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(54) **INSULATED JUMPER IN PARTICULAR FOR TERMINAL BLOCKS OF SWITCHBOARDS**

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See application file for complete search history.

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(57) **ABSTRACT**

Electrical connection jumper, in particular for terminal blocks of switchboards, comprising a conducting body extending in the longitudinal direction and a plurality of connector elements for electrical connection, which extend in the transverse direction from said conducting body, and an insulating body, integral with said conducting body, said insulating body comprising a longitudinally extending gripping part and pairs of lugs which extend therefrom in a substantially transverse direction and are able to contain partially said conducting body.

16 Claims, 1 Drawing Sheet

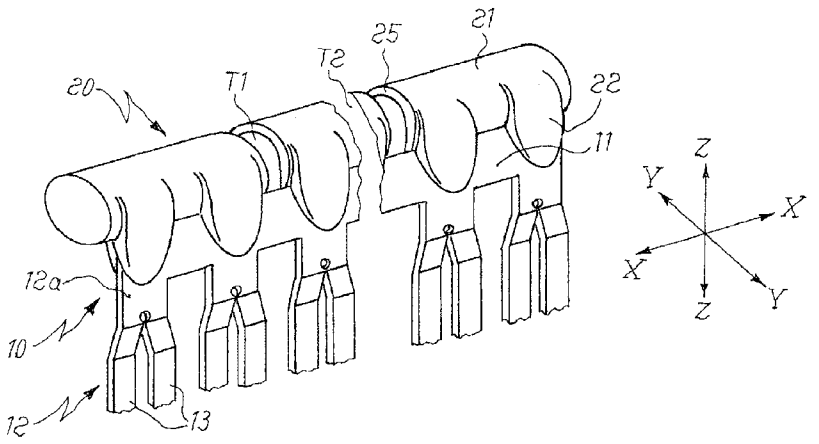

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Fig.1

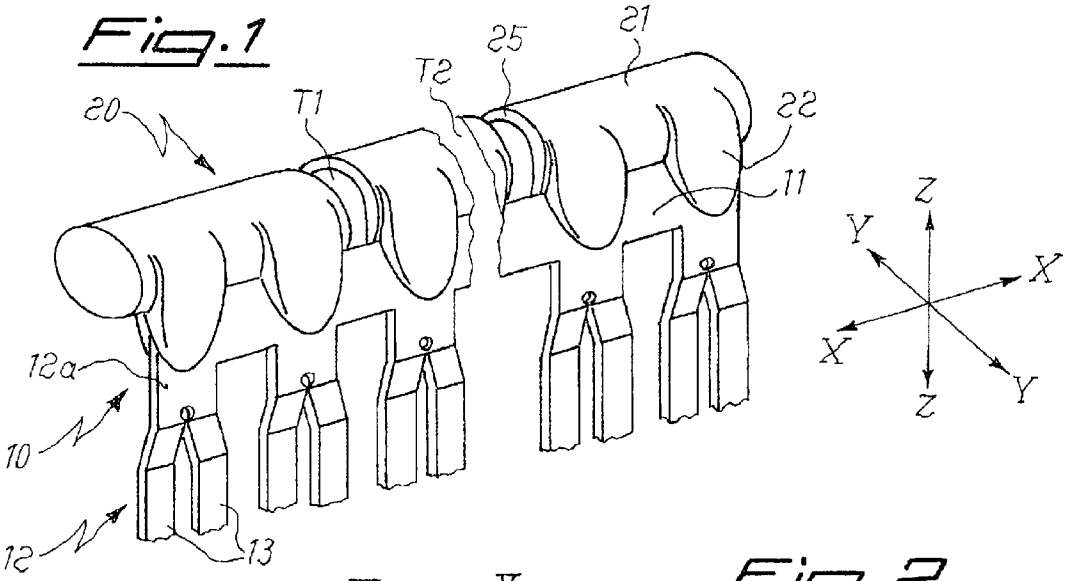


Fig.2

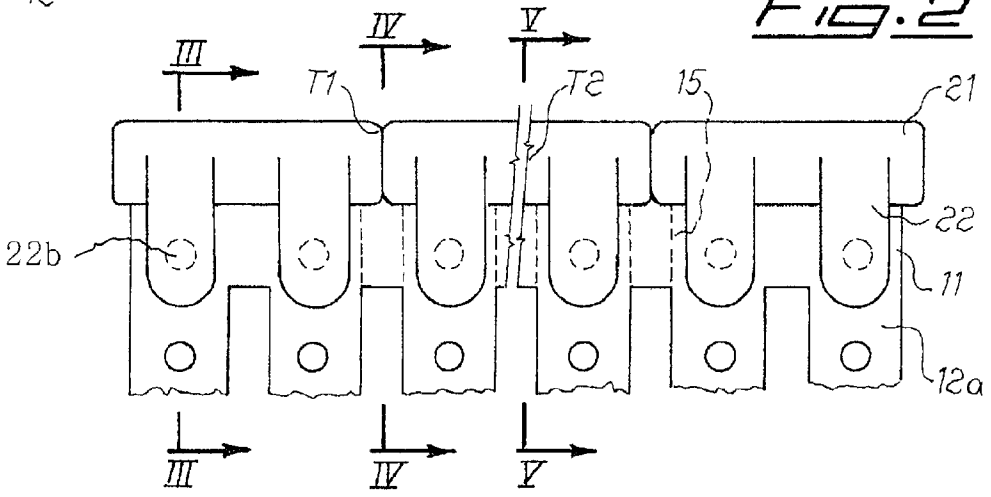


Fig.3

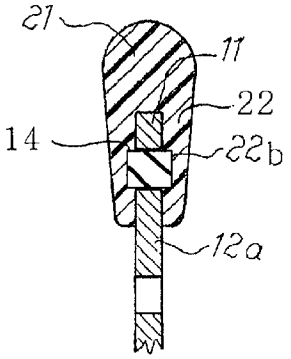


Fig.4

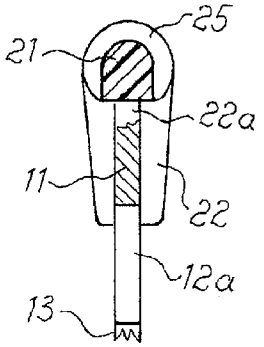
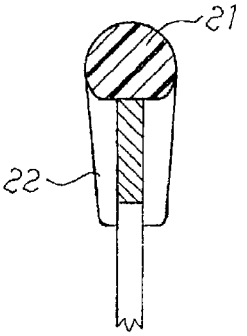


Fig.5



INSULATED JUMPER IN PARTICULAR FOR TERMINAL BLOCKS OF SWITCHBOARDS

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

BACKGROUND

1. Technical Field of the Invention

The present invention relates to an insulated jumper in particular for terminal blocks of switchboards and the like.

2. Description of the Prior Art

It is known in the technical sector relating to terminal blocks for switchboards that there exists the need to connect together two terminals arranged alongside each other on the board in order to form the required electric circuit.

Jumpers made of conductive material and designed for this purpose are also known; said jumpers are formed by a conductive metal strip extending in a substantially longitudinal direction having, extending from it in a direction perpendicular to the above direction, flat pins formed in the manner of two resilient jaws able to form the part for engagement in the seat of the terminal block.

These known jumpers, although fulfilling their purpose, since they can be easily cut in the transverse direction in order to determine correct measurement in the longitudinal direction, have the drawback, however, that they cannot be electrically insulated with respect to the exterior, in particular at the time of use by a user; this results in a high risk of contact with the user him/herself and/or with foreign bodies and therefore injury both for the former, who may suffer an electric shock, and damage for the system which is short-circuited.

