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B. J. BUTLER

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ELECTRICAL CONDENSER

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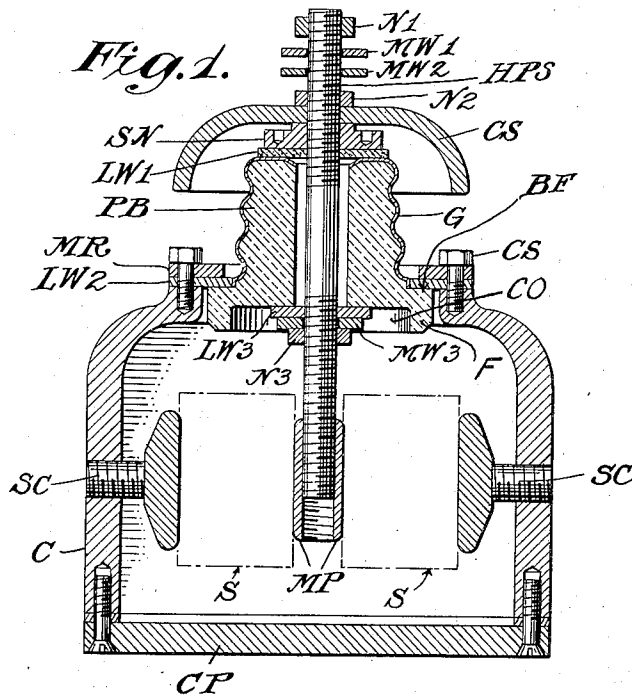


Fig. 2.

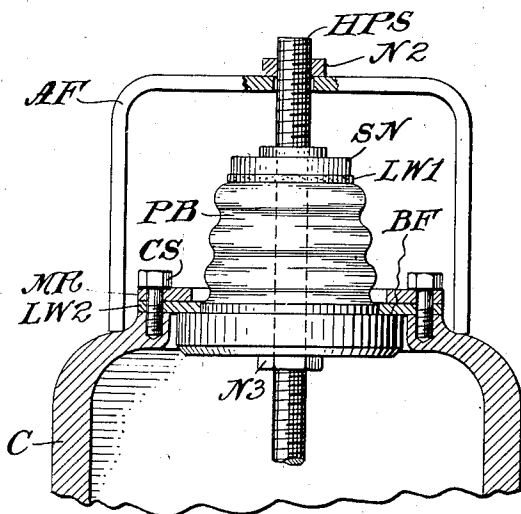
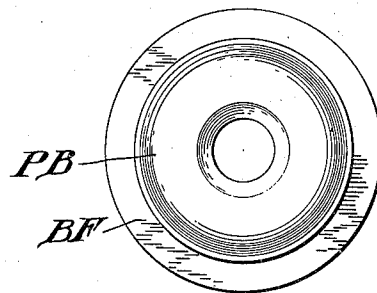


Fig. 3.



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ELECTRICAL CONDENSER

Application filed December 6, 1927. Serial No. 238,076.

This invention relates to electrical condensers and, more particularly, to a new and improved bushing for insulating a high potential terminal thereof from the casing.

The invention provides a high potential bushing which may be readily inserted in the condenser casing and secured therein and is adapted to positively separate the high potential stud from the casing, both electrically and mechanically. A corona shield is secured to the stud for distributing the electrostatic stress and for protecting the bushing from mechanical injury.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which

Fig. 1 is a central vertical section of the condenser fitted with the bushing in accordance with the present invention;

Fig. 2 is a detail view showing the method of assembling the condenser and bushing; and

Fig. 3 is a top plan view of the bushing. Like reference characters denote like parts in the several figures of the drawing.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring more particularly to the drawing, especially to Fig. 1, the condenser and casing therefor are formed in the usual manner, comprising for example a pair of condenser stacks S separated by mid-plate MP and clamped under pressure by means of screw clamps SC carried by casing C.

Casing C is open at the bottom to permit the parts to be readily assembled and is pro-

vided at the top with an opening through which the high potential stud HPS may pass. Said stud is threaded or otherwise secured to mid-plate MP and forms one terminal for the condenser, the other terminal being provided by casing C. Cover plate CP may close the bottom of the casing after the mechanism has been assembled and is secured by any suitable means.

The bushing PB, which may be formed of porcelain or other suitable refractory insulating material, comprises a substantially cylindrical portion having a corrugated surface and a bottom flange BF by means of which the bushing is secured in place. The bushing is recessed to permit free passage of the high potential stud HPS and is preferably entirely out of contact with said stud with the exception of the clamping means thereof, to be described.

The bushing is held in the casing as by means of washer LW 2 which may be formed of lead or other soft material whereby injury is prevented, said washer being secured by metal ring MR and cap screws CS passing therethrough.

