EMBOSSED MALE TAB FOR USE WITH QUICK CONNECT TERMINALS

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EMBOSSED MALE TAB FOR USE WITH QUICK CONNECT TERMINALS

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4 Claims

ABSTRACT OF THE DISCLOSURE

A universal, reversible male tab for use with any con-
ventional female terminal. The tab includes a centrally
embossed strip area located on each side of the tab tongue
and plain strip area on each side of the embossed strip
areas.

This application is a continuation-in-part of my pending
application Ser. No. 524,704, filed February 3, 1966, and
now abandoned, for Embossed Male Tab For Use With
Quick Connect Terminals.

The present invention relates to an improved electrical
connection, and more particularly to an improved male
tab for use with quick connect terminals.

It is a principal object of the invention to provide a
novel and improved male tab for use with a fem-

male terminal and of a modified form of male tab in which
a simplified form of embossing is employed which includes
strengthening ribs;

FIG. 6 is a sectional view in side elevation of the
male tab taken on a line 6-6 of FIG. 5;

FIG. 7 is a sectional view in side elevation of the
male tab taken on a line 7-7 of FIG. 5; and

FIG. 8 is a cross-sectional view of the male tab taken
on a line 8-8 of FIG. 5.

The manufacture of combined male tab and contact
spring units for use in electrical circuits has presented
some problems for the reason that the resilient switch arm,

FIGS. 1 to 4 inclusive illustrate a presently preferred
form of the invention in a male tab 10 having four individ-
ual switch arms 12, 14, 16 and 18 formed integrally
therewith. The male tab is adapted to be joined with
a female terminal 20 which may be of ordinary construc-
tion consisting of a base element 22 having a centrally disposed
upwardly bowed control spring element 23 provided with
a detent 24, and side walls 20 and 26 bent inward to overlie
edge portions of the top face of the inserted male tab
10.

The male tab 10 comprises a strip of bronze material
having the desired qualities of electrical conductivity,

strength, resiliency, and the like, which may be .000
inch in thickness. It will be understood that other suit-
able materials, of which beryllium copper is an example,
are available, and that the gage may be as little as .014
inch or even less if so desired. The tongue portion 30
of the male tab 10, shown on an enlarged scale in FIG.

2, is assembled to be ¼ inch wide in order to fit ex-
actly within the female terminal 20, and is formed with
two shoulders 32 which engage against the side walls
26 of said holder. Two rows of bosses 34 extend down

middle of the tongue providing a series of raised

boses on both sides. It will be understood that the male

tab may be made in other widths, for example ¼" or

¼", to fit correspondingly dimensioned female terminals.

The embossing is continued onto the widened base

of the tongue and is there extended laterally by two ad-

ditional rows of bosses 35 at each side thereof. It will

be noted that the two centrally disposed rows of bosses 34

on each side of the tongue are interrupted at the middle

length to provide a detent receiving well 36 on each side

of the tongue. When the tongue 30 is now pushed

into the female terminal 20 either side up, the

bosses 34 formed on the downwardly facing side of the
tongue will be engaged against the base 22 including
the spring element 23, and the detent 24 will be en-
gaged within the detent receiving well 36. The bent over
portions of side walls 26 of the holder extend over the upper face of the tongue 30 a sufficient distance only to engage portions of the upper face of the tongue, but not the bosses thereon. In this form of the invention the height of the bosses on both sides of the tongue is gaged so that the height of the bosses above one side only of the tongue 30, added to the .020 inch gage thickness of the tongue, will equal the .032 inch deep aperture of the holder as indicated in FIG. 4. The detent 25 interlocks with adjacent bosses to hold the tab 10 in place as specifically shown in FIG. 3. Since the two sides of the tongue 30 are substantially symmetrical, the tab 10 is reversible and may be inserted in the female terminal either side up.