In order to solve the problem of insulation, jumpers are also known where the conductive strip is embedded in an insulating body; in this case also, however, there is the risk of drawbacks arising from the fact that cutting to size of the jumper is difficult owing to the double and different superimposed material, which requires complicated cutting operations using different tools respectively adapted to the type and thickness of material to be cut, making cutting practically impossible.

SUMMARY

The technical problem which is posed, therefore, is to provide electrical connection jumpers, in particular for terminals of switchboards, which are able to be cut to size and ensure perfect insulation of the visible conducting parts so as to prevent them from coming into contact with the user and/or with foreign bodies, causing short-circuits of the system.

In connection with this problem it is also required that this jumper should have small dimensions, be easy and inexpensive to produce and assemble and be able to be adapted easily at any user location using cutting means which are easy and inexpensive to provide.

These results are obtained according to the present invention by an electrical connection jumper, in particular for terminal blocks of switchboards and the like, comprising a conducting body extending in the longitudinal direction, a plurality of connector elements extending in the transverse direction from said conducting body, and an insulating body, integral with said conducting body, said insulating body comprising a longitudinally extending gripping part and pairs of oppositely arranged lugs which extend therefrom and are able to contain partially said connector elements.

BRIEF DESCRIPTION OF THE FIGURES

Further details may be obtained from the following description of a non-limiting example of embodiment of the subject of the present invention provided with reference to the accompanying drawings in which:

FIG. **1** shows a perspective view of a jumper according to the present invention, in its entirety;

FIG. **2** shows a side view of the jumper according to FIG. **1**;

FIG. **3** shows a schematic cross-section along the plane indicated by III-III in FIG. **2**;

FIG. **4** shows a schematic cross-section along the plane indicated by IV-IV in FIG. **2**; and

FIG. **5** shows a schematic cross-section along the plane indicated by V-V in FIG. **2**.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

As shown in FIGS. **1** and **2** and assuming solely for the sake of convenience of the description and without a restrictive meaning, a set of three reference axes with a longitudinal direction X-X, transverse direction Y-Y and vertical direction Z-Z, respectively, the jumper for terminal blocks of switchboards according to the present invention comprises essentially: a conducting body **10** extending in the longitudinal direction X-X in the form of a thin strip **11** which has suitable dimensions for the electric load envisaged, and a plurality of connector elements **12** which extend in the transverse direction Y-Y from said strip **11** and are formed by a neck **12**a which is extended by one or more (two in the example of the figure) flat pins **13** for connection to the terminal (not shown).

The conducting body **10** is integrally joined to an insulating body **20** comprising a substantially continuous, longitudinally extending gripping part **21** which, in the example shown in the figure, has a circular cross-section with, extending from it, pairs of lugs **22** symmetrically arranged opposite each in the transverse direction Y-Y and aligned with each other in the longitudinal direction at a constant interval.

The lugs **22** of each pair are suitably spaced from each other in the transverse direction Y-Y so as to form a respective seat **22**a in the vertical direction, such as not to penetrate into the gripping part **21** of the longitudinally extending insulating body **20**.

As shown in FIG. **3**, said lugs **22** have pins **22**b extending in the transverse direction Y-Y and suitable for engagement with a corresponding seat **14** open in the transverse direction in the neck **12**a of the conducting part **10**.

In this way the connection between conducting body **10** and insulating body **20** ensures that the gripping part **21** of the said insulating body is free of electrical conduction.

Advantageously this connection is obtained by overmoulding the insulator onto the conducting body.

It can also be seen how, at the opposite ends, the insulating body always projects in the longitudinal direction X-X beyond the conducting body, thus ensuring insulation of the jumper with respect to the user.

This configuration provides numerous advantages compared to the prior art since, when the jumper is cut to size, it will be possible to cut separately the insulating material and the conducting strip, thus ensuring the ease of cutting using conventional tools.

