Oct. 3, 1961 W. P. HERMAN ET AL 3,003,133

FEMALE CONNECTOR

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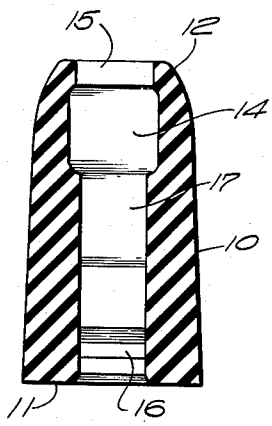

FIG. 1

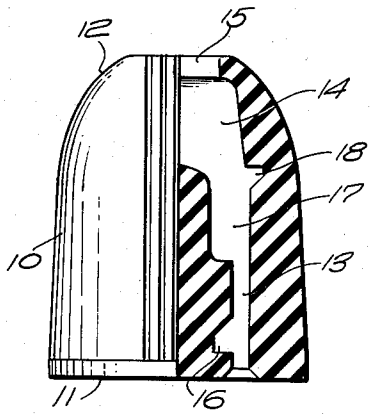

FIG. 2

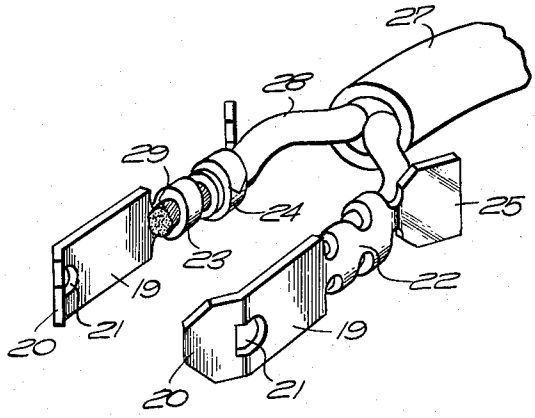

FIG. 3

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FEMALE CONNECTOR

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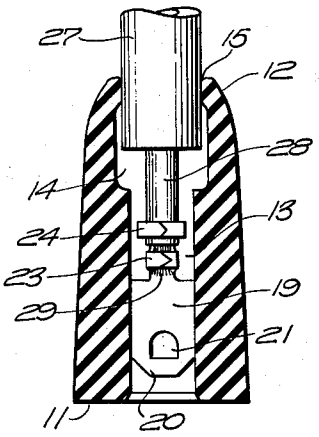

