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BAYONET CLOSURE WITH GASKET COMPRESSION LIMITING MEANS

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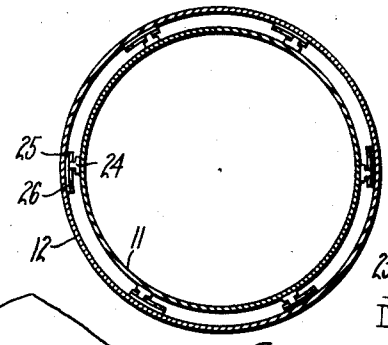


Fig. 4

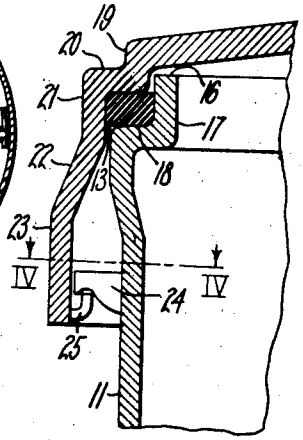


Fig. 3

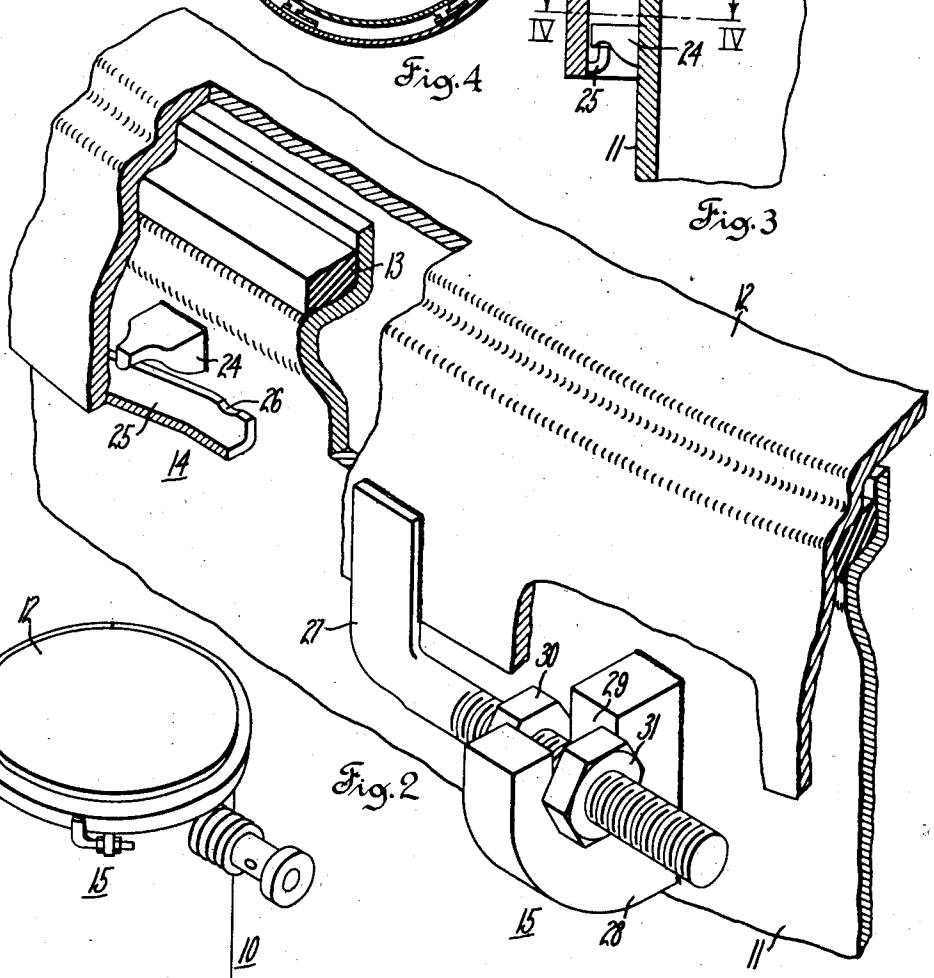


Fig. 2

Fig. 1

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BAYONET CLOSURE WITH GASKET COMPRESSION LIMITING MEANS

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This invention relates to tanks or receptacles and more particularly to a new and improved means for removably clamping and sealing a cover to a transformer tank.

The clamping and sealing of a cover to a receptacle such as a transformer tank involves the application of compression forces on a resilient gasket between the cover and tank to obtain an effective fluid tight joint therebetween.

