

TRANSFORMER WINDING SUPPORT

The invention relates to a support assembly for a
5 transformer winding in an electromotive machine.

An assembly according to the invention comprises a
well provided by a support member for receiving the
winding, a strap for securing the winding in the well,
and a lead secured to the strap and passing through a
10 central opening in the winding for electrical connection
to a neutral conductor. This reduces the likelihood of
the transformer breaking free owing to vibration in use
and causing an open circuit.

The assembly preferably comprises a number of wells
15 and is arcuate to match the internal configuration of
the machine, and includes an electromagnetic shield for
the winding. The assembly also preferably includes means
for electrically insulating the strap from the support.

DRAWINGS:

20 Fig. 1 is a partial section of a generator
containing a support assembly according to the invention;

Fig. 2 is a section along 2-2 in Fig. 1;

Fig. 3 is a perspective view of the assembly in
Figs. 1 and 2;

25 Fig 4 is a top view of a transformer in Fig. 2;

Fig. 5 is a section along 5-5 in Fig. 4

Fig. 6 is a top view of a neutral armature assembly
in Fig. 2;

Fig. 7 is a perspective view of a fully assembled
30 support from Figs. 1 and 2;

Fig. 8 is a partial section showing the electrical
interconnection of the neutral armature assembly to a
neutral lead terminal block in Figs. 1 and 2; and

Fig. 9 is a schematic diagram of the connection of
35 the current transformer secondary windings in Fig. 1 and
2.

Reference is now made to Fig. 1 which illustrates a section of generator 11 that includes a rotor 12 mounted on a shaft 13. The shaft 13 is driven by an input shaft 14 connected thereto by means not shown. A stator 16 is shown press-fitted into the generator housing 17. The stator 16 has integral therewith, armature windings 18 and 19 shown schematically herein. It is to be understood that the details of the generator 11 are conventional. The generator housing 17 includes a recessed portion 21 in which there is positioned and secured by means not shown, a current transformer support assembly 22 that embodies the invention. The cross sectional illustration of the current transformer support assembly 22 reveals a number of the basic components of the current transformer support assembly. Centrally disposed and passing through a secondary transformer winding 23 is a neutral lead 24 secured at its lower end 26 to a neutral armature conductor 27. A current transformer support member 28 surrounds the secondary winding 23. Further details of the current transformer support assembly can be more clearly seen in Fig. 2 and the various components that comprise the current transformer support assembly 22 are set forth in expanded graphic detail in Figs. 3-7.

Reference is now made to Fig. 2 in which there is shown in section, the current transformer support assembly 22. The explanation of the details of construction of the current transformer support assembly 22 will be enhanced by reference to the details of construction of the various components illustrated in Figs. 3-7. Accordingly, the current transformer support member 28 here shown having an arcuate configuration is secured at either end by bolts 31, 32 to the schematically illustrated generator housing 17. Attention is now directed to Fig. 3 which sets forth a perspective view of

the current transformer support member 28. The view in Fig. 3 represents a top view of the current transformer support member 28 as it would be viewed in position in Figs. 1 and 2. The current transformer support member 28 is provided with mounting flanges 33 and 34. Each of the flanges 33 and 34 are provided with bored openings 36 and 37 through which bolts 31 and 32 shown in Fig. 2 pass. The current transformer support member 28 is shown provided with three well-shaped chambers 41, 42 and 43. Each of the well-shaped chambers 41, 42 and 43 are identical and the details of construction of but one of these chambers will be explained. Accordingly, it will be seen, for example in Fig. 2, that chamber 41 is provided at the bottom with a central opening 44 and a peripherally disposed lip 46. The centrally disposed opening 44 can also be readily discerned in Fig. 3 as can the peripherally disposed lip 46. On opposite sides of well-shaped chambers 41, 42 and 43 are threaded openings 51, 52, 53 and 54.

Reference is now made back to Fig. 2 where the cross-sectional details of the current transformer support member 28 may be more keenly be appreciated. Each of the well-shaped chambers 41, 42 and 43 has positioned therein secondary current transformer windings 61, 23 and 63. These secondary current transformer windings are donut shaped as can be discerned by a study of Fig. 4 which shows a top view of secondary current transformer windings 61. The secondary current transformer windings 61, 23 and 63 are conventional transformer windings in their construction detail and are provided with a pair of leads 64, 65. Leads 64 and 65 are not shown in Fig. 2. The manner in which the secondary current transformer windings 61, 23 and 63 are interconnected is set forth in Fig. 9 to be described hereinafter. Fig. 5 illustrates a cross-section of the

current transformer 61 and adds further detail to this conventional secondary current transformer winding.