The bushing may be clamped upon the high potential stud between the washer LW 1, preferably formed of leather to prevent injury to the bushing, and washer LW 3 which may be formed of lead. Washer LW 1 may be held in contact with the top of bushing TB as by spanner nut SN threaded upon the high potential stud and washer LW 3 may be secured against the lower portion of said bushing in a recess formed therein as by means of nut N 3. Metal washer MW 3 may be inserted between nut N 3 and washer LW 3 if desired. The lower portion of bushing PB is preferably recessed to receive washers LW 3 and MW 3 to conserve space within the casing C.

Corona shield CS is carried by high potential stud HPS and may be inserted thereover in contact with spanner nut SN and secured by nut N 2. The corona shield is preferably cup-shaped in order to mechanically protect the porcelain bushing from injury as well as to distribute the electrostatic stress about the high potential stud. An external

connection may be secured to the high potential stud in any suitable manner as by means of metal washers MW 1 and MW 2 and nut N 1.

5 The surface of porcelain bushing PB is preferably glazed as indicated at G in order to prevent the same from being affected by moisture and to improve the insulating qualities thereof. The surface is preferably cor-
10 rugated in order to increase the surface distance between the high potential stud and the casing and prevent leakage currents from creeping thereover.

In assembling the condenser temporary bar
15 AF, as shown in Fig. 2, may be secured to high potential stud HPS as by nut N 2 and utilized for holding the base flange BF of bushing PB securely against washer LW 2. After
20 the condenser has been securely clamped in place and the casing filled with suitable insulating material, the temporary bar AF may be removed and the corona shield CS ap-
plied.

The above described bushing is so con-
25 structed as to effectively insulate the high potential terminal of the condenser from the low potential casing and may be readily applied when the condenser is assembled. After
the condenser is completed, the bushing is
30 permanently held in place by the high potential stud. Washers of soft material, such as lead or leather, are employed to prevent the pressure used in clamping the bushing
from damaging the same and to permit a cer-
35 tain resiliency during use for taking up mechanical shocks and compensating for any expansion or contraction that may take place.

From Fig. 1 of the drawing the recess CO
40 on the under side of the bushing PB is a desirable feature because on cooling an insulating embedment generally shrinks. Where
such contraction occurs an air space is left
with the result that if this air space is in the
45 high potential field it is not strong and resistant to creepage, breakdown etc. The particular shape of bushing PB enables any such
shrinkage and air space to occur in the recess
CO on the under side of the bushing with-
50 out serious damage because any such air space is reinforced electrically by the down-
ward extending flange F. It will be seen this
flange F projects in the densest portion of the
field between the casing and high potential
55 terminal for the purpose of keeping up the strength and insulation resistance between
these high potential parts should it become
weakened by shrinkage cracks or air spaces
in the recess CO.

60 While certain novel features of the invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitu-
tions and changes in the forms and details of
65 the device illustrated and in its operation may

be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. The combination with a capacitor stack
provided with clamping means therefor, of 70
a rigid terminal stud secured intermediate
the ends of said stack, a casing for said
stack, an insulating bushing closing a por-
tion of the outer wall of said casing, said
stud passing thru said bushing and having 75
clearance between the stud and bushing
whereby variation in clamping dangerous
stresses on said stack transmits no stresses
to said bushing.

2. The combination with a capacitor stack 80
provided with clamping means therefor, of
a rigid terminal stud secured intermediate
the ends of said stack, a casing for said stack,
an insulating bushing closing a portion of
the outer wall of said casing, said stud pass- 85
ing thru said bushing and having clearance
between the stud and bushing whereby varia-
tion in clamping dangerous stresses on said
stack transmits no stresses to said bushing,
and means sealing each end of said clearance 90
space between the bushing and said stud.

3. The combination with a capacitor stack
provided with clamping means therefor, of
a rigid terminal stud secured intermediate
the ends of said stack, a casing for said stack, 95
insulating material constituting at least a
portion of the outer wall of said casing, said
stud passing thru said insulating material
and having clearance between the stud and
insulating material whereby variation in 100
clamping stresses on said stack transmits no
stresses to said insulating material, and
means sealing each end of said clearance
space between the insulating material and
said stud, each of said sealing means compris- 105
ing a yieldable washer and a nut threaded
on said stud.

4. The combination with a capacitor stack
provided with clamping means therefor, of 110
a rigid terminal stud secured intermediate
the ends of said stack, a casing for said stack,
an insulating bushing closing a portion of
the outer wall of said casing, said stud pass-
ing thru said bushing and having clearance 115
between the stud and bushing whereby varia-
tion in clamping stresses on said stack trans-
mits no stresses to said insulating material,
said bushing being at least supported in part
by said stack.

In testimony whereof I hereunto affix my 120
signature.

BENJ. J. BUTLER.