Sept. 28, 1948. W. J. CAMPBELL 2,450,232

JOINT STRUCTURE

Filed Nov. 29, 1945

Fig. 1.

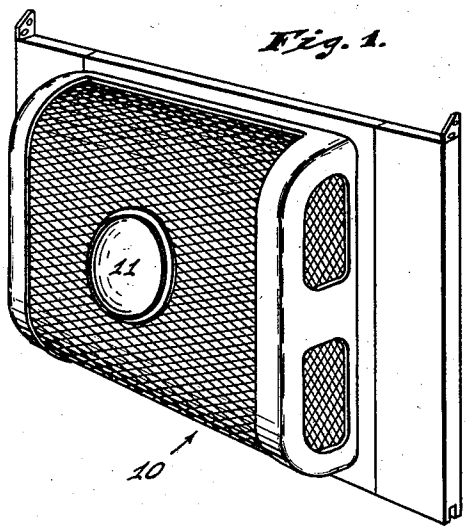
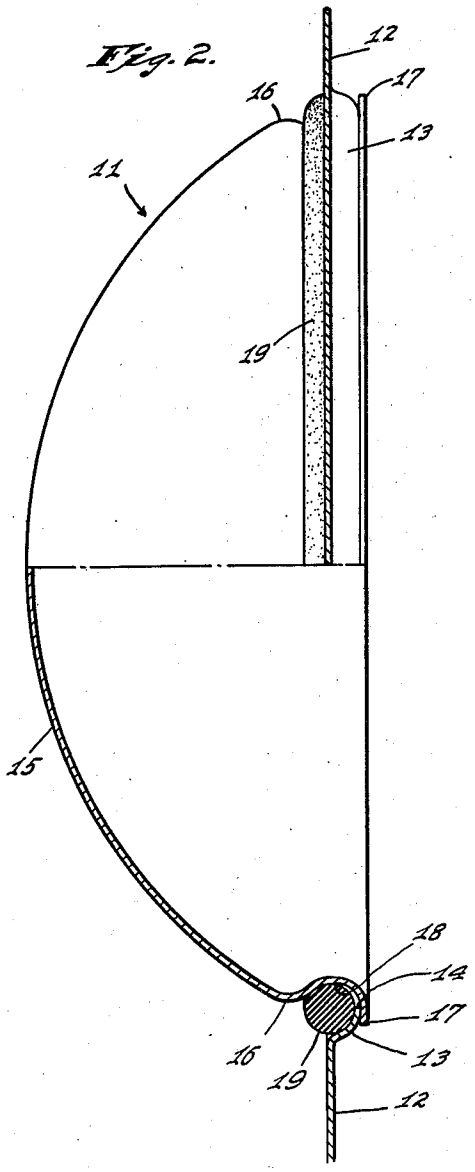


Fig. 2.



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Patented Sept. 28, 1948 2,450,232

UNITED STATES PATENT OFFICE

2,450,232

JOINT STRUCTURE

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Application November 29, 1945, Serial No. 631,552

8 Claims. (Cl. 220—61)

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The present invention relates to joint structures, and is particularly concerned with the provision of means for securing in place in an aperture in a member, a closure member for that aperture, when it is desired to avoid loosening of the joint or rattling of the joined members, as a result of vibration, and where the joined members are made of such materials that the use of ordinary fastening means to accomplish the desired ends is not feasible.

More particularly, I am concerned with the mounting of a bright metal dome or cap in the center of a reticular sheet forming a part of a housing for a window ventilator fan. In the specific structure with which I am primarily concerned, a fan and motor are mounted within a housing, which housing consists of a frame and an expanded metal sheet stretched upon the frame, the frame and sheet being painted or enameled. The construction is such that the motor projects outwardly somewhat beyond the general plane of the open-work sheet; and a dome is provided to cover the projecting portion of the motor. That dome preferably is made of, or plated with, some bright metal. If screws or bolts are used to fasten the two parts together, it is necessary to provide the parts with perforations through which those fastenings may project; and the vibration, incident upon the use of the organization, will work the fastening means loose, in spite of the use of any known nut locking means. Obviously, rattling of the associated parts will result, as soon as the fastening means work loose.

It is the primary object, then, of the present invention to provide some means whereby the parts in question may be held together without the provision of perforations, and without the possibility that the fastening means will work loose to permit rattling of the parts. Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a perspective view of a ventilator fan housing, showing the dome assembled with the housing through the medium of my improved joint structure; and

Fig. 2 is an enlarged transverse section, a part of the dome being shown in side elevation, and the housing sheet being shown fragmentally.

