

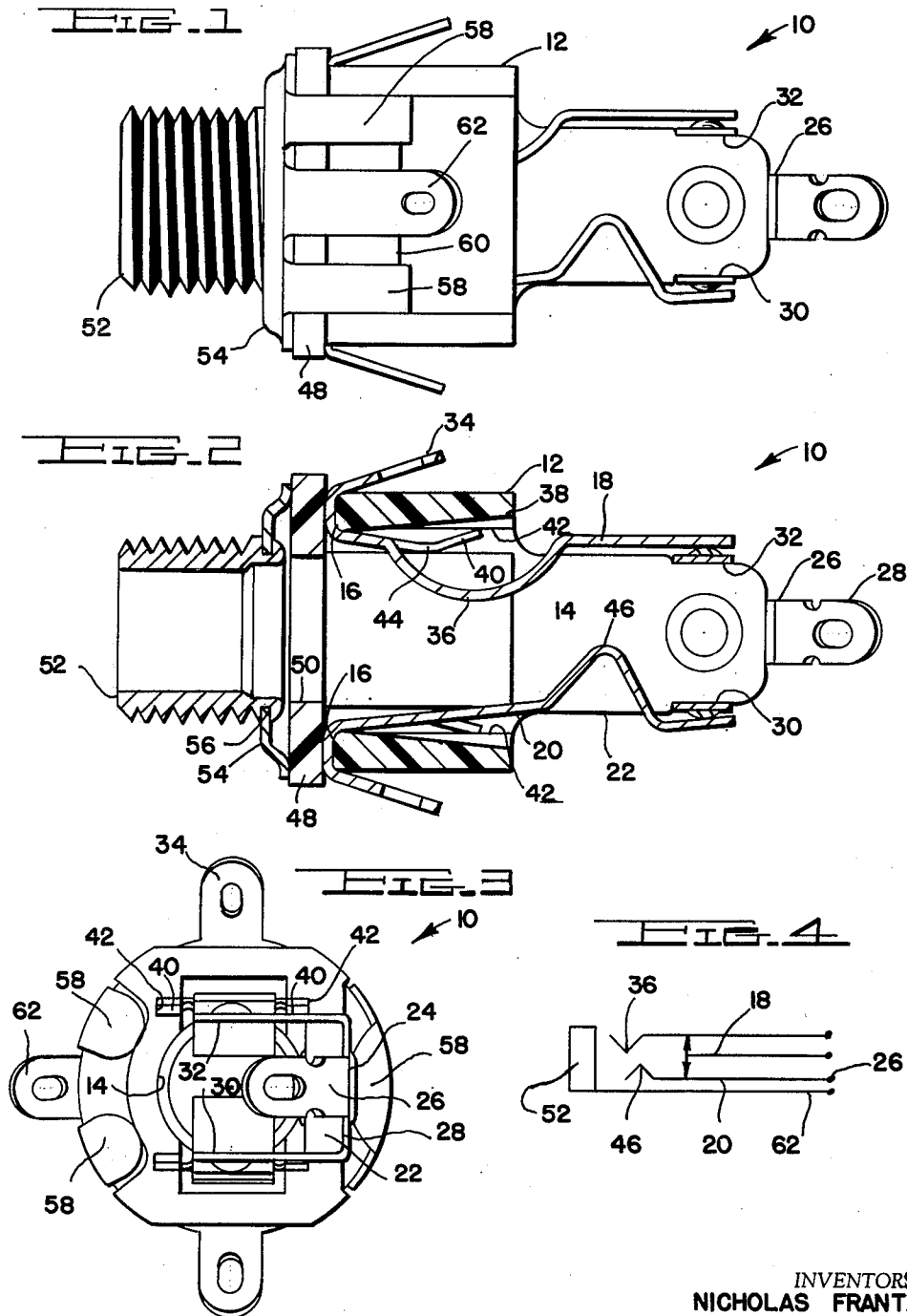
July 17, 1962

N. FRANTZ ET AL

3,045,079

ELECTRICAL JACK

Filed Oct. 2, 1958



INVENTORS
 NICHOLAS FRANTZ
 STANLEY GLOVIK
 BY
 FINN G. OLSEN
 ATTORNEY

1

3,045,079

ELECTRICAL JACK

Nicholas Frantz, Skokie, and Stanley Gloviak, Westchester, Ill., assignors to Carter Parts Company, Skokie, Ill., a corporation of Illinois