FIG.4

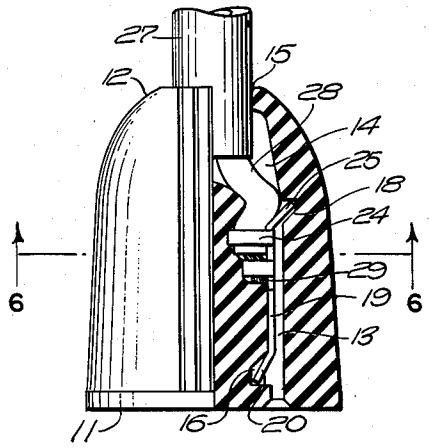

FIG. 5

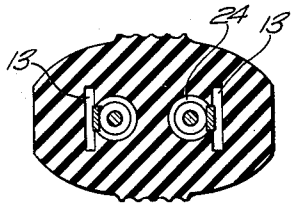

FIG. 6

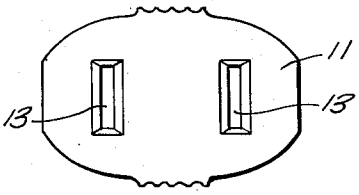

FIG. 7

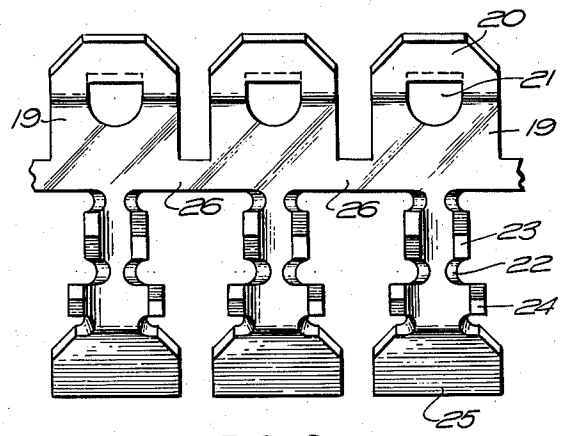

FIG. 8

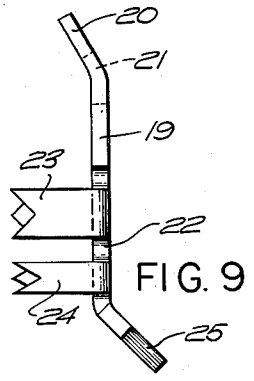

FIG. 9

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3,003,133
FEMALE CONNECTOR

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Filed Jan. 20, 1959, Ser. No. 787,964
5 Claims. (Cl. 339—59)

Our present invention relates to the electrical plug art and more particularly to a novel construction of a female connector.

The principal object of the present invention is to provide a novel female connector having a novel contact blade and anchorage therefor.

A further object of the present invention is to provide a female connector having a novel anchoring means for the contact blades in the plug husk.

Another object of the present invention is to provide a female connector in which the contact blades and the plug husks have cooperating portions for retaining the blades in parallel alignment.

A further object of the present invention is to provide a female connector which is simple in construction and easy and economical to manufacture and assemble.

With the above and other objects and advantageous features in view, our invention consists of a novel arrangement of parts, more fully disclosed in the detailed description following, in conjunction with the accompanying drawings and more particularly defined in the appended claims.

In the drawings,

FIG. 1 is an enlarged vertical section of the plug husk taken transversely through the plane of one of the slots.

FIG. 2 is a front elevation partly in section of the plug husk.

FIG. 3 is a perspective view of the contact blades assembled with the cord lead connection.

FIG. 4 is a view similar to FIG. 1 of the completely assembled connector.

FIG. 5 is a view similar to FIG. 2 of the completely assembled connector.

FIG. 6 is a section taken on line 6—6 on FIG. 5.

FIG. 7 is a bottom view of the connector.

FIG. 8 is an enlarged fragmentary view of a strip of blades prior to assembly.

FIG. 9 is a side elevation of one of the contact blades.

In the construction of female connectors the blade is anchored completely within the husk but room must be left in the slot for inserting the male contact blade. The major problem is to retain the female blade in parallel relation, hugging the walls of the slots under all strain conditions to permit easy insertion of the male contact blades. The present invention provides a female connector construction in which cooperating elements are provided between the blades and the husk which tend to retain the blades in proper position.

Referring more in detail to the drawings, the plug husk 10 may be made of any suitable material such as resilient rubber or plastic and is provided with a flat bottom portion 11 and tapered upper end 12 which tapers toward the cord lead opening. The plug husk 10 is provided with a pair of spaced parallel slots 13 in which the contact blades are positioned. The upper ends of the slots 13 terminate in a cord receiving chamber 14 having the cord entrance opening 15.

Each slot 13 is sufficiently wide to hold both the male and female contact blades in electrical contact. Adjacent the lower end of each slot is a recess 16 which extends inwardly towards the center of the husks from the inside fall of the slot as shown in FIG. 2. The recess 16 extends the full width of the slot as shown in FIG. 1, and is provided with a horizontal bottom and a slanted top to provide a wide entrance to the recess. The upper third of the slot 13 is provided with a wide slot portion 17 which is formed by cutting inwardly towards the center of the husk. The outer wall of each slot is therefore straight while the inner wall of each slot is cut away at 16 and 17. At the upper end of the slot 13 adjacent its communication with the chamber 14 the outer slot wall is provided with a cut out portion 18 which is of the same shape as the cut out portion 16 but inverted. This forms a flat upper wall and vertical inner wall to form a 90° angle, while the bottom of the cut out portion tapers downwardly into the slot as shown in FIG. 2.

