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MULTIPLE PLUG AND RECEPTACLE

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FIG. 1

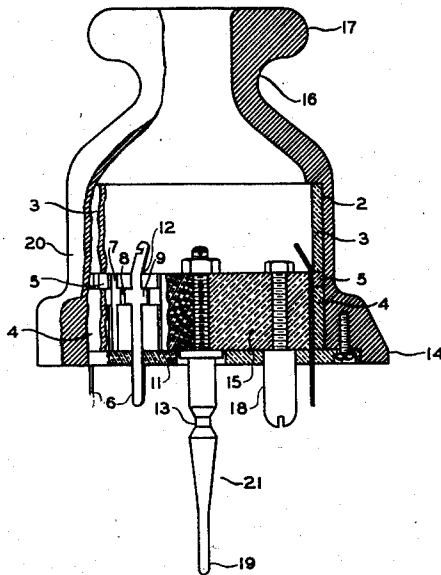


FIG. 2

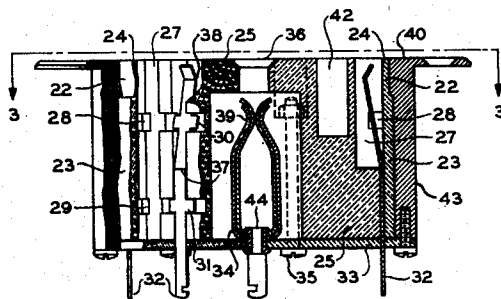
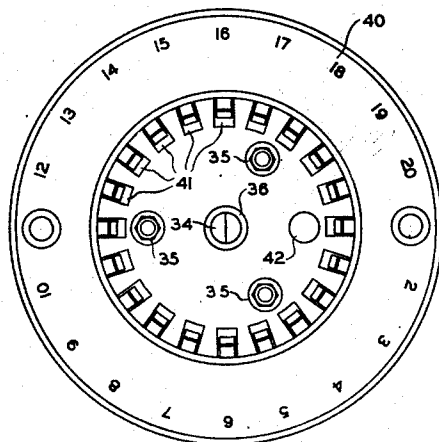


FIG. 3



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MULTIPLE PLUG AND RECEPTACLE

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5 Claims. (Cl. 173—330)

This invention relates to plugs and receptacles and especially to the manner in which the terminals of the plug engage the terminals of the receptacle.

5 In variously interconnected electrical systems where a number of lines must be simultaneously established, means for rapidly and easily accomplishing this object are well known to those versed in the art. This is especially true in multiplex
10 printing telegraph connections. Very often it is desirable to alter the interconnections of one or more of the lines without changing the permanently made connections. Many different types of plugs and plug receptacles have been proposed
15 for this purpose.

It is an object of my invention to provide means for insuring positive contact between plug terminals and plug receptacle terminals while simultaneously providing means for varying the inter-
20 connections between the plug terminals and the various plug receptacle terminals without permanently altering the connections of any of the line wires leading to the respective terminals. The receptacle is so designed that it may be mounted
25 on a desk or table without the necessity of its protruding above the surface of the desk. Moreover, connections may be readily made to the plug receptacle terminals by positioning the receptacle and the wires connected thereto in a
30 hole bored in the desk from which it is easily removed.

The plug receptacle terminals are flat bars bent angularly in the form of an obtuse angle and are so mounted and formed as to form flexible
35 spring-jack connections with the terminals of the plug.

The terminals of the plug receptacle are mounted in slots provided in the lateral face of an insulating cylindrical guide core. The spring-
40 jack portions of these terminals have lugs extending from their sides. When no terminal connections are made these lugs are under tension against shoulders cut circumferentially in the lateral face of the cylindrical guide core. The
45 plug terminals enter the slots and engage the spring-jack portions of the plug receptacle terminals to make positive connection with the same. With this arrangement, no contacting surface of the plug terminals rubs over any portion of the
50 insulating material of the cylindrical plug receptacle core, all such frictional contact being made between metallic surfaces only. This arrangement has been found to prevent any wearing of the insulating material because of metallic sur-
55 faces contacting therewith.

The features of the invention may be more clearly understood by reference to the following description considered in conjunction with the accompanying drawing.

Fig. 1 shows the plug in sectional view, with portions of the housing cut away to more clearly disclose the means provided for holding the terminals in place.

Fig. 2 shows the plug receptacle in sectional view, with portions of the housing similarly cut away for more clearly disclosing the means for holding the terminals in the plug receptacle.

Fig. 3 shows a top view of Fig. 2 along the line 3—3.