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Referring more particularly to the drawings, it will be seen that I have indicated the ventilator fan housing above-described, by the reference numeral 10, the dome 11 being shown in association therewith. The reticular sheet is indicated by the reference numeral 12 and, as is shown, said sheet is formed with a central aperture therein. Perimetrally bounding that aperture, the sheet 12 is formed to provide an inwardly offset flange 13 whose cross-sectional contour is substantially a 90° arc of a circle. The perimetral channel formed by the flange 13 faces toward the outer surface of the sheet 12; and the extremity 14 of said flange bounds and defines the aperture in the sheet 12.

The dome 11 comprises a body portion 15, of generally part-spherical form; and its major perimetral dimension, indicated by the reference numeral 16, is such as will pass snugly through the aperture defined by the extremity 14 of the perimetral flange 13. At its rear end, the dome 11 is formed with a perimetrally projecting flange 17 whose perimetral dimension exceeds that of the extremity of the flange 13. Thus, the dome 11 may be moved through the aperture defined by the flange 13, from the inner side toward the outer side of the sheet 12, until the flange 17 of the dome 11 engages the flange 13 of the sheet 12 to limit movement of the dome 11 in that direction.

Between the region of the major perimetral dimension of the body 15, indicated by the reference numeral 16, and the flange 17, the body 15 is reduced to form a perimetrally outwardly opening groove 18. When the parts are in assembled relation, as shown in Fig. 2, the flange 13, the groove 18, and the region of major perimetral dimension of the body 15 cooperate to provide an outwardly opening perimetral channel whose cross-sectional extent exceeds 180°, the portion 16 of the dome and the base of the flange 13 defining an unclosed chord through which access to that channel may be gained.

A retainer element 19 of resilient material may now be entered in that channel to engage the flange 13 and the groove 18 in such a fashion as to urge the flange 17 into engagement with the flange 13. Preferably, the element 19 will be an elastic ring whose normal perimetral dimension is less than the major perimetral dimension of the body 15; and preferably, the material of the element 19 will be elastically compressible, its normal cross-sectional diameter be-

ing greater than the length of the chord defined between the region 16 of the dome 11 and the base of the flange 13. Such an element may be made of rubber, or of other materials having the above-described characteristics. An element having those characteristics may be forced through the open side of the channel defined between the groove 18 and the flange 13; and, when so manipulated, will contract perimetrally and expand cross-sectionally to exert an outward pressure upon the dome 11, tending to hold said dome resiliently in position with its flange 17 engaged with the flange 13.

I claim as my invention:

1. A joint structure comprising a first member formed with an aperture therein and a closure member adapted to close said aperture, said first member being formed with an offset flange surrounding said aperture, said closure member having a body contoured and dimensioned to pass snugly through said aperture, an outwardly-projecting perimetral flange at the rear end of said body having external dimensions exceeding the dimensions of said aperture, whereby, when said closure member body is passed through said aperture, said closure member flange will engage the flange on said first member to limit movement of said closure member in one direction, said closure member further being formed immediately forward of its flange, with a perimetral, outwardly-opening channel having a radial dimension less than the radial dimensions of said closure member forwardly and rearwardly of said channel, and a resilient element removably received in said channel and engaged between said closure member body and the flange of said first member to hold said closure member against retrograde movement.

2. A joint structure comprising a first member formed with an aperture therein and a closure member adapted to close said aperture, said first member being formed with an offset flange surrounding said aperture, said closure member having a body contoured and dimensioned to pass snugly through said aperture, an outwardly-projecting perimetral flange at the rear end of said body having external dimensions exceeding the dimensions of said aperture, whereby, when said closure member body is passed through said aperture, said closure member flange will engage the flange on said first member to limit movement of said closure member in one direction, said closure member further being formed, immediately forward of its flange, with a region of reduced dimension, and a ring-like member of softly resilient material removably received in said last-named region and engaged between said closure member body and the flange of said first member to hold said closure member against retrograde movement.

3. A joint structure comprising a first member formed with an aperture therein and a closure member adapted to close said aperture, said first member being formed with an offset flange surrounding said aperture, said closure member having a body contoured and dimensioned to pass snugly through said aperture, an outwardly-projecting perimetral flange at the rear end of said body having external dimensions exceeding the dimensions of said aperture, whereby, when said closure member body is passed through said aperture, said closure member flange will engage the flange on said first member to limit movement of said closure member in one direction, said closure member further being formed, immediately forward of its flange, with a region of reduced dimension, and a rubber ring removably received in said last-named region and engaged between said closure member body and the flange of said first member to hold said closure member against retrograde movement.

