June 5, 1956 W. L. HENDERSON 2,749,525

TRANSFORMER COIL AND INSULATION FOR THE SAME

Filed Nov. 18, 1952

Fig. 1.

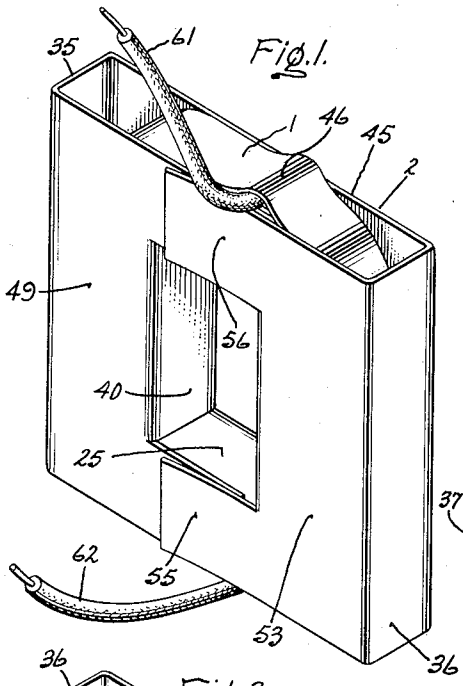


Fig. 2.

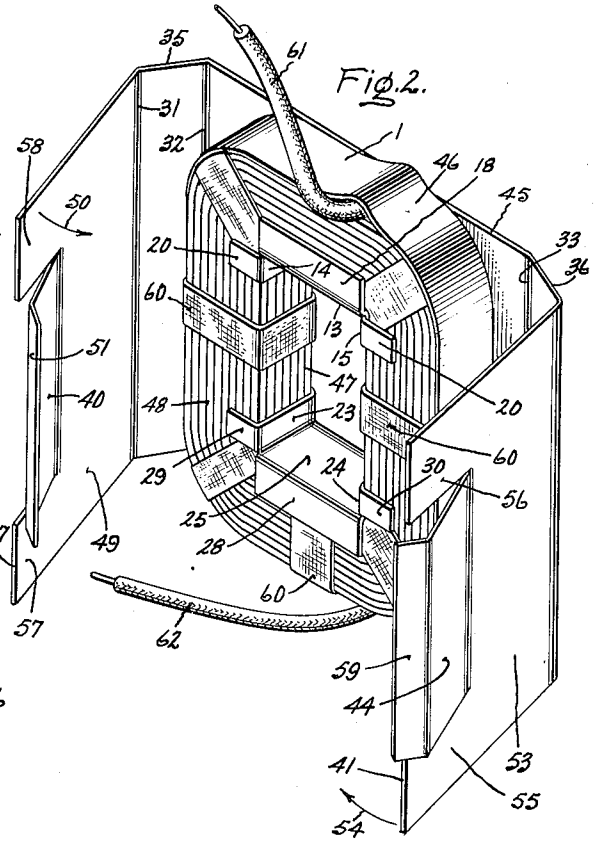


Fig. 3.

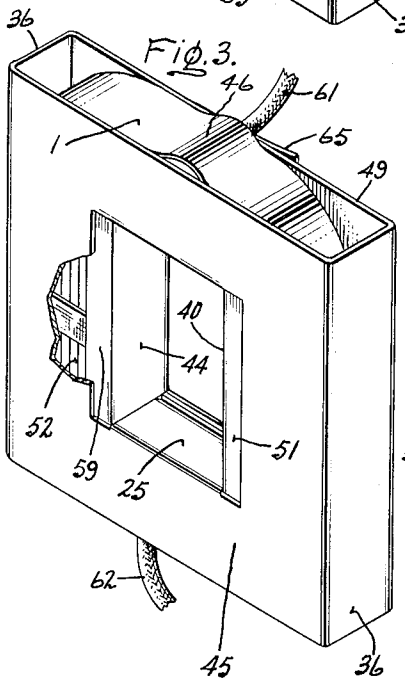
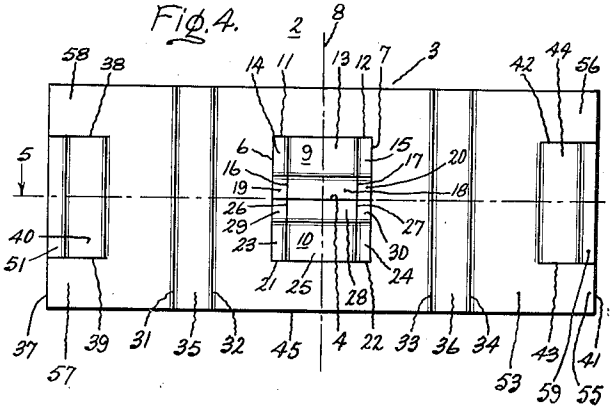