Referring to FIGS. 2 and 3 of the drawing, a housing wall is indicated at 50 having formed therein a slot 52 of a width to receive a widened base section 54 of the male tab 10, and also of the correct depth to receive the male tab 10. In order to permit the male tab to be mounted through the slot 52, the depth of the slot 52 should equal the sum of the heights of the bosses on both sides of the tongue added to the thickness of the metallic material from which the tongue is made. The tongue 30 and a widened base section 54 of the male tab having been inserted through the slot 52, the male tab is locked in position by staking at 56 as shown in FIG. 2.

FIGS. 5, 6, 7 and 8 illustrate a further modification of the invention in which the embossing has been simplified, and in which ribs have been formed in the base portion of the male tab to prevent bending of the relatively thin element. The female terminal 20 into which the male tab is fitted is shown in alignment with the male tab in position to be connected thereto. In the embodiment of FIGS. 7 to 10 inclusive, since the male tab is formed with a narrow embossed area disposed entirely between the inner edges of the inwardly bent side walls 26 of the female terminal, the height of the bosses on one side only of the tongue added to the thickness of the tongue, will equal the depth of the aperture of the holder. In this respect the arrangement is similar to that illustrated in FIG. 4 of the drawings.

Referring to FIG. 5, the male tab 58 is formed with a widened base portion 59 generally similar to that shown at 54 in FIG. 2, which is adapted to be fitted into a slot 52 of a housing wall 60 and to be held in position by staking 56. The male tab 58 is assumed to be .020 inch in thickness, and the tongue portion 60 to be .032 inch wide in order to fit exactly within the female terminal 20. The male tab is formed with a base portion having two shoulders 62 which engage against the side walls 26 of the holder. The bosses formed on each side of the male tab are .012 inch in height, so that regardless of which side up the male tab is thrust into the female terminal 20 the male tab will be held firmly in the manner shown in FIG. 4. It will be noted further that in the embodiment of FIGS. 5 to 8 inclusive a groove 63 is formed in the lower surface of the slot 52 through the housing wall 60 to receive the bosses formed in the under side of the male tab 58.

In the form of the invention illustrated in FIGS. 5 to 8 the construction and arrangement of the bosses has been simplified and improved to provide a male tab of greater strength and rigidity. The bosses provided toward the outer end of the tab comprise two offsets 64, 66 in side-by-side relation, the offset 64 sloping gradually upward from the end of the tab and terminating in a flat, sharply squared-off end offset from the upper surface of the tab, the other offset sloping gradually downwardly from the other side of the tab and terminating similarly in a flat, squared-off end offset from the under surface of the tab. The relatively great length of the two bosses 64, 66 causes these elements to act as ribs substantially increasing the strength and rigidity of the tip portion of the male tab.

The bosses provided toward the base end of the tab comprise also only two offset bosses 68 and 70 having squared-off ends in side-by-side relation, one boss being offset to the upper side of the male tab, while the other is offset to the under side of the tab. One offset boss 68 constitutes a strengthening rib of substantial length extending from adjacent the central portion of the tab onto the base portion 59. The other boss 70, offset from the opposite surface of the male tab, is no more than a square dot with an offset flat surface having a sharply squared-off end surface for engagement with the spring detent surface 23 of the female terminal 20. Except for the very limited area covered by the boss 70, the boss or rib 68 is of a width equal to the sum of both bosses.

The base portion 59 of the male tab is further strengthened by two offset ribs 72 and 74 which extend longitudinally of the upper side of said base portion, one at each side of the rib 68. The ribs 72 and 74, in addition to strengthening the base portion, provide contact surfaces which engage against the upper wall of the slot 52 formed in the housing wall 60, the opposite wall being engaged by the under side of the base portion 59 of the male tab 58. The bosses 66 and 70, which project from the under side of the male tab 58, are received through the housing wall 60 in a recess 76 formed in the under side of the slot 52, when the parts are assembled by the projection of the tip end of the male tab 58 into its operative position through the housing wall 60.

The embossed male tab herein disclosed has been found to cooperate in a most effective manner with commercially available female holders in that the bosses employed to add to the thickness of a thin gage material form a tongue of the desired thickness which is of rigid construction, providing hard electrically efficient contact surfaces, and is particularly well adapted for use in a male tab and spring connector unit which is of a simple low-cost one-piece construction, and is available in any desired form for use in a variety of electrical circuits.

