

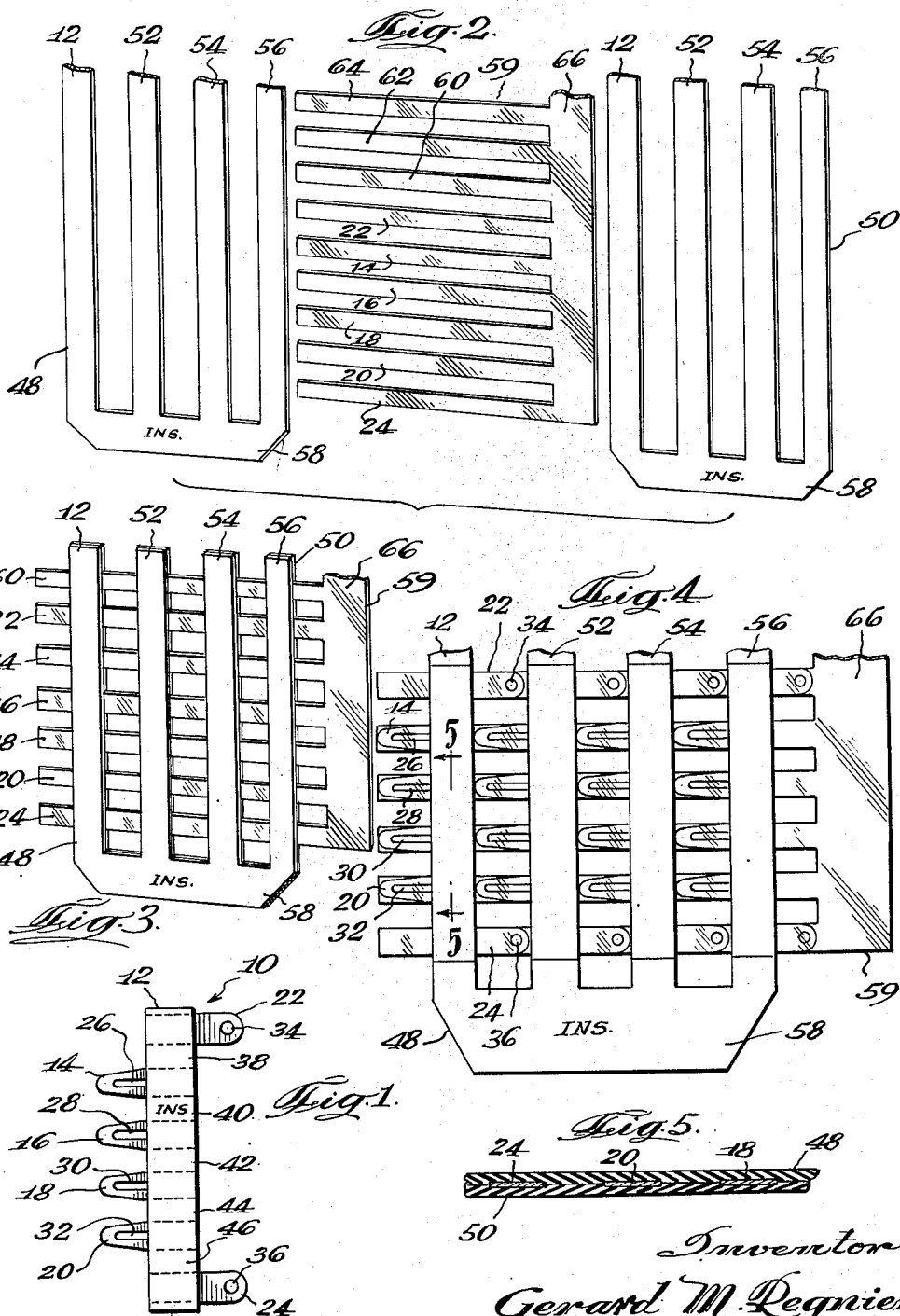
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METHOD FOR MAKING TERMINAL STRIPS AND THE LIKE

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## UNITED STATES PATENT OFFICE

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METHOD FOR MAKING TERMINAL STRIPS  
AND THE LIKE

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This invention relates to radio terminal strips and the like, and to a novel method for manufacturing the same. More particularly, the invention is directed to a production method for manufacturing terminal strips comprising insulating mounting strips and having electrical conducting terminal lugs affixed thereto.

In the construction and assembly of electrical devices containing wiring systems such as phonographs, radios, television sets, testing equipment, electrical or electronic amusement machines and the like, terminal strips are used extensively for mounting, connecting and guiding electrical conductors. Heretofore these strips have been manufactured by affixing terminal and mounting lugs, made of electrical conductive materials such as brass, copper and the like, which have previously been shaped and cut to the desired size and form, to strips of non-conductive materials such as wood, rubber, plastics and the like. Obviously such a method of manufacture required considerable skill, time and labor.

