Dec. 31, 1963 L. H. RANKIN 3,116,362

INSULATING BUSHING ASSEMBLY WITH SPRING RETAINING MEANS

Filed Sept. 6, 1961

FIG. 1

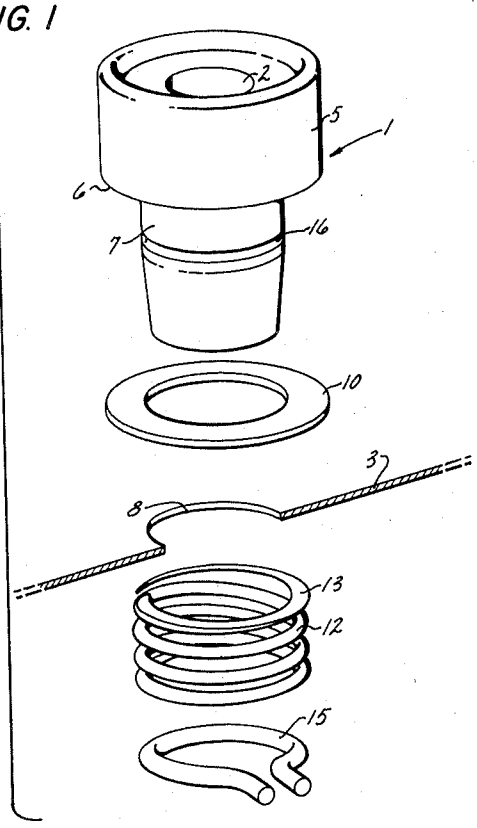



FIG. 2

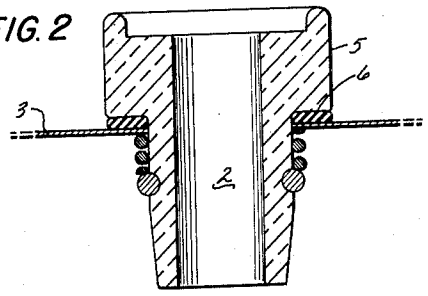



FIG. 3

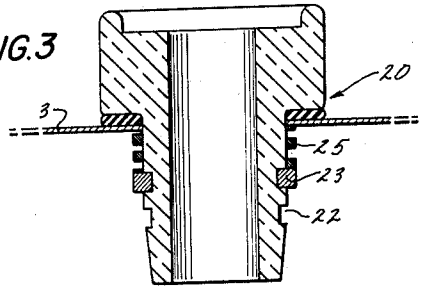
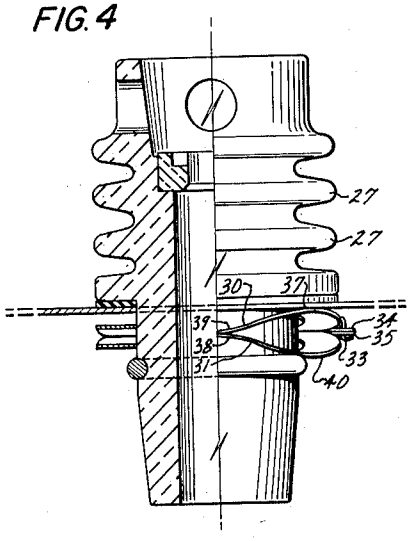



FIG. 4




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United States Patent Office 3,116,362 Patented Dec. 31, 1963



# 3,116,362
# INSULATING BUSHING ASSEMBLY WITH SPRING RETAINING MEANS

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Filed Sept. 6, 1961, Ser. No. 136,349
1 Claim. (Cl. 174—153)

This invention relates to insulating bushings associated with electrical apparatus and has for one of its primary objects the provision of an improved insulating bushing assembly that can be quickly and easily assembled and mounted in a suitable opening in a wall of the associated electrical apparatus where it will provide an effective seal between the bushing and apparatus wall.

A further object of this invention is the provision of an improved insulating bushing assembly that effectively precludes improper installation and provides an evenly distributed and accurately predetermined mounting force.

A still further object of this invention is the provision of an improved insulating bushing assembly that is self-aligning, shock absorbing and subject to a minimum amount of damage during installation.

A still further object of this invention is the provision of an imporved insulating bushing assembly that is economical to manufacture and easy to install while being durable and reliable in operation.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application which will be indicated in the appended claim.

In the drawings:

FIG. 1 is an exploded perspective view of an embodiment of the insulating bushing assembly of the present invention shown with a portion of a mounting wall;

FIG. 2 is a cross section view of the insulating bushing assembly shown installed through a mounting wall portion;

FIG. 3 is a view similar to FIG. 2 but showing another embodiment of the invention; and

FIG. 4 is a partial cross section view of a still further embodiment of the invention.

