

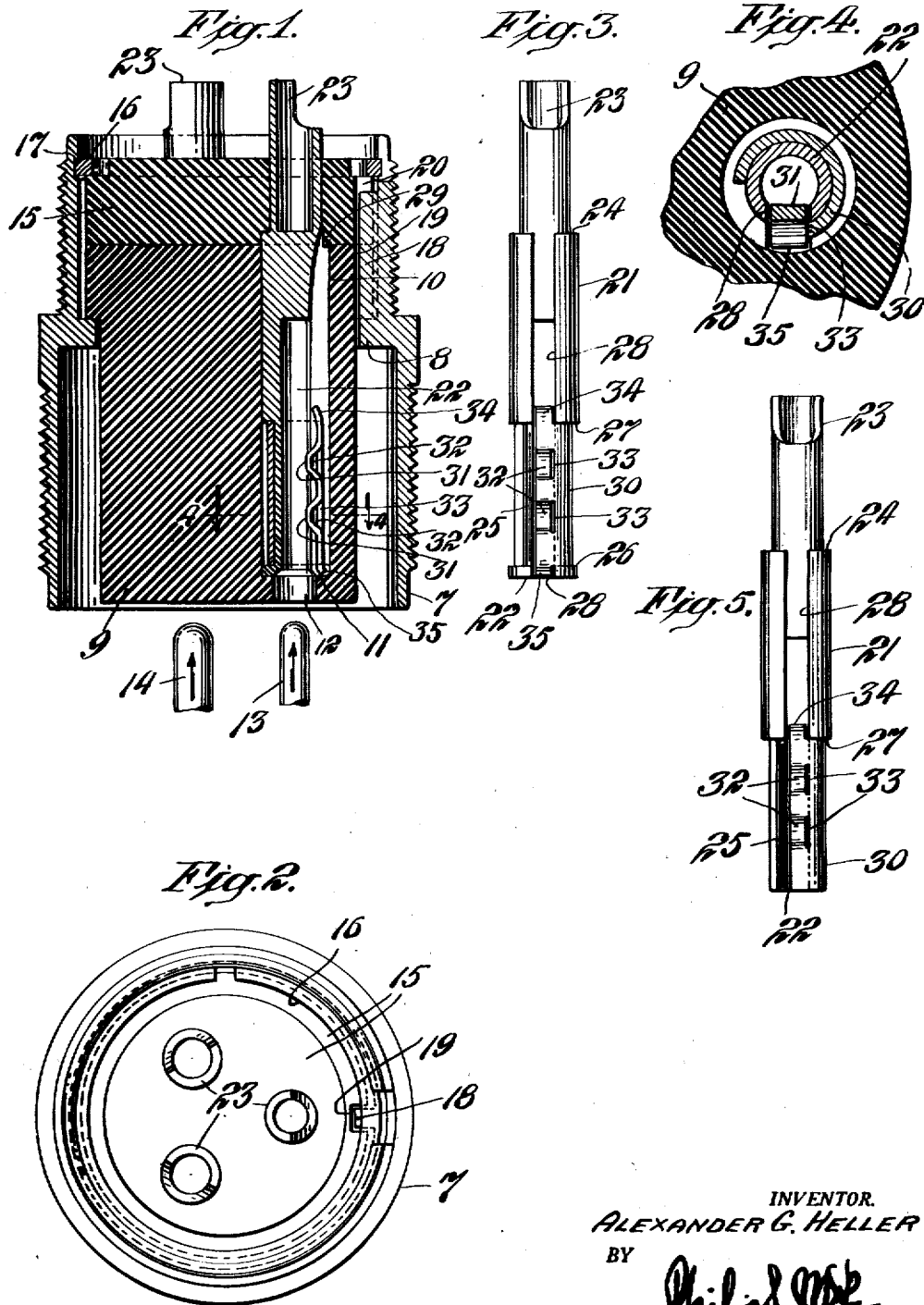
July 31, 1945.

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2,380,908

PIN JACK FOR MULTIPLE PLUG-IN CONNECTORS

Filed Aug. 4, 1943



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2,380,908

PIN JACK FOR MULTIPLE PLUG-IN CONNECTORS

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Application August 4, 1943, Serial No. 497,404

5 Claims. (Cl. 173—363)

The invention here disclosed relates to plug-in connectors and particularly to the pin jacks employed in such connectors.