It is, therefore, a primary object of this invention to provide a terminal strip and method for manufacturing the same which will overcome all of the disadvantages set forth above.

Another object is to provide a radio terminal strip and the like having both its lugs and mounting strip integrally formed.

A further object is to provide a novel method for manufacturing terminal strips, mounting lugs, sliding multiswitches and the like.

Still another object is to provide a method for manufacturing terminal strips and the like which entirely eliminates the necessity for affixing the metallic members of the strip to the mounting strip.

Still a further object is to afford a method for manufacturing terminal strips and the like which permits the substitution of metallic sheets and plates for strip material.

Yet a further object is to provide a method for manufacturing terminal strips and the like in which the conductor members are bonded to the non-conductive member.

Yet another object is to afford a method for manufacturing terminal strips and the like which eliminates a number of costly manufacturing operations.

And still a further object is to provide a terminal strip and the like of sturdy construction, but yet less expensive than those now being used.

For the purpose of facilitating an understanding of my invention I have illustrated in the accompanying drawings a preferred embodiment

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thereof together with diagrams, from an inspection of which, when considered in connection with the following description together with my discussion thereof, should result an understanding of the manner of practicing the methods of this invention, the construction, assembly and use of the invention and an appreciation of the many advantages inherent therein.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a top plan view of a radio terminal strip embodying the principles of this invention;

Fig. 2 is an exploded perspective view of the blanks from which the terminal strip is made;

Fig. 3 is a perspective view of the assembled blanks shown in Fig. 2, and illustrates the next step in the method of manufacturing the radio terminal strips;

Fig. 4 illustrates the next step in the method of manufacturing the terminal strips; and

Fig. 5 is a cross sectional view taken on line 5—5 in Fig. 4, viewed in the direction indicated and showing how the members are bonded together.

Referring now to Fig. 1 of the drawings, reference numeral 10 indicates a radio terminal strip comprising a mounting member 12, terminal lugs 14, 16, 18 and 20 and mounting lugs 22 and 24.

The mounting strip 12 may be made from an electrical insulating material such as rubber, wood, plastics, pressed fibre and the like, but I prefer to use a laminated paper fifty per cent (50%) impregnated with a phenolic resin such as phenol-formaldehyde. This affords a thermo-setting plastic such as is marketed under the trade name "Lamicoid." There are a number of other thermo-setting plastics as well as thermoplastics which may serve equally well.

The terminal lugs 14, 16, 18 and 20 may be formed with slot shaped perforations 26, 28, 30 and 32 to which the wires may be affixed as by soldering. These strips may be formed from any electrically conductive material such as brass, bronze, copper, plated metals and the like. However, I prefer to use plated brass because of its favorable soldering characteristics. The mounting lugs 22 and 24 may also be perforated as at 34 and 36 for mounting purposes.

It will be noted that all of the lugs are formed from the protruding ends of strips which are embedded in the mounting strip 12 as illustrated in dotted outline in Fig. 1 of the drawings. However, all of the lugs are insulated one from the other

by portions of the mounting strip 12 as at 38, 40, 42, 44 and 46.

In my novel method of manufacturing the terminal strips, sheets of uncured Lamicoid, or the like, are formed, as by stamping, into blanks such as 48 and 50 having longitudinal strips such as 12, 52, 54 and 56, separated one from the other, but joined at one end by a blank portion 58.

A sheet of electrically conductive metal 59 is then stamped to afford transverse strips such as 24, 20, 18, 16, 14, 22, 60, 62 and 64. These strips are also separated one from the other, but are likewise joined at one end by a blank portion 66.

In the next step the plastic blanks 48 and 50 are positioned so that their corresponding longitudinal strips are aligned, one with the other, and the metallic sheet 59 is then inserted therebetween so that its transverse strips such as 14 to 64 are positioned between the plastic strips 12, 52, 54 and 56 as shown in Fig. 3 of the drawings. A number of such assembled units, each separated by a pressing plate, are then placed in a hydraulic laminating press and subjected simultaneously to heat and pressure so that the plastic flows around the metal strips to form a tight bond therewith as shown in Fig. 5 of the drawings. I have found that a temperature ranging from 250° F. to 400° F., and a pressure of from 2,500 pounds per square inch to 5,000 pounds per square inch produces the best results. This pressure and temperature should be maintained for a period of from six (6) to fifteen (15) minutes to insure proper bonding. This period I call "the curing cycle." After the "curing cycle" is completed and the plastic is properly set, the sheets are then removed from the press and the metallic strips are perforated, as by stamping, to afford a semi-finished blank such as shown in Fig. 4 of the drawings. This blank is then cut into the separate mounting strips such as that illustrated in Fig. 1.

If desired, the last two steps may be combined by using a progressive die which will both perforate and cut the material at the same time. Likewise, a single plastic blank may be utilized for each metallic blank 59 by merely folding a sheet such as 53 along a transverse axis (book fashion) to envelope the metallic sheet 59. The laminating press may be of the hydraulic or air type and may be electrically, steam or otherwise heated. It should also be understood that the various steps may be somewhat altered or performed in different sequence. Thus, the bonded blank may first be cut into individual strips and then perforated.