Filed Oct. 2, 1958, Ser. No. 764,937

7 Claims. (Cl. 200—51.1)

The present invention relates to improvements in electrical jacks, and more particularly to an improved electrical jack having two normally closed contact elements adapted to be opened on insertion of a plug into the jack.

One of the problems faced in the past in making electrical jacks having a plurality of normally closed contact elements, has been the need to make the jacks small enough to meet the dimension requirements of the purchaser and still have adequate insulation between conductive elements to meet the standards of dielectric tests that are required.

It is an object of the present invention to overcome the defects that have existed in prior art structures and to provide an electrical jack having a plurality of normally closed contact elements adapted to be opened when the plug is inserted into the jack and to make prescribed electrical connections with said plug, said jack being constructed and arranged so that its dimensions are characterized by their smallness while still obtaining optimum dielectric properties between the electric conducts of the jack.

It is another object of the present invention to provide an electrical jack of the foregoing character which has the mounted portion of each spring contact element in a common plane, thereby producing a pack with a minimum overall length.

It is still another object of the present invention to provide an electrical jack of the foregoing character which has a common shunt terminal for engagement by the plurality of contact elements.

It is still another object of the present invention to provide an electrical jack of the foregoing character which is characterized by the relatively few parts that are required and which has a one piece molded dielectric plastic body for mounting the contact elements as well as the shunt terminal.

It is still another object of the present invention to provide an improved electrical jack of the foregoing character wherein the molded plastic body is constructed and arranged to hold the several spring contact elements in a predetermined spaced relation and to assure that such elements will remain in their mounted positions when in use.

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 elevation of an electrical jack embodying one form of the present invention;

FIGURE 2 is a section taken through the axis of the electrical jack illustrated in FIGURE 1;

FIGURE 3 is an end elevation as viewed from the right of the embodiment shown in FIGURE 1; and

FIGURE 4 is a schematic diagram illustrating the electric circuits that can be made when using the electrical jack illustrated in FIGURES 1 to 3, inclusive.

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,

2

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 drawing, a more detailed description of the present invention will be given. The electrical jack 10 has an insulator 12 made of a molded phenolic and having a central opening 14. The one end of the insulator 12 has a pair of diametrically opposed notches 16 extending transversely between the opening 14 and the outer surface of the insulator 12. The notches 16 are of sufficient width and depth to receive the intermediate or mid-portions of spring contact elements 18 and 20.

The insulator 12 includes an extended leg 22. Mounted near the end of the leg 22 by means of a rivet 24 is a shunt terminal 26. The latter has an outwardly projecting portion 28 to which an electrical conductor (not shown), can be attached. Also forming a part of the shunt terminal 26 is a U-shaped portion 28 which straddles the leg 22 so as to provide two parallel spaced contact portions 30 and 32. The portions 30 and 32 are of sufficient length so that they extend into the path for a plug (not shown) provided by the opening through the insulator 12.

The spring contact element 18 is a U-shaped member which straddles the end wall of the insulator 12 with the intermediate or midportion of the spring contact element 18 fitting into one of the transverse notches 16. The one side of element 18 extends externally of the insulator 12 and has an apertured end 34 to which an electric conductor can be connected. The other side of element 18 extends through the opening 14 with its free end normally in contact with the portion 32 of the shunt terminal 26. The other side of element 18 also has a radially inwardly projecting portion 36 which is adapted to be engaged by a plug (not shown) when the latter is inserted through the opening 14, thereby deflecting the free end of spring contact element 18 away from the shunt terminal portion 32. The radially inwardly projecting portion 36 will then be in engagement with the sleeve or ring of the plug (not shown), and therefore, the spring contact element may be identified as a sleeve or ring spring terminal.