While any type of suitable contact blade may be used, we prefer to use the type of blade shown in FIGS. 3, 8 and 9 which is furnished in strip form so that it can be crimped to the cord lead connection on a crimping press. Referring to FIGS. 8 and 9, each contact blade comprises a rectangular contact portion 19 bent inwardly at its lower end at 20 and provided with an assembly opening 21 at the bend. The upper end of each blade is provided with a narrow cut out portion 22 having spaced sets of integral lugs or tangs 23 and 24. The tangs 23 are adjacent the contact portion 19 and the tangs 24 are adjacent the upper end of the blade. The upper end of each blade is provided with an integral generally rectangular portion 25 which extends at an outward angle from the blade.

When the blades are furnished in strip form as shown in FIG. 8 a short connecting piece of metal 26 is retained on the continuous strip to hold the blades in spaced side by side relation for feeding into the crimping press. Referring to FIG. 3, the cord lead wire 27 is separated into separate insulated cord lead connections 28 having bared ends 29. In the crimping press the blades are crimped to the cord lead connections 28 so that the lugs or tangs 23 wrap around the bare ends 29 of the cord lead connection and the lugs or tangs 24 wrap around the insulated portions 28 of the cord lead connections to provide strain relief.

In assembly, the cord opening 15 is spread and the blades are pulled into their respective slots into the positions shown in FIGS. 4 and 5. It will be noted that the bent lower end 20 of each blade will enter the recess 16 to prevent further movement of the blade downwardly. The bent upper portions 25 of each blade will enter the upper recesses 18 on the outside walls and prevent upward movement of the blades. Now it will be noted that the crimped portion of each blade where the tangs 23 and 24 are crimped to the cord lead connections extend inwardly from the plane of each blade a greater distance than the width of the wide blade portions 17. This results in a distortion of the husk body to accommodate the crimped portions as shown in FIG. 5. The resilient walls tend to push the blades outwardly and this results in the portion 25 being tightly positioned in the recess 18 to retain the blade in parallel position with the slot. However, a more important result of this construction is when the cord lead wire 27 is pulled by the user to disconnect the plug the strain is transmitted to a point inwardly of the end of the portion 25. The upper end of the portion 25 acts as a pivot and the upward pull on the cord lead wire 27 produces a turning effect on each blade tending to force it inwardly against the inner wall of the slot and tending to jam the lower bent end 20 into its recess 16. It is important that the end 20 remain in its recess 16 to permit free passage of the male contact blades into and out of the slot. Therefore the strain on the cord lead connection 27 and its resultant pivotal action will always keep the blades in proper position and alignment as shown in FIGS. 4 and 5.

We have thus provided a female connector in which the contact blades and husk body are provided with cooperat-

ing portions which when subjected to a pulling strain, tend to retain the blades in proper position in the husk. Other advantages of the present invention will be readily apparent to a person skilled in the art.

We claim:

1. A female connector comprising an integral one-piece body of resilient material having an upper cord receiving chamber and two spaced parallel slots extending downwardly from said chamber through said body, a contact blade seated in each slot against the inner wall thereof, an electrical cord connection to each contact blade extending from said cord receiving chamber, cooperating means between each blade and slot to lock said blade against axial movement in said slot, and cooperating means between each blade and slot to force each blade against the inner wall of its slot when a pulling strain is applied to the electrical cord connection, said last named means comprising an integral portion extending from the upper end of each blade beyond said electrical cord connection, said integral portion being bent at an outward angle and entering a recess in the outer wall of its slot, the cord-connection portion of each contact blade being offset laterally inwardly such that a pulling strain on said cord will tend to pivot the contact blade about said integral portion and against the inner wall of the body.