Heretofore, the practice in clamping a cover to a transformer tank involved the use of external evenly distributed bolts around the periphery of the cover. This type of clamping device is difficult to paint evenly around the clamp elements and provides rust gathering pockets around the periphery of the tank. Thus, it is deemed important to keep the clamping means free from the weathering elements. Further, in order to provide a good seal between the removable cover and the transformer tank, the compression forces between the cover and the tank should be controlled.

Therefore, in accordance with the present invention a new and improved transformer cover clamping structure is provided. This structure comprises a plurality of inclined notched slides which are evenly spaced around the inner surface of the cover and a plurality of projections such as pins mounted on the tank, one arranged to engage each of the notched surfaces during a clamping operation. The pins move over the slides until the pins are engaged in the notches thereby obtaining a predetermined sealing compression on the gasket between the cover and tank.

It is, therefore, one object of the present invention to provide a new and improved transformer cover clamping structure which will effectively resist weathering.

Another object of the invention is to provide a new and improved transformer cover clamping structure which will substantially enclose the sealing gasket and subject it to a predetermined compression force.

A further object of this invention is to provide a new and improved transformer cover clamping structure which can be easily operated to engage or disengage the cover from the tank structure.

Objects and advantages other than those set forth above will be apparent from the following description when read in connection with the accompanying drawings, in which:

Fig. 1 is an isometric view of an assembled distribution transformer tank and cover with a cover adjusting bolting structure;

Fig. 2 is an enlarged isometric partial cut away view of a portion of the assembled distribution transformer tank and cover illustrating the invention;

Fig. 3 is an enlarged axial cross sectional view of a portion of the transformer cover and tank shown in Figs. 1 and 2 in sealing engagement; and

Fig. 4 is a cross sectional view of Fig. 3 on line IV—IV.

Referring more particularly to the drawing by characters of reference, Figs. 1–4 illustrate a transformer **10** comprising two relatively joining members which are a

cylindrical receptacle or tank **11** and a circular top or cover **12**, a resilient gasket **13** of suitable material such as synthetic rubber between the cover and tank, and a plurality of sealing or clamping means or compression components **14**. The cover and tank are held in a clamping position by a disengageable fastening means **15** mounted along the periphery of the members. Although the drawing shows the invention incorporated on a transformer tank, nevertheless, it is intended that the invention be used on any receptacle utilizing a cover.

There are particular advantages in the illustrated construction of the tank and cover. For example, it is desirable that the gasket material be protected from exposure to the atmosphere which would cause aging and deterioration of the gasket material. Likewise, it is desirable that the gasket material be protected from contact with the liquid inside of the tank, as the illustrated tank may have placed therein insulating liquid and an electrical apparatus.

The enlarged view of Fig. 3 clearly shows the tank and cover structure. The upper part of tank **11** is provided with a flange which is spaced from upper edge **16** of the tank wall **11**. The flange may be formed by inwardly or outwardly extending the wall of the tank to provide a continuous step shaped cross sectional flange as part of the tank. Upper surface **18** of the flange is flat, providing a flat seat for the gasket **13**. Rim or lip **17** of the wall of the tank extends upwardly from the inner edge of the flange, whereby the rim of the tank serves as a positioning and retaining means for the gasket which can be slipped over the rim onto the flat upper surface of the flange.

The central portion of the cover is preferably dome shaped and has a depending edge which has a three section step shaped portion and a downward outwardly flared portion or flange. The first section **19** is turned downwardly from the domed central portion of the cover so that there is an angle of slightly more than ninety degrees therebetween. The intermediate section **20** is turned outwardly from the bottom of the first section with an angle of ninety degrees between the first section and the horizontally extending intermediate section, and the third section **21** is turned vertically downwardly from the outer edge of the intermediate section. The flared portion has a first section **22** extending outwardly from the bottom of the third section of the step shaped portion at an angle of approximately one hundred sixty degrees, and a second section **23** turned vertically downward from the bottom of the first section of the flared portion.

Gasket **13** is compressed between two flat surfaces, one being the upper surface **18** of the flange on the tank and the other being the flat surface **20** of the depending edge portion of the cover **12**, whereby the force of compression on the gasket is distributed over the entire upper and lower surface of the gasket.

The step shaped portion of the depending edge of cover **12** cooperates with the flange and with the upwardly extending rim **17** of the tank to enclose the gasket. The gasket is covered on top and bottom by the flat surface **20** of the cover and by the flat upper surface **18** of the tank, respectively, and the gasket is enclosed on its inner and outer edges or sides by the lip or rim **17** of the tank and the vertical section **21** of the cover, respectively.

