

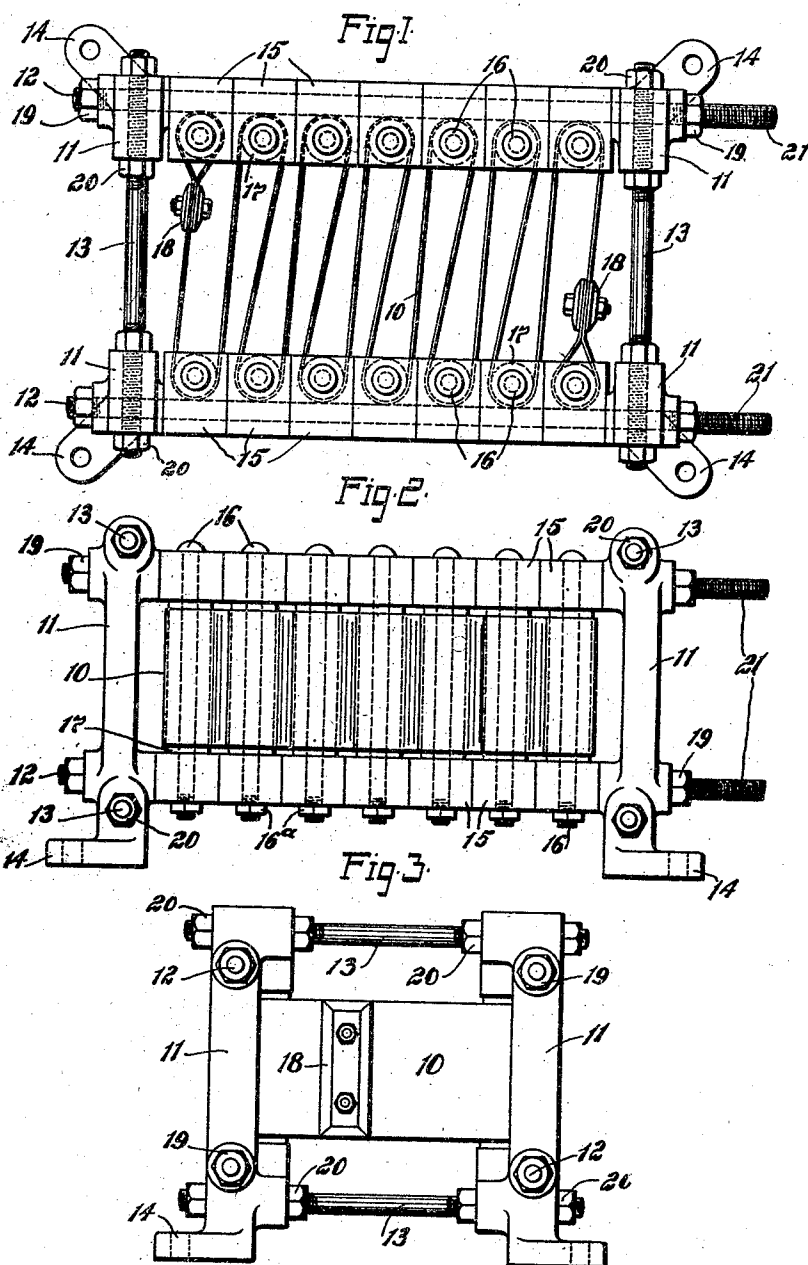
No. 870,611.

PATENTED NOV. 12, 1907.

H. C. BEEKLEY.

SERIES SHUNT FOR DYNAMO ELECTRIC MACHINES.

APPLICATION FILED NOV. 29, 1906.



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SERIES SHUNT FOR DYNAMO-ELECTRIC MACHINES.

No. 870,611.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed November 29, 1905. Serial No. 289,550.

To all whom it may concern:

Be it known that I, HENRY CLYDE BEEKLEY, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Series Shunts for Dynamo-Electric Machines, of which the following is a full, clear, and exact specification.

My invention relates to series-shunts for compound wound dynamo-electric machines.