Fig. 4.



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TRANSFORMER COIL AND INSULATION FOR THE SAME

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2 Claims. (Cl. 336—209)

This invention relates to coils for transformers and more particularly to the insulation for such coils.

A conventional transformer comprises a plurality of coils mounted upon an iron core, these coils usually being prewound with a window being provided therein permitting assembly over the core. A recent development in this field has been the so-called precision wound coil wherein the wire forming the coil is wound with each turn of the same layer directly abutting and with each turn of a succeeding layer laying in the groove defined by two adjacent turns of the previous layer. In this way, a coil is formed having the maximum amount of copper in a minimum space. Since the wire with which these precision wound coils are formed is merely insulated with a relatively thin enamel coating, it is necessary to provide additional external insulation to prevent damage to the coil. Heretofore, various arrangements have been provided for insulating precision wound coils, however, these have been characterized by their difficulty of assembly, relatively high cost, and lack of sufficient over-all protection for the coil. It is, therefore, desirable to provide an external insulator for a precision wound transformer coil characterized by its simplicity, ease of assembly on the coil, complete insulation, and finally, relatively low cost.

It is therefore an object of this invention to provide an improved transformer coil having insulation incorporating the desirable features set forth above.

Further objects and advantages of this invention will become apparent and the invention will be better understood by reference to the following description and the accompanying drawing, and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In accordance with this invention, a transformer coil is provided having a substantially rectangular coil window and a coil insulator formed of a substantially rectangular blank of sheet insulation material. The blank has a longitudinal slit formed in its center portion with its ends respectively terminating in a pair of parallel transverse slits thereby defining a pair of center tabs respectively foldable in a direction parallel to the longitudinal dimension of the blank. The center portion of the blank is arranged abutting one face of the coil with the center tabs being respectively folded into the core window and respectively abutting the two sides thereof parallel with the longitudinal dimension of the blank. Each transverse edge of the blank has a pair of spaced apart slits extending longitudinally inward therefrom, defining an end tab foldable in a direction parallel to the transverse edge. One end of the blank is folded over and abutting the other face of the coil with its end tab being folded into the core window and abutting the side thereof adjacent the fold of the said one end of the blank while the other end of the blank is similarly folded over and abutting the other side of the coil and the first end of the blank with its end tab also being

folded into the core window and abutting the side thereof adjacent its fold. In this way, both faces of the coil and its core window are insulated by means of a simple insulator punched from a single blank of insulation material.

In the drawing,

Fig. 1 is a view in perspective showing a transformer coil having the improved insulator of this invention assembled thereon;

Fig. 2 is another view of the coil of Fig. 1 during the process of assembly of the improved insulator of this invention;

Fig. 3 is another view in perspective, partially broken away, further illustrating the assembly of the improved insulator of this invention on a transformer coil; and

Fig. 4 is a plan view showing the improved transformer coil insulator of this invention.