These connectors comprise usually a plug having a number of pin contacts and a receptacle having a corresponding number of jacks placed to receive such pins. These coupling members must be small in size and at the same time be of durable, rugged construction. The number of circuits to be completed and hence the number of pins and jacks on these small coupling members may vary from only one or two to eighteen or more. This means that the pins and the jacks must be quite small. Difficulties have been experienced in providing jacks for these multiple plugs which would hold the pins firmly enough to assure positive electrical connection, which would be strong enough to stand rough usage and which at the same time would be self-aligning or self-adjusting to compensate for variations or possible misalignment in the many pins of the plug.

Objects of the present invention are to overcome faults such as mentioned, found to exist in present constructions and to provide a pin jack particularly for a multiple connector, which though small in size, will be of rugged construction and adapted to compensate for variations in the pin member and to at all times provide good electrical connection.

Other objects of the invention will appear in the course of the following specification.

The drawing accompanying and forming part of the specification illustrates certain commercial embodiments of the invention, but structure may be modified and changed as regards the instant disclosure, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawing is a longitudinal sectional view of the receptacle member of a multiple connector, showing one of the new jacks incorporated therein.

Fig. 2 is an end view of the receptacle.

Fig. 3 is a side view of the jack removed from the receptacle.

Fig. 4 is an enlarged cross-sectional detail as on the plane of line 4—4 of Fig. 1.

Fig. 5 is a side view of a modified form of the jack.

The receptacle shown in Figs. 1 and 2, is of generally conventional design, comprising a screw shell 7, interiorly shouldered at 8, to support a correspondingly shouldered insulating block 9, forming a base for carrying the jacks.

The base piece is formed with cylindrical open-

ings 10, to receive the jacks, shouldered at 11, to form seats for the jacks and having smaller entrance openings 12, for the pin contacts 13, 14, etc., which may be of different sizes, the jacks corresponding in size.

An insulating wafer 15, holds the jacks in their seats in the base and is in turn held in place by a spring locking ring 16, engaged in a groove 17, in the interior of the shell.

Both the base and the wafer are secured in non-rotatable relation in the shell by a key rib 18, on the side of the shell engaged in aligned grooves 19, 20, in the sides of the insulating base and wafer.

The jack consists of a generally cylindrical stud 21, hollowed in one end to constitute a contact sleeve at 22, of slightly larger dimensions than the contact pin and hollowed in the opposite end to form a tubular wiring terminal 23, the latter portion being reduced to provide a shoulder 24, for holding engagement by the wafer 15.

In the first form of the invention shown in Figs. 1 to 4, the contact sleeve portion of the stud is reduced in diameter at 25, to leave an end flange 26, and an opposing shoulder 27. A longitudinal slot 28, is cut through this entire sleeve portion, it being shown extended in through the flange 26, at the pin entry end and through the side of the stud past the shoulder 24. At the upper end, this slot serves the purpose of a key groove, receiving a keying lug 29, on the wafer, which thus locks the jack against turning and locates the terminal portion in the desirable position for making the soldered connection with the wire.

A flat strip of spring material 30, coiled into circular shape, is shown engaged about the reduced portion 25, and as having an inwardly struck portion 31, extending radially in through the slot 28, beyond the inner surface of the contact sleeve, Fig. 4.

In the illustration, the radially projecting portion 31, is produced by striking a plurality of longitudinally aligned indentations 32, across one end of the spring strip 30, providing as shown in Fig. 1, small arches which are detached at their inner edges at 33, from the body of the strip. Because of their arched formation, these inwardly projected portions are rigid enough to act substantially as solid lugs exerting radial pressure on an inserted pin to force the latter diametrically over into firm engagement with the opposite side of the socket. The provision of one or more of these inwardly struck arches effects a gradual engagement with the pin as the latter is entered in

the socket and in the final position, holds the pin over against the opposite side of the socket, solidly engaged with the wall of the socket, at both ends of the pin. This insures extended surface engagement and hence good electrical contact, free of resistance.

The spring holding strip need not be completely circular, Fig. 4, showing that it may be substantially C-shaped in cross-section, this providing sufficient spring effect to force the pin solidly into engagement with the side of the socket.

The coiled spring strip can be engaged over the reduced portion of the sleeve between shoulders 26 and 27, by entering the intermediate portion of the coiled strip edgewise into the slot 28, with the indented portion inside the sleeve and then rotating the coil to bring the indented portion out into the slot, as in Fig. 3. As shown in this view, the strip may have longitudinally extending lugs 34, 35, at the opposite edges of the same in line with the indentations 32, to enter and stand in the slot in this final position and thus to serve as retainers for holding the spring strip properly positioned on the sleeve. In the seated position of the jack, Fig. 1, any displacement of the spring strip will be prevented by the surrounding walls of the insulating base.