Referring now more particularly to Fig. 1, the housing 20 has a cylindrical bore 2 terminating in a shoulder and into which fits a core assembly consisting of insulating rings 3 and 4 mounted on insulating guide core 15, portions 5 of which are left protruding in order to form a supporting segmented flange or collar. On the lateral face 5 of the core 15 upright guide grooves 7 and a less deeply milled circular groove 8 are cut. Into these grooves fit, respectively, the main body portions and the protruding lug portions 9
80 of terminals 6.

It is to be noted that the terminals 6 are so mounted on the insulating core 15 that they may be readily removed. The terminals are held in their respective grooves 9 by insulating ring 4 frictionally mounted over the core and terminal assembly. The guide grooves 7 in the core 15 hold the terminals from movement in a circular path lying in a plane perpendicular to the axis of the plug, while the lug portions 9 of the terminals 6 hold the terminals against motion in the direction of the axis of the plug.

Housing 20 may be shaped as shown in Fig. 1, the body portion being narrowed to form a neck 16 and collar 17.

Insulating core 15 is held in place by base insulating plate 11 which, in turn, is secured to housing 20, thereby holding the core assembly snugly in place within the housing 20.

The terminals 6, as shown in Fig. 1, are straight. One end, namely, that to which the incoming wire is attached, is bent angularly at 12 in an inward direction, thereby facilitating the dismantling of the completed core assembly.

Pilot terminal 21, to which a conductor may or may not be connected, serves simultaneously both as a terminal and as a holding plug, or it may serve solely as a holding plug. Pilot 21 functions as a holding plug only after it is passed through opening 36, and is subsequently positioned and

locked in place within bent portions 39 of spring contact clip 34 of the plug receptacle. At the same time the pointed portion 19 of pilot 21 enters a hole 44 in the base of clip 34 to more securely hold the assembly together and prevent any axial play between the plug and plug receptacle. These features of the invention are more clearly shown in Fig. 2.

Fig. 2 shows the plug receptacle which also has a housing 43 with a supporting ledge or flange 40 bearing indicating numerals, such as 1 and 10, the latter numerals being shown on Fig. 3. This housing has a cylindrical bore 23 which has a narrower shoulder portion 22, adapted to prevent extrusion through the upper opening of housing 43 of a core assembly which, in turn, consists of insulating ring 24 and insulating guide core 25. Guide core 25 may be made up of one or two pieces, as indicated by the dividing line at numeral 26. On the lateral face of core 25 upright guide grooves 27 and circular grooves 28 and 29 are cut. Into these grooves fit, respectively, the main body portion and the protruding lug portions 30 and 31 of the terminal contacts 32.

The terminals 32 are fitted to the core 25 in a manner similar to that described above with respect to terminals 6 and core 5. In the case of terminals 32, lug portions 31 are closely fitted into circular groove 29, while lug portions 30 are loosely fitted into circular groove 28 so as to avoid frictional contact between the lugs 31 and walls of the insulating core 25. It is to be noted also that circular groove 28 is cut more deeply than circular groove 29. The only part of terminal 32 tensionally contacting the upper division of core 25 is the inner faces of lugs 30 which are tensioned against the outer surface of the circular groove 28.

Insulating core 25, as well as insulating ring 24, is held in place by insulating base plate 33 which is secured to housing 43, thereby holding the core assembly snugly in place within the housing 43. Bolt member 35 holds core 25 to plate 33, thereby holding the assembly together.

The terminals 32, as shown in Fig. 2, have a slightly angular bend in the inward direction, as shown at 37, and a sharply angular outward bend, as shown at 38.

Pilot contact spring clip 34 is secured to insulating base plate 33 and is provided with portions adapted to engage the prolonged pointed portion 19 of the pilot terminal 21. Core 25 is provided with an opening 36 through which pilot 21 enters and, subsequently, makes engagement, by means of recessed portion 13, with bent portion 39 of clip 34, prolonged portion 19 simultaneously entering hole 44 in clip 34.

In order to fit the plug to the plug receptacle, the large pilot 21 is placed in position in the opening 36 of the receptacle and pointer 14 is placed in position over any desired point of a tabulated face 40 of the housing 43. The upper inclined surfaces of angular portions 39 of clip 34 will then engage the more angular portions of pilot 21, pointed portion 19 thereof entering hole 44 and thereby holding the plug and plug receptacle in centralized position.