Referring now to the drawing, there is shown a precision wound transformer coil generally identified as **1**, having the improved insulator, generally identified as **2**, of this invention assembled thereon. Referring specifically to Fig. 4, the insulator **2** is formed of a substantial rectangular blank **3** of suitable sheet insulation material. A center slit **4** is punched along the longitudinal center line **5** of blank **3** with its ends terminating in transverse slits **6** and **7** respectively parallel with and evenly spaced on either side of transverse center line **8**. Slits **4**, **6** and **7** define two center tabs **9** and **10** respectively foldable at right angles to the blank **3** as will be hereinafter described.

Center tab **9** has two relatively short slits **11** and **12** extending transversely inwardly from the outer ends of transverse slits **6** and **7** thereby defining a center section **13** and side sections **14** and **15** of tab **9**. Tab **9** also has two relatively short slits **16** and **17** extending transversely inwardly from slit **4** on the line of the inner ends of longitudinal slits **11** and **12** thereby defining an outer portion **18** of center section **13** of tab **9**, and outer portions **19** and **20** of side sections **14** and **15** of tab **9**. Tab **10** has similar longitudinal slits **21** and **22** defining side sections **23** and **24** and center section **25** and similar transverse slits **26** and **27** defining end portions **28**, **29** and **30**. Side sections **14** and **15** of tab **9** are respectively foldable at right angles with respect to center section **13**, and end portions **18**, **19** and **20** are respectively foldable at right angles with respect to center section **9**, and side sections **14** and **15**. Side sections **23** and **24** of tab **10** are similarly foldable at right angles with respect to center section **25** and end portions **26**, **27** and **28** are also foldable at right angles with respect to sections **23**, **24** and **25**.

A pair of parallel spaced apart creases **31** and **32** are formed on one side of transverse center line **8** while another pair of similar transverse creases **33** and **34** are formed on the other side of transverse center line **8**, these transverse creases respectively defining end sections **35** and **36** as will be hereinafter described. The transverse end **37** of blank **3** has a pair of parallel slits **38** and **39** extending longitudinally inward thereby defining end tab **40**, while the other transverse end **41** has a similar pair of longitudinally inwardly extending slits **42** and **43** defining end tab **44**.

Referring now to Fig. 2, the center portion **45** of blank **3** in which tabs **9** and **10** are located and defined by creases **32** and **33** is positioned abutting face **52** of coil **1**. It will be seen that the outer periphery of coil **1** is surrounded by a strip of suitable insulating material **46** and the coil defines a substantially rectangular coil window **47**. Tabs **9** and **10** are respectively bent into coil window **47** with section **25** of tab **10** abutting one side of window **47** parallel to longitudinal axis **5** of blank **3** and with the other center section **13** of tab **9** similarly abutting the

opposite side of core window 47. Outer ends 28 and 18 of center sections 29 and 30 respectively are folded over at right angles thereto and abut the face 48 of coil 1. Side sections 23 and 24 of tab 10 are bent over at right angles to center section 25 and respectively abut the sides of core window 47 parallel to transverse axis 8 of blank 3. End portions 29 and 30 are folded over at right angles beside sections 23 and 24 and abut the face 48 of coil 1. Side sections 14 and 15 of tab 9 are similarly folded over at right angles to center section 13 and respectively abut the same sides of core window 47 as side sections 23 and 24 of tab 10. End portions 19 and 20 are similarly bent over at right angles to side sections 14 and 15 and abut face 48 of coil 1.

In the next step of the assembly, the end portion 49 of the blank 3 intermediate transverse end 37 and crease 31 is folded over, as shown by arrow 50, until it abuts face 48 of coil 1. It will now be seen that the end portion 35 intermediate creases 31 and 32 spans the width of coil 1. Tab 40 is then folded into core window 47 abutting the side thereof adjacent end portion 35 of blank 3 and the outer end 51 is folded at right angles to tab 40 and abuts face 52 of coil 1, under center portion 45 as best shown in Fig. 3. End portion 53 intermediate transverse edge 41 and crease 34 is then folded over, as shown by the arrow 54, so that its legs 55 and 56 formed by tab 44 abut the upper surface of legs 57 and 58 of end portion 49 formed by tab 40. The end tab 44 of end portion 53 of blank 3 is then similarly folded into core window 47 and its end portion 59 folded over at right angles to the main portion of tab 44 and abutting face 52 of coil 1. It will be seen that tab 44, as in the case of tab 40, abuts the side of core window 47 adjacent end portion 36 of blank 3, and also abuts side sections 15 and 24 of tabs 9 and 10.