In the modified form of the invention shown in Fig. 5, the end flange appearing at 26, in Fig. 3, is omitted. This permits the coiled spring strip being forced edgewise over the reduced portion 25, of the sleeve, without first having to enter the strip through the slot and then rotate it into position. Besides greater ease of assembly, this second form of the invention permits of the spring being coiled for a closer fitting engagement on the reduced portion of the sleeve, so that it is held in position by such spring frictional engagement. Once in position in the socket, the spring is held against any possibility of disengagement by seating against the shoulder 11, Fig. 1, and by binding pressure on the sleeve occasioned by insertion of the pin in the sleeve.

The contact sleeves can be inexpensively produced from cylindrical rod stock, drilled in from opposite ends to form the contact socket and wiring terminal, such end portions being turned down to form the reduced end portions and the abutment shoulders 24 and 27, the first of such shoulders for holding engagement by the insulating wafer 15, and the second shoulder for positioning the spring holding band.

The coiled spring is easily made of flat spring stock curled to the necessary curvature and indented at one end with the small aligned arches to enter the slot and frictionally engage the pin contact.

The longitudinal slot in the side of the stud provides an entrance for the indented pin engaging portions of the spring and serves when engaged by the key lug on the wafer to secure the stud in properly angled position. The coiled springs are easily engaged over the ends of the contact sleeves and can, if necessary, be readily removed for replacement. The longitudinal slot 28 need not be cut through the end of the stud and in such event, the C-shaped spring strip may be engaged over the reduced portion of the stud by first entering one end of the C-shaped piece through the slot and then rolling the piece circumferentially into the final position illustrated in Fig. 4.

What is claimed is:

1. A pin jack for a multiple plug-in connector comprising a rigid contact sleeve having a slot in one side extending longitudinally inwardly from the pin receiving end of the same, and a flat spring strip coiled about the slotted end portion of said sleeve and having a permanently indented portion projecting radially inwardly through said slot beyond the inner surface of said sleeve into position to be engaged by a pin contact entered in said sleeve, said slot extending inwardly beyond said spring strip and an insulating holding member engaged over the opposite end of the sleeve and having a key lug entered in the inner end position of said slot.

2. A pin jack for a multiple plug-in connector comprising a rigid contact sleeve having a slot in one side extending longitudinally inwardly from the pin receiving end of the same and a flat spring strip coiled about the slotted end portion of said sleeve and having a permanently indented portion projecting radially inwardly through said slot beyond the inner surface of said sleeve into position to be engaged by a pin contact entered in said sleeve and a retaining flange on said slotted end of the sleeve, the slot extending through said flange to enable the coiled strip being slipped edgewise over the end of the sleeve with the inwardly angled portion entering through the slot in said flange.

3. A pin jack for a multiple plug-in connector, comprising a contact sleeve having a longitudinal slot at one side, a coiled strip of flat spring material engaged about the slotted portion of said contact sleeve, said strip being indented at one end transversely of the strip and in longitudinally aligned arches entered in said slot and projecting radially inward beyond the inner surface of the contact sleeve into position for engagement by a pin contact entered in the sleeve.

4. A pin jack for plug-in connectors, comprising a contact sleeve having an open-ended slot extending longitudinally inwardly from the pin receiving end of the same, a strip of flat spring metal coiled in substantially C-shape and having portions at one end of the same bent angularly inwardly and substantially radially of the center of said C-shape formation, said radially projecting portions being of a width to enter the open end of the slot and whereby said coiled spring member may be engaged edgewise over the end of the sleeve, said C-shaped member being of a diameter to closely surround the contact sleeve and the angularly projecting end portions being of sufficient extent to project radially through the slot past the inner circumference of the contact sleeve and means for retaining said spring member so positioned on the contact sleeve.

5. A pin jack for plug-in connectors, comprising a contact sleeve slotted in one side of the same and a C-shaped pin retaining spring of flat strip spring material closely surrounding said contact sleeve and having integral inwardly arched portions at one end of the same projecting substantially radially through and beyond the slotted wall of the contact sleeve, said radially projecting arched portions having free side edges but left integrally connected at their ends with the main body of said flat strip spring material.

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