10 It is customary to provide compound wound machines with shunts of German-silver, connected across the terminals of the series field winding, to shunt a part of the armature current around the series winding for the purpose of obtaining a proper compounding effect. Usually in such machines it is difficult to provide the field magnets with exactly the proper number of series turns. In large machines designed for heavy current loads it is generally impossible to do so for the reason that very few series turns are necessary. In fact to obtain the proper series ampere turns with the full load current frequently fractions of turns would be required. It is therefore customary to provide a greater number of series turns than would be required if the full load current traversed the series winding and to provide a series shunt across the series field terminals whereby a part of the current is shunted around the series winding to obtain the proper ampere turns.

20 The shunt referred to is usually non-inductive, and as commonly constructed, consists of a strip of German-silver wound back and forth around porcelain tubes mounted in two parallel plates of insulation. The strip is thin and wide to obtain the proper resistance and heat radiating effects.

35 The above type of shunt is non-adjustable. It is customary therefore to carry in stock a large number of shunts of different sizes and capacities, in order that the proper compounding effect may be obtained for each individual machine. In some cases if the resistance of a particular shunt is too great, portions of the resistance material are sheared off until a strip of the proper resistance is obtained. In the latter case an unnecessarily large shunt frame is used. This is objectionable for the reason that the shunt is usually attached to the frame of the machine.

45 The object of my invention is to provide a shunt the frame of which can be adjusted for any desired length of resistance material.

In carrying out my invention I mount the strip of resistance material in a sectional frame, whereby the size of the latter may be increased or decreased at will for any length of resistance material.

50 More specifically considered, my invention consists in a series-shunt having a zig-zag or looped resistance metal, a substantially rectangular frame for the strip comprising four metal castings for the corners of the

frame through which castings pass two pairs of longitudinal parallel bolts each pair of which pass through opposite ends of the same corner castings, a plurality of insulating blocks mounted on each of the bolts, insulated rods mounted in the blocks said rods being in two opposite parallel sets, said resistance strip being looped about the insulated rods, and end-bolts passing through the metal castings at right angles to the aforesaid bolts for spreading apart the two pairs of longitudinal bolts and blocks supported thereon, to put resistance strip under tension.

For a better understanding of my invention, reference is had to the accompanying drawings, in which

Figure 1 is an elevation of my shunt; Fig. 2 is a plan view of the same; and Fig. 3 is an end view of the same.

Referring to the figures of the drawing, I have shown at 10 a long flexible strip of resistance material, preferably German-silver. This resistance strip is zig-zaged or wound back and forth as shown so that the shunt will be compact. The strip is thin and wide so that the resistance will be high and the heat radiation sufficient to prevent an undesirable rise of temperature.

75 The supporting frame is rectangular in shape, and consists of four similar cast metal corner pieces 11 mounted on four long longitudinal bolts 12 and four shorter transverse bolts 13. As is clear from the drawings each cast metal corner piece is provided with two pairs of openings to receive the bolts, the holes of one pair being arranged at right angles to the holes of the other pair. Each cast metal corner piece 11 is provided with a perforated lug 14 by means of which the shunt may be attached to a support.

85 Mounted on each bolt 12 are a number of blocks 15 preferably of insulating material as fiber. The blocks 15 are arranged side by side and there is an equal number on each bolt. Each block 15 has a hole or opening to receive the supporting bolt 12, and an opening arranged at right angles to the first mentioned opening to receive an insulated rod 16 on which one section or loop of the resistance strip 10 is supported. I have, in this case, shown seven fiber blocks on each bolt. Each of the rods 16, about which the resistance material 10 is looped, is mounted in two opposite insulating supporting blocks 15, and is held in place by a nut 16^a. As is clear from the drawings, the rods are all parallel to each other and are arranged in two sets, the sets being in parallel planes. Mounted on each rod is a tube of insulating material 17, preferably of porcelain. These tubes are all of equal length, and hold the inner ends of the blocks the proper distance apart. Each pair of insulating blocks 15, and the insulated rod 16 mounted therein, may be mounted on or removed from the bolts 12 as a unit and therefore constitute one section of the frame.

100 The resistance strip 10 is wrapped back and forth

around all the tubes and each free end is fastened to the last adjacent section or portion extending between two tubes by means of a clamp 18. By means of these clamps the ends of the resistance strip can be connected to the terminals (not shown) of the series field winding.

