

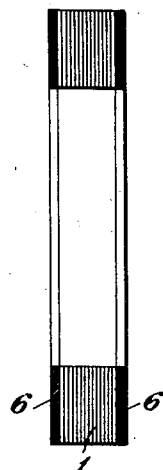
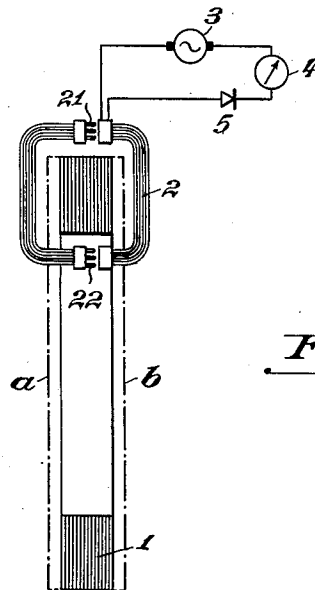
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PROCESS FOR ASSEMBLING CURRENT TRANSFORMERS

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UNITED STATES PATENT OFFICE

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PROCESS FOR ASSEMBLING CURRENT TRANSFORMERS

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The invention relates to process and apparatus for the mass production of current transformers.

It is a well known fact that the initial permeability, which is of the greatest importance in the construction of current transformers, fluctuates within very wide limits approximately in the proportion of 1:2 in the highly alloyed sheet iron supplied. When making current transformers in quantities it is therefore essential to take as a basis for the dimensioning of the iron cores the lowest values of permeability occurring in the consignments of material. Consequently most of the transformers of a quantity contain more iron than would be required by the limit of error prescribed for the type of transformer in question. In individual transformers the requisite quantity of iron is exceeded to the extent of about 100%.

A further disadvantage of the variation of the plates to be used is that for the balancing of the transformer, that is to say for the uniform distribution of the transforming error over the upper and lower current ranges the requisite alterations of the proportions of the number of windings cannot be calculated in advance, but that on the contrary after completion of the transformer the equalization must be effected subsequently in the testing room by taking off a greater or less number of windings. These subsequent corrections necessitate the waste of a good deal of time especially in types of transformers such as transverse hole transformers, in which the secondary windings cannot be got at until the entire iron core has been removed.

According to the present invention the above mentioned disadvantages are overcome, and the differences in the permeability of the iron plates supplied are balanced or compensated in that during manufacture only so many plates are packed or stacked in each transformer as are necessary for the observance of the errors taken as a basis of the calculation.

This process renders it possible to build up the transformer in accordance with values calculated in advance, the cross-section of

the core being selected so as to correspond to the worst kind of plate encountered. This core cross-section is now, according to the invention, not completely filled out during the manufacture of the core but after inserting or stacking an average number of plates the no-load current of the transformer is first measured by connection to a source of alternating current of constant potential. Of course the no-load voltage can also be measured just as well with constant maintenance of the no-load current. The result of this measurement shows whether the requisite number of plates have been placed in position or whether further plates require to be added or removed.

In case of transformers with a closed iron cross-section therein, for example with a ring-shaped iron core, the procedure observed may be such that use is made of an auxiliary winding for determining the number of plates. This auxiliary winding can be made divisible or separable by the use of a multiple plug, so that the determination of the requisite number of plates can be carried out within a short space of time.

In the case of transformers with a non-closed plate section the secondary coil will be used direct for the measurement of the no-load current.

In order to avoid difficulty the structural building up of the transformer by the process according to the invention the space lacking in the determined structural height of the iron packet can be filled up by means of suitable intermediate layers, such for example as layers of press pan, wood or other suitable substances.

Reference is to be had to the accompanying drawings in which Fig. 1 illustrates the application of the auxiliary winding to the core in order to effect a measurement during the stacking operation, and Fig. 2 shows the core after its stacking has been completed.

In Fig. 1 the dot-and-dash lines *a*, *b* indicate the height of the stack calculated for the core 1 of the transformer. The measurements which according to the present invention are to be made during the stacking operation, may be carried out by means of an

auxiliary winding or coil 2 which by the provision of two multiple connectors or plugs 21 and 22 can be divided or separated into two halves. The winding or coil 2 can therefore
6 although closely wound, be applied readily to that portion of the core which has been stacked, and readily removed from such portions. At 3 I have indicated an alternating
10 current generator from which the no-load measuring current is taken. For the purpose of the measurement I may employ, as illustrated, a continuous current measuring instrument 4 in series with a rectifier 5. After
15 the minimum height of core or stacking required, as determined by successive measurements, has been reached, that portion of the space or height calculated (a height corresponding to the distance between the lines
20 a, b of Fig. 1) which is not filled by the sheet metal portions 1 of the core, is filled with layers 6 of a material which is magnetically and electrically non-conductive, for instance
press pan.

I claim:

25 A process for the mass production of current transformers in which the magnetic cores of the transformers are constructed of a number of plates, consisting in stacking a number of the plates so that the lowest values
30 to be expected in such plates with respect to their magnetic properties correspond to a precalculated value, testing the magnetic properties of said stacked plates, and then adding or subtracting plates until the complete
35 core corresponds in its magnetic properties to the core taken as a basis of calculation.

In testimony whereof I affix my signature.
GEORG KEINATH.

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