In addition to enclosing the inner and outer sides of the gasket, the depending portion of the cover cooperates with the flange and the lip of the tank to provide a double guide means for properly placing the cover on the tank. The rim **17** of the tank is guided along the first or uppermost vertical section **19**, of the cover as the cover is lowered onto the tank, thereby providing an inside guide. An outside guide for placing the cover on the tank is provided by the third or lower vertical section **21**

of the cover which slides along the vertical edge of the flange.

The spacing between the flared portion of cover 12 and the tank wall provides space for containing the clamping means 14, thus keeping them free of the weathering elements. Within this space are mounted a plurality of projections 24 which are spaced radially outward around the outer periphery of the tank.

At spaced intervals around the inner periphery of the vertical section 24 of the flared portion of cover 12 are attached notched arcuate slides 25. One slide is provided for each projection 24. Slides 25 are slightly inclined in the direction of rotation of cover 12 during a clamping operation and upon rotation of cover 12 clockwise, slides 25 exert a force against the projections 24 causing cover 12 and tank 11 to compress gasket 13, producing a sealing engagement.

Although Fig. 2 illustrates a slide extending around a portion of the inner periphery of the cover, each slide could also be arranged to extend around a portion of the outer periphery of the tank, thus mounting each projection around the inner periphery of the cover.

To prevent excessive compression which would be injurious to gasket 13 a notch or stop 26 is made on each slide 25 at a predetermined point along its slope. These notches halt the movement of slides 25 on projections 24 and indicate that a predetermined desired compression of gasket 13 has been obtained. A gasket of material such as synthetic rubber should be compressed to not more than one-third of its original thickness, otherwise its resiliency will be detrimentally affected.

An L-shaped stud 27 is welded to cover 12 and is threaded to accommodate threaded members, for example, nut 30 and nut 31. A stud holder 28, which has a slot 29 for engaging the stud 27 is welded to the tank 11 and extends radially outward.

In closing tank 12, cover 11 is first loosely placed in position by inserting stud 27 in slot 29. Nut 31 is then attached to stud 27, nut 30 having been added previously to stud 27. Nut 30 is then turned counterclockwise causing the slides 25 to move under their respective projections 24, thereby compressing gasket 13. This action continues until the projections 24 snap into notches 26 of slides 25 at which time a specified compression force is applied to gasket 13 and the clamping operation is completed. Nut 31 is then turned clockwise toward stud holder 28 to lock cover 12 and receptacle 11 in this given relative position. Thus, disengageable means 15, mounted on the periphery of the members 11 and 12, relatively moves and holds the members in given relative positions.

Although only one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What is claimed is:

1. In combination, two relatively joining members comprising a cylindrical receptacle provided with an opening therein and a cover for said opening, a downwardly extending flange integrally arranged on said cover surrounding said opening, resilient gasket means mounted between said members, means mounted on said members for causing said members to compress said gasket means therebetween comprising two compression components, one of said components comprising a slide having a cam surface substantially parallel to said flange, said cam surface having a notch at a predetermined position, the other of said components comprising a radially extending projection, one of said components being mounted around the inner periphery of said flange and extending radially inwardly toward said receptacle, the other of said components being mounted on the outer periphery of said receptacle and extending radially outwardly toward said flange, said components cooperating together whereby movement of said projection along said cam surface effects a predetermined amount of compression on said gasket means during joining of said members, and means for relatively rotating said members and for holding said members in a given position, said means comprising an elbow shaped stud having a first leg externally mounted on said cover flange and a threaded second leg positioned substantially parallel to said cover and said flange, a stud holder externally mounted on said receptacle with a slot for closely containing said second leg of said stud, and a pair of threaded members engaging said threaded second leg and abutting opposite sides of said holder to adjust and secure said stud in said holder.

2. In combination, two relatively joining members comprising a cylindrical receptacle provided with an opening therein and a cover for said opening, a downwardly extending continuous flange integrally arranged on said cover and surrounding said opening, gasket material arranged between said members, said flange having a plurality of arcuate slides substantially identically positioned around the inner periphery of said flange and extending radially inwardly toward said receptacle, each of said slides being provided with a surface substantially parallel to said flange and inclining toward said cover, said surface having transverse elements perpendicular to said flange, each said surface being provided with a stop at the end furthermost from the edge of said flange, a plurality of projections mounted on the outer periphery of said receptacle extending radially outwardly toward said flange, one engaging each said surface during relative rotational movement of said members, each of said projections and its cooperating surface effecting a predetermined compression force on said gasket material upon each of said projections engaging said stop, and means for relatively rotating said members and for holding said members in a given relative position, said means comprising a threaded stud externally mounted on said flange, said stud having a threaded end portion substantially parallel to said cover and said flange, a holder externally mounted on said receptacle for containing said stud and threaded members engaging said stud to adjust and secure said stud in said holder.

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