under the shoulders of the insulators positioned below the insulating element **34**. Thus, referring to FIGURE 1, it can be seen that the free end of the tongue **53** is clinched over the shoulder **24** thereby rigidly locking the insulator **24** and insulating element **34** to the terminal clamp **42**. Positioned within the sleeve **44** is a coil spring **54**, and extending through the coil spring **54** and into the opening **18** of the insulator **16** is a push button element **56**. The latter has a shoulder at **58** which is adapted to engage the upper end of spring **54** thereby depressing the same when the push button is depressed, said shoulder **58** then serving as a portion against which the spring **54** can act for urging the push button element **56** back to its normal position shown in FIGURE 1. The push button element **56** also has another shoulder **60** which limits the extent to which the push button element can be depressed through the opening **18**. The push button element **56** has a groove **62** into which a snap ring **64** has been fitted. The snap ring **64** is sufficiently large so that it prevents the coil spring **54** from urging the push button element **56** outwardly beyond the position shown in FIGURE 1. The push button element **56** has a second annular groove **66** into which an electrically conductive snap ring **68** is inserted. When the push button element **56** is in the position shown in FIGURE 1, the electrically conductive snap ring **68** will be out of engagement with the end portions **30** of the spring contact element **26**. However, when the push button element **56** is depressed, the inwardly extending portions **30** will be engaged by the ring **68** thereby closing a circuit between the spring contact elements **26**. This can be seen schematically in FIGURE 4 wherein the conductive ring **68** is shown spaced from the portions **30** of the spring contact elements **26**, and when the conductive ring **68** is caused to bridge the portions **30** by depressing the push button element **56**, a circuit will be closed between the portions **30**.

The electrical jack **12** will now be described briefly. It will be observed that the insulator **70** is constructed identically the same as insulator **16**, and therefore, it will not be described again. The jack **12** has one spring contact element mounted on the insulator **70**, which is identified by the reference numeral **72**. It will be noted that spring contact element **72** is relatively short and has an inwardly projecting portion **76** which is adapted to be engaged by a conventional electrical plug (not shown). The spring element **72** is mounted in the slot **20** in the same manner as previously described with respect to the spring contact elements **26** with respect to the insulator **16**. Mounted between the insulators **16** and **70** is a spacer clamp **80** which has a pair of tabs **82** which are adapted to fit through the slots **40** in the insulating element **34** and to pass through a pair of slots **84** formed in the middle of the sheet metal portion **52** of the terminal clamp **42** and then to be bent over as is shown in FIGURE 2. The spacer clamp **80** also has a pair of laterally extending fingers **86** which are adapted to engage the adjacent shoulders **24** of the insulator elements **16** and **70**. Thus, when the spacer clamp **80** is mounted in place, its base portion **88** will be seated on the insulating element **34** and its fingers **86** will resiliently urge the insulator elements **16** and **70** against the insulator element **34** and the tabs **82** will extend through the clamping terminal **42** thereby cooperating with the tongues **53** of the terminal clamp **42** in holding the various parts of the twin electrical device together. The spacer clamp also will prevent the insulators **16** and **70** from being laterally displaced inwardly toward one another.

Referring to FIGURE 4 it will be seen that when plug (not shown) for the electrical jack is inserted through the sleeve **46**, an electric circuit will be closed between the sleeve **46** and the terminal **90** which is made an integral part of the sheet metal member **52**. The plug, not shown, will at the same time be in electrical contact with the spring contact element **72**.

Referring now to FIGURES 5 and 6, another modification of the invention will be described wherein the twin electrical device **100** comprises electrical jacks **102** and **104**. In this embodiment several of the component parts are the same as were used in the embodiment of FIGURES 1 to 4, inclusive, and hence, they will not be described in detail. Thus, insulating element **34**, terminal clamp **42**, sleeves **44** and **46** and spacer terminal **80** are the same and may be used interchangeably with the corresponding parts of the embodiment of FIGURES 1 to 4, inclusive.

In the embodiment of FIGURES 5 and 6, the jacks **102** and **104** are the same, so only one will be described. It is to be understood, however, that either or both of these jacks may be modified without departing from the present invention. Referring to electrical jack **102**, it will be seen that the insulator **106** has an extension **108** which is an integral part of molded body. The insulator **106** carries two spring contact elements **110** and **112**, each having radially inwardly projecting portions adapted to be engaged respectively by the tip and ring or sleeve of a conventional plug (not shown) for an electrical jack.

The extension **108** carries a double shunt terminal **114** which has a horizontal U-shaped portion **116** providing two spaced contact portions, concealed behind contact **110** in FIGURE 5, one normally engaged by the free end of spring contact element **110** and the other normally engaged by the free end of spring contact element **112**. Thus, a jack having two normally closed contacts is provided, and on inserting the conventional plug (not shown), these contacts will be opened and contact element **110** will engage the plug tip while contact element **112** will engage the plug ring or sleeve. A common ground terminal **90** is provided for both jacks **102** and **104**. For a more detailed showing of jacks **102** and **104**, reference

is made to copending application, Serial No. 764,937 filed October 2, 1958.

The jack **104** also has two normally closed contact elements so that the twin electrical device **100** has four such normally closed contact elements. It is to be observed that these contact elements are all mounted in a common plane, that is, flush with the surface of the insulating element **34**, thereby assuring the smallest possible dimension from end of sleeve **46** to the free end of shunt terminal **114**.

Referring next to FIGURES 7 and 8, another embodiment of a twin electrical device **120** is shown having two push button switches **122** and **124**. Each of these push button switches is the same as the push button switch **14** described with respect to FIGURES 1 to 4, inclusive, so they will not be described in detail. However, they illustrate another arrangement that can be made using common parts with other twin devices, such parts being, by way of example, the sleeves **44**, the terminal clamp **42**, the insulating element **34**, the insulators **16**, and the like.

Having thus described our invention, we claim:

A twin electrical device, comprising an insulating element having a pair of spaced apertures, a pair of sleeves positioned on one side of said insulating element and a pair of hollow insulators with central openings positioned in side-by-side relation on the other side of said insulating element so that the openings in said sleeves and in said insulators are in registry with said apertures, each of said insulators having shoulder means on opposite sides thereof intermediate the ends of said insulators, a first clamp member connected to said sleeves and overlying

said one side of said insulating element and having tongues extending beyond said other side and clinched over the shoulder means on each of said insulators, said first clamp member having a pair of slots formed therein and positioned between said sleeves, a second substantially U-shaped clamp member positioned on the other side of said insulating member and having a base and legs, said base being positioned between said insulators in engagement with said shoulder means on the insulators, said legs having tabs projecting from the ends thereof and extending through said pair of slots so as to clinch the insulating element and first clamp member together and so that said base in cooperation with said tongues holds said insulators in place, and a plurality of spring contact elements having portions thereof overlying the ends of said insulators adjacent said insulating element and being clamped therebetweeen and with the legs of the contact elements extending into said hollow insulators.

References Cited in the file of this patent

UNITED STATES PATENTS

1,538,157	Benjamin	May 19, 1925
1,986,652	Wack	Jan. 1, 1935
2,142,107	Brown	Jan. 3, 1939
2,166,803	De Reamer	July 18, 1939
2,331,181	Gaynor	Oct. 5, 1943
2,502,658	Lindmark	Apr. 4, 1950
2,572,335	Hafke	Oct. 23, 1951
2,634,345	Knight	Apr. 7, 1953
2,903,540	Gloviak et al.	Sept. 8, 1959