The intermediate portion of the spring contact element 18 is sufficiently wide so as to completely fill the notch 16. This assures that the element 18 will not shift laterally. Also, this wide portion extends on into the opening 14 until substantially to the other end portion 38 of the insulator 12. The wide portion is split longitudinally into three longitudinal segments. The center one forms the spring contact arm that is in engagement with the contact portion 32 of the shunt terminal 26. The side segments 40 fit into the slots 42 in the inner wall of insulator 12. This position is obtained by sliding the segments 40 down into the slots 42 from the left end of insulator 12. The segments 40 are crimped as at 44 so as to assure that the opposite sides of the slots 42 will be engaged by the segments 40 thereby holding the spring contact element in place. When fully inserted, only the free end of spring contact element 18 can be moved, and contact element 18 is retained in a very stable position.

The spring contact element 20 is similarly constructed to spring contact element 18, but it has a radially inwardly projecting portion at 46 which is axially displaced from the radially inwardly displaced portion 36 of contact element 18. The portion 46 is adapted to be engaged by the tip of the plug (not shown) and therefore the spring contact element 20 may be referred to as a tip spring terminal. In other respects the spring contact element 20 functions in the same manner as spring contact element 18 in that when the plug (not shown) engages the

3

portion 46, the free end of the spring contact element 20 will be deflected away from the contact portion 30 of the shunt terminal 26. Thus, when the plug (not shown) is fully inserted into the electrical jack 10, both of the normally closed connections at the terminal portions 30 and 32 will be opened and the spring contact elements 18 and 20 will close connections with the ring and the tip, respectively, of the plug (not shown).

The spring contact elements 18 and 20 are held in position by the insulating element 48 which seats on the end wall of insulator 12 and blocks the open side of the notches 16 in which the intermediate portions of spring contact elements 18 and 20 are fitted. The insulating element 48 has a central opening 50 which is in registry with the opening 14 of the insulator 12.

Positioned above the insulating element 48 is a sleeve 52 which has a clamp terminal 54 integrally attached as at 56. The clamp terminal 54 has a plurality of tongues 58 which are clinched under the shoulder 60 of the insulator 12 to lock the sleeve 52, the insulating element 48 and the insulator 12 together. The clamp terminal 54 has a terminal 62 to which an electric conductor (not shown) can be connected to provide a ground connection.

Referring to FIGURE 4, a schematic diagram of the circuits that can be made when using the electrical jack 10 can be seen. The sleeve 52 is shown connected to the ground terminal 62. The spring contact elements 18 and 20 are in normally closed positions with respect to the shunt terminal 26. When the plug (not shown) is inserted through the sleeve 52 the ring of the plug will engage the portion 36 and the tip of the plug will engage the portion 46 of spring contact element 20. This will have the effect of closing two separate circuits through the plug (not shown) and simultaneously of opening the circuits which are normally closed through the shunt terminal 26.

One of the features of the present invention is its compactness and its construction and arrangement which allows its longitudinal dimension to be kept at a minimum while providing optimum insulation between the various contact elements. It is to be noted that the spring contact elements 18 and 20 have their intermediate portions in a common plane therefore assuring that the shortest dimension with the respect to the overall length of the contact elements can be employed. Also the various electrical components are insulated so that there will be no danger of short circuiting between the various parts. It is also to be observed that the various parts when assembled can not shift with respect to one another either during the assembly operation or thereafter, thus, assuring that optimum results will always be obtained from the electrical jack.

