

- (21) Application No. 41227/77 (22) Filed 4 Oct. 1977
(61) Patent of Addition to No. 1471739 dated 3 Jun. 1974.
(31) Convention Application No. 2645051 (32) Filed 6 Oct. 1976 in
(33) Fed. Rep. of Germany (DE)
(44) Complete Specification Published 4 Feb. 1981
(51) INT. CL. ³ H01F 27/40
(52) Index at Acceptance
H1T 12 1F 5 7C1A 7C5

(19)



(54) A BANK OF CAPACITORS FOR VOLTAGE CONTROL
ON WINDINGS OF TRANSFORMERS AND CHOKES

(71) We, TRANSFORMATOREN
UNION AKTIENGESELLSCHAFT of
Deckerstrasse 5, 7 Stuttgart-Bad Cannstatt,
Federal Republic of Germany, a German
Body Corporate, do hereby declare the
invention, for which we pray that a patent
may be granted to us, and the method by
which it is to be performed, to be particularly
described in and by the following statement:

The invention relates to a bank of capacitors for voltage control on windings of transformers and chokes, in which an individual capacitor is parallel-connected to each portion of the winding to be controlled, and is an improvement or modification of the invention described and claimed in Patent No. 1471739.

In accordance with the specification of the main Patent, there is provided a bank of capacitors in association with transformer or choke windings for controlling voltage surges in said windings, said bank comprising a plurality of disc coils each of which comprises a plurality of disc coils each of which comprises a plurality of conductors lying on each other and wound to form a spiral with the ends lying at the inner end of the spiral being unconnected, the disc coils being substantially magnetically uncoupled with the windings of the transformers and chokes, each winding to be controlled having a capacitor connected in parallel and all the capacitors being connected in series.

This bank of capacitors serves capacitive control of the voltage distribution in high voltage windings. The high series capacitances required for this may be housed in these banks of capacitors without any particular difficulties so that they operate electrically fully satisfactorily. With the known arrangement however the circular cross section provided for the bank of capacitors is disadvantageous as is the resulting large space requirement during installation in

tanks of liquid-cooled transformers.

The invention seeks to provide a bank of capacitors such that it can be fitted in near the windings in the normally constructed tanks of transformers or chokes without requiring any additional space and without impairing their electrical properties.

According to the invention there is provided a bank of capacitors in association with transformer or choke windings for controlling voltage surges in said windings, said bank comprising a plurality of disc coils each of which comprises a plurality of conductors lying on each other and wound to form a spiral with the ends lying at the inner end of the spiral being unconnected, the disc coils being substantially magnetically uncoupled with the windings of the transformers and chokes, each winding to be controlled having a capacitor connected in parallel and all the capacitors being connected in series, the bank being shaped to fit between the coils and tank walls of the transformer or choke so as to utilise the space therebetween.

Preferably corners present in cross section of the disc coils are rounded off.

According to advantageous refinements of the invention a bank of capacitors is provided in a tanks of a liquid-cooled transformer, wherein the bank of capacitors has the shape of a three-sided column, one side being flat and parallel to the tank wall and the two other sides being curved inwardly to the axis of the bank of capacitors and parallel to cylindrical surfaces of transformer windings adjacent thereto or two sides being flat and parallel to the tank walls and the third side being curved inwardly to the axis of the bank of capacitor and parallel to one cylindrical surface of a transformer winding adjacent thereto.

The invention is very advantageous, because it utilises the spaces available between the windings of the different limbs and the

50

55

60

65

70

75

80

85

90

5 tank walls optimally, independently of their cross sectional shape. As a result it is even possible to house banks of capacitors with very large series capacitances for the transformer windings, without enlarging the tank.

10 The invention will now be described in greater detail by way of example with reference to the drawing, the single figure of which shows a portion of an open transformer tank in plan view.

15 In a tank with tank walls 73 are provided high voltage windings 55 and 56 which are disposed around iron cores (not shown) and around reduced voltage windings (also not shown). The adjacent windings 55 and 56 together with the tank walls 73 adjacent to them form three sided hollow chambers. These hollow chambers, not shown in detail, are delimited on the side of the tank walls 73 by flat surfaces and on the side of the windings 55 and 56 by surfaces curved into the hollow chambers.

20 Banks of capacitors 54 are arranged in these hollow chambers, the banks of capacitors being made up of disc coils each of which comprises a plurality of conductors lying one on another and wound to form a spiral being unconnected. The disc coils are joined together to form a constructional unit the banks 54 of capacitors are matched to the shape of the hollow chamber accommodating them with respect to their cross sectional shape and, in the present embodiment, form three-sided columns. These three-sided columns are delimited, according to whether they are arranged in the triangular space between adjacent windings 55 and 56 or in the corner of the tank corner are limited, by two flat sides and by two or one inwardly curved sides respectively. As a result, complete utilisation of the space within the tank is possible.

45 In special cases it may be advisable to house one or more banks of capacitors in a special casing having any desired cross section.

WHAT WE CLAIM IS:-

50 1. A bank of capacitors in association with transformer or choke windings for controlling voltage surges in said windings, said bank comprising a plurality of disc coils each of which comprises a plurality of conductors lying on each other and wound to form a spiral with the ends lying at the inner end of the spiral being unconnected, the disc coils being substantially magnetically uncoupled with the windings of the transformers and chokes, each winding to be controlled having a capacitor connected in parallel and all the capacitors being connected in series, the bank being shaped to fit between the coils and tank walls of the transformer or choke so as to utilise the space therebetween.

2. A bank of capacitors according to claim 1, wherein corners present in the cross section of the disc coils are rounded off.

3. A bank of capacitors according to claim 1 or 2 in a tank of a liquid-cooled transformer, wherein bank of capacitors has the shape of a three-sided column, one side being flat and parallel to the tank wall and the two other sides being curved inwardly to the axis of the bank of capacitors and parallel to cylindrical surfaces of transformer windings adjacent thereto.

4. A bank of capacitors according to claim 1 or 2, in a tank of a liquid-cooled transformer wherein the bank of capacitors has the shape of a three-sided column two sides being flat and parallel to walls of the tank and the third side being curved inwardly to the axis of the bank of capacitors and parallel to an surface of a cylindrical transformer winding adjacent to it.

5. A bank of capacitors for voltage control of transformer or choke windings substantially as described herein with reference to the drawing.

For the Applicants,
J.F. WILLIAMS & CO.,
Chartered Patent Agents,
34 Tavistock Street,
London W.C.2.

Printed for Her Majesty's Stationery Office,
by Croydon Printing Company Limited, Croydon, Surrey, 1980.
Published by The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.

1584098

COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