Positioned beneath the current transformer winding 61 and resting on the peripherally disposed lip 46 is an
5 electromagnetic shield 68. The electromagnetic shield 68, shown in section in Fig. 2, if illustrated in three-dimensional form, would take on the appearance of a washer with a centrally disposed opening 69.

Electromagnetic shields 71 and 72 are provided for each of
10 the secondary current transformer windings 23 and 63.

Positioned beneath, and arcuately disposed, are armature windings 15, 18 and 19 shown in dotted outline.

Electromagnetic fields are generated in armature windings 18 and 19. The affect of these fields is
15 shielded from, for example, secondary current transformer windings 61, 23 by electromagnetic shields 68 and 71 respectively.

Each of the current transformers are provided with a neutral lead. Accordingly, there are three neutral leads 20, 24 and 25. Each of the neutral
20 leads is provided with a head 38, 39 and 40. The heads 38, 39 and 40 are integrally electrically secured to a neutral armature strap 76 by means, for example, of solder or brazing. The neutral armature strap 76 is secured to the current transformer support 28 by

25 screws 77, 78, 79 and 80. The screws 77, 78, 79 and 80 are threadingly fitted into threaded openings 51, 52, 53 and 54 of support member 28. Electrically insulating blocks 81, 82, 83 and 84 electrically separate the neutral armature strap 76 from the current transformer support

30 member 28. Fig. 6 illustrates the neutral armature support assembly just described. It will be observed in Fig. 2 that neutral leads 20 and 25 are not positioned coincident with the center line of secondary transformer windings 61 and 63. These neutral conductors 20 and 25
35 are spaced from the center lines of the windings in order

to facilitate the fabrication of the neutral armature assembly to the support member 28. In Fig. 6 at the left hand end of the neutral armature strap 76, there is shown an electrical connection tab 86 not visible in Fig. 2.

5 Referring now again to Fig. 2, there is illustrated on the left in this figure a neutral lead terminal block 91. The neutral lead terminal block 91 allows external connection of the neutral leads from the armature to the electrical distribution system. Fig. 8 is
10 a front view of a portion of the current transformer support assembly 22 as set forth in Fig. 1 and depicts the manner in which the electrical connection tab 86 may be secured by wire 87 to a terminal lead 88 of the neutral lead terminal block 91. All of the electrical connections
15 between wires may be provided by conventional soldering or brazing techniques.

Referring now once again to Fig. 2, armature windings 15, 18 and 19 are each provided respectively with neutral armature conductors 49, 48 and 47.

20 Reference is now made to Fig. 7 which illustrates the fully assembled current transformer support assembly 22 with all of the components heretofore described operatively positioned and ready for insertion in the housing of a generator.

25 Fig. 9 is a schematic diagram in a manner in which the current transformer secondary windings 61, 62 and 63 are connected in parallel to a fault current detection circuit 65.

30 From the foregoing description, it should be apparent that the current transformer support assembly of this invention provides a compact, rigid structure that enhances the integrity of the manner in which fault current transformers will be secured within a generator.



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CLAIMS:

1. A support assembly for a transformer winding in an electromotive machine which comprises a well provided by a support member for receiving the winding, a strap for
5 securing the winding in the well, and a lead secured to the strap and passing through a central opening in the winding for electrical connection to a neutral conductor.
2. An assembly according to claim 1 which comprises a
10 number of wells and is arcuate to match the internal configuration of the machine.
3. An assembly according to claim 1 or claim 2 which includes an electromagnetic shield for the winding.
4. An assembly according to any preceding claim which
15 includes means for electrically insulating the strap from the support member.
5. An assembly for a transformer winding as herein described with reference to the drawings.
6. An electromotive machine having an assembly according to any preceding claim.
- 20 7. An electromotive machine according to claim 6 including a neutral lead which acts as a transformer primary and a winding which acts as a secondary.

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