Having thus disclosed our invention, we claim:

1. An electrical jack characterized by the smallness of its dimensions comprising an insulator having a central axial opening and a single integral leg projecting from one end, the other end of said insulator having two generally diametrically opposed notches extending between the inner and outer surfaces of said insulator; a shunt terminal mounted on the free end of said leg and having a pair of laterally spaced contact portions; a first spring contact element with an intermediate portion fitted into one of said notches, an outer end portion projecting from said insulator to form an electric terminal and an inner end portion extending in a generally axial direction toward said shunt terminal and normally engaging one of said contact portions, said inner end portion having near its free end a radially inwardly projecting segment adapted to be engaged by an electrically conductive tip of an electric plug inserted through said insulator and thereby to separate the inner end portion from said one contact portion and to make an electric connection between said tip and said first spring contact element;

4

a second spring contact element having an intermediate portion fitted into the other of said notches, an outer end portion projecting from said insulator to form an electric terminal and an inner end portion extending in a generally axial direction toward said shunt terminal and normally engaging the other of said contact portions, said inner end portion having a radially inwardly projecting segment adapted to be engaged by an electrically conductive ring of said electric plug and thereby to separate the inner end portion from said other contact portion and to make an electric connection between said ring and said second spring contact element; an apertured insulating element overlying said other end of the insulator with the aperture in registry with said opening, said insulating element holding the intermediate portions of the first and second spring contact elements in their respective notches; and a sleeve positioned on said insulating element in registry with said aperture and carrying a ground terminal clamp, the latter clamping said insulator and insulating element together.

2. An electrical jack as defined in claim 1 wherein the first spring contact element has two spring fingers, one on each side of said inner end portion, said fingers being deflected into engagement with the inner surface of said insulator to help retain the spring element in place.

3. An electrical jack as defined in claim 1 wherein the second spring contact element has two spring fingers, one on each side of said inner end portion, said fingers being deflected into engagement with the inner surface of said insulator to help retain the spring element in place.

4. An electrical jack as defined in claim 1 wherein said insulator has shoulders on opposite sides, and said clamp has tongues deflected over said shoulders for rigidly clamping the insulator to the insulator element.

5. An electrical jack as defined in claim 1 wherein said insulator is a one-piece molded dielectric plastic body.

6. An electrical jack adapted to receive a plug having an electrically conductive tip and an electrically conductive ring axially displaced from said tip, said jack comprising an insulator body having an annular portion at one end adapted to have said plug pass therethrough and a single leg integral with said portion and disposed at the opposite end of said body, a shunt terminal mounted on said leg and having a pair of spaced contact portions, a pair of spring contact elements supported over the other end of said insulator body in spaced relation to one another, each contact element having an end extending outwardly from said insulator to form a terminal and having the other end extending through said insulator body with its free end engaging respectively one of said spaced contact portions, each of said contact elements also having a portion displaced into the intended path of said plug so as to be engaged by the plug when the same is inserted into said jack thereby disengaging said free ends from said spaced contact portions, the displaced portions being axially spaced from one another so as to be engageable respectively by the conductive ring and conductive tip of said plug when the latter is inserted into said jack.

7. In an electrical jack, an insulator having a central axial opening and an extended portion at one end with a pair of laterally spaced contact portions mounted on said extended portion of said one end, a pair of spring contact elements overlying the other end of said insulator on opposite sides of said opening and in a common plane, said contact elements each having one of their respective ends projecting from said insulator to form terminals and the other of their respective ends extending through said opening into engagement respectively with said laterally spaced contact portions, an insulating element fitting against the overlying portions of said contact elements, and means clamping said insulating element against said insulator and contact elements to hold the latter in place.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

1,676,055	Schellenger	-----	July 3, 1928		2,470,915
2,153,369	De Reamer	-----	Apr. 4, 1939	5	2,572,335
					2,768,234
					2,803,717
					2,903,540

Bosh	-----	May 24, 1949
Hafke	-----	Oct. 23, 1951
Popp	-----	Oct. 23, 1956
Sanda	-----	Aug. 20, 1957
Gloviak et al.	-----	Sept. 8, 1959