After the pilot 21 of the plug is thus positioned with respect to the opening 36 of the plug receptacle, the terminals 6 may not be aligned with the openings of slots 41 of core 25 so as to enable terminals 6 to contact inclined portions 38 of the plug receptacle terminals 32. By rotating the plug after first inserting the pilot 21 within the opening 36, the desired connections between terminals 6 and terminals 32 may be made by posi-

tioning indicating lug 14 of the plug over a desired and previously assigned index numeral, such as 1, 10, Fig. 3, on the face 40 of the plug receptacle. In this manner terminals 6 and openings 41 are readily and positively aligned. As clearly shown in Fig. 2, the terminals 32 at lug portions 30 normally rest under tension against the shoulders of circular groove 28. When the plug is then pressed downward, the terminals 6 enter the slots or openings 41 and force the terminal ends 38 of the plug receptacle terminals 32 outward towards the periphery of the plug receptacle core assembly, and simultaneously force the lug members 30 of the terminals 32 away from the shoulders of the circular groove 28, thereby causing bent portions 38, as well as bent portions 37, to exert frictional contact against the outer faces of terminals 6. Upon further downward motion, portions 13 of pilot 21 engage with the spring-jack portions 39 of pilot contact clip 34, and pointed portion 19 of pilot 21 passes into hole 44 of clip 34 still further, thereby locking the plug and plug receptacle snugly together.

If a fixed position of the plug and plug receptacles is desired, a guide pin 18 may be inserted and locked onto a holding member in the core 15, and a hole, as at 42 in the core 25, may be provided to receive the guide pin. With this arrangement a fixed relation may be held between the terminals of the plug and the terminals of the plug receptacle.

From the foregoing description it will be noted that the receptacle may be mounted on a table or any other flat surface through which the necessary conductors pass, and the top of the receptacle may be made level with the top of the table, connections being made to the plug receptacle terminals at point 32 thereof. The plug receptacle may be readily removed for changes in the permanent connections to the various terminals 32 by simply withdrawing the housing 21 from its position in the table top.

What is claimed is:

1. In a plug terminal, the combination of a housing having an internal shoulder, a flanged insulating core disposed with the housing and provided with guide grooves which extend through the flange, spring terminals secured in the guide grooves, spacing members between the core and the housing and insulating the terminals from the housing, one spacing member being disposed between the flange and the shoulder and the other having one end abutting the flange and surrounding said core, and a closure for said housing against which the other end of the last-mentioned spacing member abuts whereby the core is definitely positioned and held within the housing.

2. In a plug terminal, the combination of a housing having an internal shoulder, an insulating core disposed within the housing and provided with peripheral guide grooves, spring terminals disposed within the grooves, means seated against said shoulder and serving to insulate the spring terminals from the housing, said means engaging and surrounding said core to hold said springs within the grooves and in spaced relation to the housing, and a closure for said housing abutting said insulating means and the core.

3. In a plug terminal, a cylindrical insulating core having in the outer periphery thereof a groove extending around the core and a plurality of grooves extending axially of the core and intersecting the first-mentioned groove, a housing having a shouldered cylindrical internal bore

within which the core is disposed, a plurality of contact terminals positioned in the axial grooves and having lugs projecting therefrom and into the first-mentioned groove, and insulating means	
5 abutting the shoulder and comprising a cylindrical sleeve surrounding the core interposed between the core periphery and the cylindrical wall of the housing and in frictional engagement with the core so as to cover the grooves and aid in	
10 maintaining the contact terminals in position, and a cover for the housing against which the core and the insulating sleeve abut.	
4. The combination of a substantially cylindrical rigid core having in the outer periphery	
15 thereof a plurality of grooves extending axially of the core and a groove extending around the core and intersecting said other grooves, angularly bent spring terminals, each having a main body portion positioned in one of the axial grooves	
20 and lug portions positioned in said circumferentially extending groove whereby the terminals are secured against both longitudinal and lateral displacement, insulating means surrounding said core and including a substantially cylindrical	
25 insulating collar securing said terminals thereto against radial displacement, and a substantially cylindrical housing closely embracing said core and insulating collar and having a closed end anchored to said core and an internal	
shoulder against which said insulating means abuts.	
5. In a plug terminal, the combination of an insulating core having a peripheral groove extending around the core and a plurality of peripheral grooves extending axially of the core	80
and intersecting the first-mentioned groove, a plurality of contact terminals positioned in the axial grooves and having lugs formed thereon and projecting therefrom into the first-mentioned	85
groove thereby to hold said contact terminals against axial and lateral displacement, insulating means surrounding the core in frictional engagement therewith so as to cover the	
grooves and maintain the contact terminals positioned against radial displacement, and a housing embracing said core and said insulating means and cooperating therewith to produce a unitary rigid structure, characterized by the fact	90
that said axially extending grooves on one side of the circumferential groove are of greater depth	95
than on the other side of said circumferential groove, and by the provision of a second groove of greater depth than the first extending around the core and intersecting the axially extending	100
grooves in the region of their greater depth and lugs projecting from the contact terminals into the second-mentioned circumferential groove.	
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