Referring to FIGS. 1 and 2 of the drawings, an embodiment of the insulating bushing assembly of the present invention is shown which is of the type having a bushing 1, formed of porcelain or other suitable insulating material and provided with a central passage 2, through which electrical connections are brought into the interior of associated electrical apparatus such as transformers, switch gear or the like, the latter having a mounting wall 3, partially shown.

The insulating bushing of the illustrated embodiment is generally tubular in form and has an enlarged head portion 5 defining a shoulder 6 extending outwardly from a neck portion 7 of the bushing, the latter shown in FIG. 2 as extending through a suitable aperture 8 in the mounting wall.

In order to preclude entry of unwanted moisture or other foreign and deleterious matter into the apparatus, there is provided a sealing gasket 10 having the shape of an annular sealing ring and formed of neoprene or other suitable material. The gasket 10 is dimensioned to be snugly positioned around the neck portion 7 in abutting and coextensive relationship with shoulder 6 of the enlarged bushing head.

In accordance with one of the principal features of the present invention, the bushing is mounted through the mounting wall 3 by means of a coiled compression



spring 12 provided around the neck portion of the bushing. The ends of the spring are flattened as shown by numeral 13 in FIG. 1 and respectively bear against the mounting wall 3 and a retaining snap ring 15 received in an annular groove 16 located on the neck portion in spaced relation to the head portion of the bushing. The bushing is thus securely supported and effectively sealed in its operating position through the apparatus wall by means of the spring 12 whose exerted force is evenly distributed and can be accurately predetermined as desired. Furthermore, the spring permits the bushing to be shock absorbing and self-aligning relative to the associated wall thereby lessening damage to the bushing and insuring that the bushing will be properly positioned on the apparatus.

Installation of the bushing on and through the mounting wall is easily accomplished by inserting the neck portion with the gasket therearound through the wall aperture 8, placing the spring around the neck portion, compressing the spring and then snapping the snap ring 15 in its groove 16.

From the foregoing, it is seen that the insulating bushing assembly of the present invention is comprised of only four economically manufactured elements which can be assembled and installed on the associated apparatus without the aid of special tools and with a maximum of ease, speed and safeguard to the porcelain while at the same time requiring a minimum of skill.

The present invention may also be applied in conjunction with various other types of springs in order to produce a desired mounting and sealing force or with other types of insulating bushings such as may be required by the operating conditions of particular electrical apparatus. Accordingly, FIG. 3 shows a further embodiment of the insulating bushing assembly of the present invention wherein the bushing 20 is generally similar to that in FIGS. 1 and 2 except that the instant bushing 20 is further provided with an additional retaining ring groove designated 22. Thus, the present embodiment permits the spring force or position to be adjusted by lowering the snap ring 23 into the additional groove 22 in accordance with various operating conditions such as may be determined, for example, in the instant adjustment, by an increased wall thickness of the associated apparatus or variation in gasket thickness. In contrast with the circular cross section of the snap ring and coiled compression spring of FIGS. 1 and 2, the present embodiment utilizes a square cross section snap ring and coiled compression spring in order to impart a desired mounting and sealing force to the bushing.

A still further embodiment of the bushing assembly of the present invention is disclosed in FIG. 4 wherein a porcelain bushing of the type having a corrugated surface 27 is provided with a pair of compression springs 30 and 31 of the washer type and which are fastened together by a cotter pin 33 extending through a pair of tabs 34 and 35 each being formed as an outward extension of the respective springs.

Installation of the embodiment of FIG. 4 is generally accomplished as in the embodiments of FIGS. 1 and 2 and FIG. 3 with the exception that the springs are initially positioned around the neck of the bushing with each of their raised and depressed portions 37, 38 and 39, 40, respectively, being in meshing relationship or in phase with a corresponding raised and depressed portion, respectively, of the other spring. The springs are then relatively rotated out of phase into a desired position wherein they will impart a predetermined mounting and sealing force to the bushing, the position of maximum force being shown in FIG. 4.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above de-

scribed will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claim.

I claim:

An insulating bushing assembly for use with electrical apparatus and adapted to be installed through an aperture in the wall thereof comprising, a bushing member formed of insulating material and having a neck portion dimensioned for insertion through said aperture and an enlarged head portion dimensioned to engage the wall adjacent said aperture, removable retaining means on the neck portion spaced from said head portion, at least two washer-type springs relatively movable during assembly and having corresponding raised and depressed portions, the length of said springs along the bushing neck portion being variable by relative rotation of said springs each of said springs having tabs positioned thereon such that



in superposed position the corresponding raised and depressed portions are out-of-phase, said springs being arranged to bear against the wall and the retaining means when the bushing assembly is installed through the wall and said tabs are in superposed position, and means for locking said tabs in superposed position.

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