It should be understood that the number, shape and form of the terminal lugs as well as of the mounting lugs may be varied considerably within the purview of this invention without departing therefrom. Thus, for example, T shaped terminal lugs may be provided. Furthermore, sliding multiswitches and other devices utilizing electrically conductive strips insulated one from the other may be formed by using the novel method above described.

It should also be understood that the metallic strips used in this device may be derived from spools of metal strips rather than by stamping the same from metal sheets.

It should be obvious from the above description that the novel method of making terminal strips, which is the subject of this invention, not only permits manufacture on a production basis, eliminates a number of costly steps and reduces the amount of labor required to manufacture the same, but also affords a much sturdier terminal strip since the mounting and terminal lugs are

integrally formed with the mounting member rather than merely affixed thereto as by flanging, riveting or soldering.

While I have set forth certain theoretical explanations of the method of manufacturing my invention, I do not wish to be limited by such theories, since the results obtained may or may not be explained thereby. Such explanation has been included only with the view that the specification may be made clear and more complete. It is my desire to secure the invention as pointed out in the appended claims regardless of the theory upon which it is based. It is believed that my invention in all of its phases has been clearly set forth herein such that the practicing of the method and construction of the device should be readily understood without further description, and it should be manifest that the details of the method and of the embodiment described are capable of wide variation within the purview of the invention as described in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. The method of manufacturing terminal strips and the like which comprises the steps of assembling a plurality of parallel arranged but separated electrical conductors between a plurality of pairs of aligned insulating strips, the axes of said conductors and insulating strips being substantially perpendicular to each other, said pairs of insulators spaced one from the other to afford exposed portions of said conductors therebetween, subjecting said assembled insulators and conductors to heat and pressure until the same are fused together into a blank, simultaneously perforating the exposed portions of said conductors and punching through said blank along an irregular line passing through the inner conductor strips adjacent the rearward edge of one insulating strip and through the outer conductor strips adjacent the forward edge of the next rearward insulating strip thereby simultaneously forming the lugs and severing a finished terminal strip from the blank.

2. The method of manufacturing terminal strips and the like which comprises the steps of forming a sheet of insulating material to afford a blank consisting of a plurality of parallel strips joined together at one end thereof, folding said blank about its transverse mid-axis to envelop a plurality of parallel arranged but separated electrical conductors therebetween, the axes of said conductors and insulators being substantially perpendicular to each other, fusing said conductors and insulators together, simultaneously perforating the exposed portions of said conductors and punching through said blank along an irregular line passing through the inner conductor strips adjacent the rearward edge of one insulating strip and through the outer conductor strips adjacent the forward edge of the next rearward insulating strip thereby simultaneously forming the lugs and severing a finished terminal strip from the blank.

3. The method of manufacturing terminal strips and the like which comprises the steps of forming a plurality of sheets of insulating material to afford blanks consisting of a plurality of parallel strips joined together at one end thereof, forming a plurality of sheets of electrical conducting material to afford similar blanks having a plurality of parallel strips joined together at one end thereof, assembling one of said conductor blanks between two of said insulator blanks so that the axes of said conductor and insulator strips are at substantially right angles to each other and the strips of one insulator blank are aligned with the corresponding strips of the other

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insulator blank, fusing said blanks together, simultaneously perforating the exposed portions of said conductors and punching through said blank along an irregular line passing through the inner conductor strips adjacent the rearward edge of one insulating strip and through the outer conductor strips adjacent the forward edge of the next rearward insulating strip thereby simultaneously forming the lugs and severing a finished terminal strip from the blank.

4. The method of manufacturing terminal strips and the like which comprises the steps of forming a plurality of sheets of phenolic resin impregnated laminated paper material to afford blanks consisting of a plurality of parallel strips joined together at one end thereof, forming a plurality of sheets of metallic electrical conducting material to afford similar blanks having a plurality of parallel strips joined together at one end thereof, assembling each of said conductor blanks between at least two of said insulator blanks so that the axes of said conductor and insulator strips are at substantially right angles to each other and the strips of one insulator blank are aligned with the corresponding strips of the other insulator blank, placing a plurality of said assembled blanks within a laminating press with a pressing plate separating each assembly, subjecting said assembled blanks to a temperature of not less than 250° F. nor more than 400° F. and a pressure of from 2,500 to 5,000 pounds per square inch for a period of from six to fifteen

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minutes, simultaneously perforating the exposed portions of said conductors and punching through said blank along an irregular line passing through the inner conductor strips adjacent the rearward edge of one insulating strip and through the outer conductor strips adjacent the forward edge of the next rearward insulating strip thereby simultaneously forming the lugs and severing a finished terminal strip from the blank.

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