The invention having been described, what is claimed is:

1. A reversible male tab for use with female terminals of the type having a tab receiving aperture formed of a bottom face including a spring mounted detent adapted for engaging against one side of said male tab, and guides having longitudinally-extending, transversely-spaced surfaces adapted for engaging the opposite side of said tab, said male tab comprising:
   a. a flat aperture-entering tongue formed from an electrically conducting material of a thickness adapted to be substantially less than the depth of said aperture between said bottom face including said spring mounted detent and said opposite side engaging surfaces,
   b. said tongue being formed with bosses defining a centrally-located embossed strip area extending longitudinally along each of said sides of the tongue, and a plain, longitudinally-extending strip area of substantial width extending between each side of each said centrally-located embossed strip area and the adjacent edge of the tongue,
   c. said bosses being raised from the surface of the tongue by an amount which, added to the thickness of said electrically conducting material, provides an aperture-entering tongue of a thickness suitable to be accepted by said female terminal with the embossed strip area on one side of said tab engaging said bottom face and the plain strip areas on the other side of said tab engaging said guide surfaces,
   d. said male tab having a base portion formed as a continuation of said tongue, one of said bosses being longer than the other bosses, said longer boss extending longitudinally into said base providing a strengthening rib, and said tongue having engagement
means to hold the spring mounted detent of the female terminal.

2. The combination of claim 1, in which said bosses include toward the tongue tip of said tab two bosses in side-by-side relation, said bosses being offset to opposite sides of said tab with long tapers extending toward the tip of said tab and at their base ends sharply contoured spring-mounted detent engaging surfaces, and toward the base of said tongue two bosses in side-by-side relation offset to opposite sides of said tab having sharply contoured spring-mounted detent engaging surfaces, one of said latter bosses providing said strengthening rib.

3. An embossed male tab according to claim 1 adapted to be supported through an aperture formed in a supporting wall in which the base portion of the male tab has formed in the upper face thereof parallel strengthening ribs, one located toward each side edge of said base portion, of a height to be received with said base portion through said aperture, said aperture having formed in the underside thereof a narrow recess adapted to receive the underside embossing of said male tab.

4. A reversible male tab for use with female terminals of the type having a tab receiving aperture formed of a bottom face including a spring mounted detent adapted for engaging against one side of said male tab, and guides having longitudinally-extending, transversely-spaced surfaces adapted for engaging the opposite side of said tab, said male tab comprising:

a flat aperture-entering tongue formed from an electrically conducting material of a thickness adapted to be substantially less than the depth of said aperture between said bottom face including said spring mounted detent and said opposite side engaging surfaces; and

a base portion formed as a continuation of said tongue, said tongue including toward the tip thereof a first substantially non-resilient embossed portion comprising bosses connected together in side-by-side relation offset to opposite sides of said tongue and having sharply contoured spring-mounted detent engaging surfaces toward said base portion, toward the base portion of said tab a second substantially non-resilient embossed portion comprising bosses connected together in side-by-side relation offset to opposite sides of said tongue and having sharply contoured spring-mounted detent engaging surfaces toward the tongue tip, and a plain detent engaging surface intermediate said first and second embossed portions, said bosses defining centrally-located embossed strip areas extending longitudinally along each of said sides of said tongue and a longitudinally-extending plain strip area of substantial width extending between each side of each of said centrally-located strip areas and the adjacent edge of the tongue, said bosses being raised from the surface of the tongue by an amount which, added to the thickness of said electrically conducting material, provides an aperture-entering tongue of a thickness suitable to be accepted by said female terminal with embossed strip area on one side of said tab engaging said bottom face and the plain strip areas on the other side of said tab engaging said guide surfaces.

References Cited

UNITED STATES PATENTS

1,808,555 6/1931 Ishimaru.
2,198,704 4/1940 Lazich.
2,914,745 11/1959 Krol et al. 339—220
3,221,094 11/1965 Cherry 339—220

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339—220, 278