Coil 1 is held in assembled direction in a simple manner, as by bands of tape 60 and is provided with suitable leads 61 and 62.

It will now be readily seen that this invention provides an improved transformer coil having an insulator which completely insulates the faces of the coil and the core window, this insulator being formed from a rectangular blank of insulation material and being radially assembled on the core. It will be further seen that once assembled, the insulator 2 will remain in position without being further secured or fastened to the coil and that it is, however, readily removable should the occasion arise.

While I have shown and described a particular embodiment of this invention, further modifications and improvements will occur to those skilled in the art. I desire it to be understood therefore that this invention is not limited to the form shown and I intend in the appended claims to cover all modifications that do not depart from the spirit and scope of this invention.

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

1. In combination with a transformer coil having a substantially rectangular core window, a coil insulator formed of a substantially rectangular blank of sheet insulating material, said blank having a longitudinal slit formed in its center portion with its ends respectively terminating in a pair of parallel transverse slits thereby defining a pair of center tabs respectively foldable in a direction parallel to the longitudinal dimension of said blank, said center portion of said blank being arranged abutting one face of said coil with said center tabs being respectively folded into said core window and respectively abutting the two sides thereof parallel with said

longitudinal dimension of said blank, each transverse edge of said blank having a pair of spaced apart slits extending longitudinally inwardly therefrom defining an end tab foldable in a direction parallel to said transverse edge, one end of said blank being folded over and abutting the other face of said coil with its end tab being folded into said core window and abutting the side thereof adjacent the fold of said one end of said blank, the other end of said blank being folded over and abutting said other side of said coil and said one end of said blank with its end tab being folded into said core window and abutting the other side thereof adjacent the fold of said other end of said blank.

2. In combination with a transformer coil having a substantially rectangular core window, a coil insulator formed of a substantially rectangular blank of sheet insulating material, said blank having a longitudinal slit formed in its center portion with its ends respectively terminating in a pair of parallel transverse slits thereby defining a pair of center tabs respectively foldable in a direction parallel to the longitudinal dimension of said blank, each of said center tabs having a relatively short slit extending longitudinally inwardly from the outer ends of said transverse slits thereby respectively defining a center section for said center tab and two side sections foldable at right angles to said center section, each of said center tabs having a pair of relatively short slits extending transversely inwardly from the longitudinal edge thereof respectively in alignment with the inner ends if said relatively short longitudinally extending slits thereby respectively defining end portions for said center section and for each of said side sections respectively foldable at right angles thereto, said center portion of said blank being arranged abutting one face of said coil with said center tabs being respectively folded into said core window, each of said center tabs being arranged with its center section abutting a wall of said window parallel with said longitudinal dimension of said blank and with its side sections folded at right angles to said center section and respectively abutting the walls of said window parallel to the transverse dimension of said blank, each of said center tabs having the end portions of its center section and side sections folded at right angles thereto and abutting the other face of said coil, each transverse edge of said blank having a pair of spaced apart slits extending longitudinally inwardly therefrom and defining an end tab foldable in a direction parallel to said transverse edge, one end of said blank being folded over and abutting said other face of said coil and said end portions of said center tab with its end tab being folded into said core window and abutting said wall thereof parallel to said transverse dimension of said blank and adjacent the fold of said one end and also abutting one side section of each of said center tabs, the other end of said blank being folded over and abutting said other side of said coil and said one end of said blank and said end portions of said center tabs with its end tab being folded into said core window and abutting said wall thereof parallel to said transverse dimension of said blank and adjacent the fold of said other end and also abutting the other side sections of each of said center tabs, each of said end tabs having an end portion folded at right angles thereto and abutting said one face of said coil.

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