The longitudinal bolts are provided at both ends with tightening nuts 19, by means of which, the fiber blocks can be held closely together. The shorter bolts 13 are each provided with four nuts 20, located on both sides of the corner members 11. By means of these nuts 20, and particularly the nuts on the inner sides of the corner members, the two sets of longitudinal bolts 12, which carry the insulating blocks 15 and rods 16, can be spread apart so as to tighten or put tension in the loops of the resistance strip 10.

As is shown at 21, the longitudinal bolts extend at one end of the shunt, beyond the corner members 11. The object of this is to permit the size of the frame to be increased without changing the bolts 12. If the resistance of the strip 10 is not sufficient, the nuts 19 and 20 can be loosened and another set of insulating blocks 15 and supporting rods 16 can be added and the frame will then support a longer resistance strip. On the other hand, if the resistance is too high the size of the frame can be reduced by removing a suitable number of supporting blocks and rods. A portion of the resistance strip can be sheared off and the remainder mounted on the frame. It is evident that longer or shorter bolts 12 can be substituted when the size of the shunt is increased or decreased.

It is seen that my improved shunt is simple in construction and compact. As the frame consists of a plurality of sections its size can be easily and quickly adjusted at will by increasing or decreasing the number of sections. It will only be necessary to carry in stock a few bolts of different sizes for shunts which will produce the proper compounding effects for machines of different sizes and conditions of windings.

I do not wish to be confined to the details shown, as I have illustrated only what I consider the best embodiment of my invention. If desired each of the frame sections or units may be made of a single member.

I aim in my claims to cover all changes and modifications which do not involve a departure from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent is:

1. In a series-shunt for dynamo-electric machines, a strip of resistance material, a frame comprising a plurality of removable sections, said strip being wound or looped about said sections, and means for holding said sections together and for placing said strip under tension.

2. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, a frame therefor comprising a number of sections or blocks of insulat-

ing material, a plurality of bolts passing through said sections or blocks, and means for adjusting the relative position of said bolts to place the strip under tension.

3. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, a supporting frame therefor comprising removable insulating blocks, and a plurality of parallel supporting rods about which said strip is looped, means for supporting said blocks, and means for adjusting the relative position of said supporting means.

4. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, a frame comprising a plurality of bolts and a support for same, insulating blocks mounted on said bolts, means for permitting a variable number of blocks to be mounted on said bolts, and rods carried by said blocks, said strip of resistance metal being looped about said rods.

5. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, a frame comprising a plurality of bolts and a support for same, insulating blocks mounted on said bolts, means for permitting a variable number of blocks to be mounted on said bolts, rods carried by said blocks, said strip of resistance metal being looped about said rods, and means for adjusting the frame to put the strip under tension.

6. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, and a supporting frame therefor comprising two pairs of longitudinal supporting bolts and a plurality of removable sections mounted on the bolts of each pair, said strip being looped about said sections.

7. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, a supporting frame comprising longitudinal supporting bolts, removable insulating sections mounted on said bolts, said bolts and sections being in two sets, the resistance strip being looped between the sections of each set, and means for forcing said sets apart for putting the strip under tension.

8. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance material, a supporting frame comprising two pairs of longitudinal bolts, a number of removable insulating blocks mounted on each bolt, transverse parallel insulated rods mounted in the blocks of each pair, said strip being looped around each insulated rod, and bolts for spreading apart the two pairs of bolts and blocks thereon, to put the strip under tension.

9. In a series-shunt for dynamo-electric machines, a looped or zig-zag strip of resistance metal, a substantially rectangular frame therefor comprising four metal castings for the corners of the frame, four longitudinal parallel bolts passing through the castings two of said bolts passing through opposite ends of the same castings, an equal number of removable insulating blocks mounted on each of said longitudinal bolts between the castings, rods mounted in said insulating blocks said rods being in two opposite parallel sets, insulating tubes surrounding each of said last named rods, said resistance metal being looped about the tubes of the two sets, and end bolts passing through the metal castings at right angles to the aforesaid bolts for spreading the castings apart to put the resistance strip under tension.

In testimony whereof I affix my signature, in the presence of two witnesses.

HENRY CLYDE BEEKLEY.

Witnesses:

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ARTHUR F. KROIS.