2. A female connector comprising an integral one-piece body of resilient material having an upper cord receiving chamber and two spaced parallel slots extending downwardly from said chamber through said body, a contact blade seated in each slot against the inner wall thereof, an electrical cord connection to each contact blade extending from said cord receiving chamber, cooperating means between each blade and slot to lock said blade against axial movement in said slot, said means comprising a bent portion at the lower end of each blade entering a corresponding recess in the wall of each slot, and cooperating means between each blade and slot to force each blade against the inner wall of its slot when a pulling strain is applied to the electrical cord connection, said last named means comprising an integral portion extending from the upper end of each blade beyond said electrical cord connection, said integral portion being bent at an outward angle and entering a recess in the outer wall of its slot, the cord-connection portion of each contact blade being offset laterally inwardly such that a pulling strain on said cord will tend to pivot the contact blade about said integral portion and against the inner wall of the body.

3. A female connector comprising an integral one-piece body of resilient material having an upper cord receiving chamber and two spaced parallel slots extending downwardly from said chamber through said body, a contact blade seated in each slot against the inner wall thereof, an electrical cord connection to each contact blade extending from said cord receiving chamber, each blade having a narrow portion adjacent the upper end, spaced integral tangs extending laterally from each side edge of said narrow portion and engaging said electrical cord connection, cooperating means between each blade and slot to lock said blade against axial movement in said slot, and cooperating means between each blade and slot to force each blade against the inner wall of its slot when a pulling strain is applied to the electrical cord connection, said last named means comprising an integral portion extending from the upper end of each blade beyond said narrow portion, said integral portion being bent at an outward angle and entering a recess in the outer wall of its slot, the cord-connection portion of each contact blade being offset laterally inwardly such that a pulling strain on said cord will tend to pivot the contact blade about said integral portion and against the inner wall of the body.

4. A female connector comprising an integral one-piece body of resilient material having an upper cord receiving chamber and two spaced parallel slots extending downwardly from said chamber through said body, a contact blade seated in each slot against the inner wall thereof, an electrical cord connection to each contact blade extending from said cord receiving chamber, each blade having a narrow portion adjacent the upper end, spaced integral tangs extending laterally from each side edge of said narrow portion and engaging said electrical cord connection, cooperating means between each blade and slot to lock said blade against axial movement in said slot, said means comprising a bent portion at the lower end of each blade entering a corresponding recess in the wall of each slot, and cooperating means between each blade and slot to force each blade against the inner wall of its slot when a pulling strain is applied to the electrical cord connection, said last named means comprising an integral portion extending from the upper end of each blade beyond said narrow portion, said integral portion being bent at an outward angle and entering a recess in the outer wall of its slot, the cord-connection portion of each contact blade being offset laterally inwardly such that a pulling strain on said cord will tend to pivot the contact blade about said integral portion and against the inner wall of the body.

5. A female connector comprising a one-piece body of resilient material having an upper cord receiving chamber and two spaced parallel slots extending downwardly therefrom, said body portion having a recess in the inner wall of each slot adjacent the lower end and a recess in the outer wall of each slot adjacent the upper end, the upper end of each slot extending inwardly to form an enlarged slot area, a contact blade seated in each slot, each of said blades comprising a generally rectangular contact portion having an integral lower end bent inwardly and entering said lower recess, each blade having a narrow portion adjacent the upper end and spaced pairs of integral tangs extending from the side edges of said narrow portion, a rectangular portion extending from the upper end of each blade and bent outwardly to enter said upper recess, and an electrical cord connection entering said cord chamber and having a cord lead wire extending to each contact blade, said tangs being crimped over said cord lead connections for electrical contact therewith, said crimped portions extending into the enlarged slot area of each slot, the cord-connection portion of each contact blade being offset laterally inwardly such that a pulling strain on said cord will tend to pivot the contact blade about said integral portion and against the inner wall of the body.

References Cited in the file of this patent

UNITED STATES PATENTS

1,894,112	McNeil	Jan. 10, 1933
2,318,485	Herman	May 4, 1943
2,329,464	Gaynor	Sept. 14, 1943
2,833,998	Alden	May 6, 1958