4. A joint structure comprising a first member formed with an aperture therein and a closure member adapted to close said aperture, said first member being formed with an offset flange surrounding said aperture, said closure member having a body contoured and dimensioned to pass snugly through said aperture, an outwardly-projecting perimetral flange at the rear end of said body having external dimensions exceeding the dimensions of said aperture, whereby, when said closure member body is passed through said aperture, said closure member flange will engage the flange on said first member to limit movement of said closure member in one direction, said closure member further being formed, immediately forward of its flange, with a region of reduced dimension, and an elastic element having a normal perimetral extent less than the major perimetral dimension of said closure member body removably received in said last-named region and engaged between said closure member body and the flange of said first member to hold said closure member against retrograde movement.

5. A joint structure comprising a first member formed with an aperture therein, said member being formed with a flange perimetrally bounding said aperture, said flange being offset away from the outer side of said member and providing a perimetral channel of approximately 90° cross-sectional extent and opening toward the outer surface of said member, a closure member having a body whose major perimetral dimension is contoured to pass snugly through the aperture defined by said flange from the inner surface of said first member toward the outer surface thereof, said body being formed, immediately behind such major dimension, with a perimetral groove of reduced dimension, said groove being further defined by a perimetral flange of greater dimension than the flange of said first member, said first-named flange cooperating with said groove and with said closure member body, when said members are assembled, to define a perimetral channel whose cross-sectional extent exceeds 180° and opening toward the outer surface of said first member, and a retaining member received in said last-named channel.

6. A joint structure comprising a first member formed with an aperture therein, said member being formed with a flange perimetrally bounding said aperture, said flange being offset away from the outer side of said member and providing a perimetral channel of approximately 90° cross-sectional extent and opening toward the outer surface of said member, a closure member having a body whose major perimetral dimension is contoured to pass snugly through the aperture defined by said flange from the inner surface of said first member toward the outer surface thereof, said body being formed, immediately behind such major dimension, with a perimetral groove of reduced dimension, said groove being further defined by a perimetral flange of greater dimension than the flange of said first member, said first-named flange cooperating with said groove and with said closure member body, when said members are assembled, to define a perimetral channel whose cross-sectional extent exceeds 180°

and opening toward the outer surface of said first member, and a rubber ring received in said last-named channel.

7. A joint structure comprising a first member formed with an aperture therein, said member being formed with a flange perimetrally bounding said aperture, said flange being offset away from the outer side of said member and providing a perimetral channel of approximately 90° cross-sectional extent and opening toward the outer surface of said member, a closure member having a body whose major perimetral dimension is contoured to pass snugly through the aperture defined by said flange from the inner surface of said first member toward the outer surface thereof, said body being formed, immediately behind its major dimension, with a perimetral groove of reduced dimension, said groove being further defined by a perimetral flange of greater dimension than the flange of said first member, said first-named flange cooperating with said groove and with said closure member body, when said members are assembled, to define a perimetral channel whose cross-sectional extent exceeds 180° and opening toward the outer surface of said first member, and a ring of compressibly resilient material, whose normal cross-sectional diameter is greater than the open chord defined between said first member and said closure body, received in said last-named channel.

8. A joint structure comprising a first member formed with an aperture therein, said member being formed with a flange perimetrally bounding said aperture, said flange being offset away from the outer side of said member and providing a

perimetral channel of approximately 90° cross-sectional extent and opening toward the outer surface of said member, a closure member having a body whose major perimetral dimension is contoured to pass snugly through the aperture defined by said flange from the inner surface of said first member toward the outer surface thereof, said body being formed, immediately behind such major dimension, with a perimetral groove of reduced dimension, said groove being further defined by a perimetral flange of greater dimension than the flange of said first member, said first-named flange cooperating with said groove and with said closure member body, when said members are assembled, to define a perimetral channel whose cross-sectional extent exceeds 180° and opening toward the outer surface of said first member, and a ring of compressibly resilient material, whose normal perimetral extent is less than the major perimetral extent of said closure member body and whose normal cross-sectional diameter is greater than the open chord defined between said first member and said closure body, received in said last-named channel.

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