In addition to this, cutting may be performed both in a position T**1** predisposed for cutting (FIG. **4**) by means of an

annular undercut **25** of the gripping part and in a position T**2** which is not predisposed for cutting (FIG. **5**), while keeping, however, the gripping part totally insulated.

Said predisposed cutting zone T**1** or non-predisposed cutting zone T**2** is situated between two pairs of lugs **22** which are adjacent in the longitudinal direction, and the vertical cutting plane of the conducting part is inset in the longitudinal direction with respect to the cutting plane of the insulating body; correspondingly cutting of the conducting body **10** produces zones **15** where the conductor is inset in the longitudinal direction with respect to the cutting zone T**1**/T**2** of the gripping part **21**; in this way, since it is possible to obtain a free conducting edge which is set back from the insulating body, the risks of contact with the conducting part are reduced considerably.

Although illustrated and described in relation to a strip extending longitudinally as appropriate and to be cut, subsequently, to size, it is envisaged also that the jumper may be designed in modular form with a single connection body, with two or more bodies, or with a non-uniform succession of cutting zones determined by the alternating arrangement of jumpers with one, two or three, etc. connections.

Although not shown, it is envisaged moreover that the electrical connection part **13** may be formed with a screw element and/or clamp element as required and/or appropriate.

It can therefore be seen how with the electrical connection jumper for switchboard terminal blocks according to the present invention it is possible to achieve easily the production and/or cutting to size of the jumper and at the same time insulation of the gripping part which no longer contains the conducting part.

The invention claimed is:

1. An electrical connection jumper for terminal blocks of switchboards, comprising a conducting body extending in a longitudinal direction and a plurality of connector elements for electrical connection, which extend in a transverse direction from said conducting body, and an insulating body, integral with said conducting body, wherein said insulating body comprises a longitudinally extending gripping part and pairs of lugs which extend there from in a substantially transverse direction and partially contain said conducting body, wherein the pairs of lugs are spaced from each other in the transverse direction so as to form a respective seat for the conducting body.

2. The jumper according to claim **1**, wherein said gripping part of the insulating body is continuous.

3. The jumper according to claim **1**, wherein said lugs are arranged symmetrically opposite each other in the transverse direction.

4. The jumper according to claim **1**, wherein a depth in the vertical direction of said seat formed by the lugs is such as not to penetrate into the gripping part of the insulating body extending longitudinally.

5. The jumper according to claim **1**, wherein the conducting body includes at least one neck and at least one connection element extending from each neck.

6. The jumper according to claim **5**, wherein said lugs have at least one pin extending in a transverse direction and engaging a seat which is open in the transverse direction in the neck of the conducting body.

7. The jumper according to claim **6**, wherein said connection element comprises one or more flat pins which extend in the transverse direction from said neck for connection to a switchboard terminal.

8. The jumper according to claim **6**, wherein said connection element comprises screw means which extend in the transverse direction from said neck for connection to a switchboard terminal.

9. The jumper according to claim **6**, wherein the lugs are partially overmoulded onto the neck of the conducting body.

10. The jumper according to claim **6**, wherein the neck is formed as a strip of suitable length in the longitudinal direction.

11. The jumper according to claim **1**, wherein the insulating body is overmoulded onto the conducting body.

12. The jumper according to claim **1**, wherein said gripping part of the insulating body has at least one annular undercut that defines a cutting zone of the gripping part that is predisposed for transverse cutting.

13. The jumper according to claim **12**, wherein said cutting zone is situated between two pairs of lugs adjacent in the longitudinal direction.

14. The jumper according to claim **12**, wherein a vertical cutting plane of the conducting body is aligned in the longitudinal direction with respect to the cutting zone of the gripping part.

15. The jumper according to claim **1**, wherein said pairs of lugs symmetrically arranged opposite each other in the transverse direction are spaced from each other in the longitudinal direction at a constant interval.

16. The jumper according to claim **1**, wherein the opposite ends of the insulating body project in the longitudinal direction with respect to the conducting body.

* * * * *