Oct. 17, 1950 W. W. BABER 2,525,994

EXPANSION CLOSURE DEVICE

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Fig. 1.

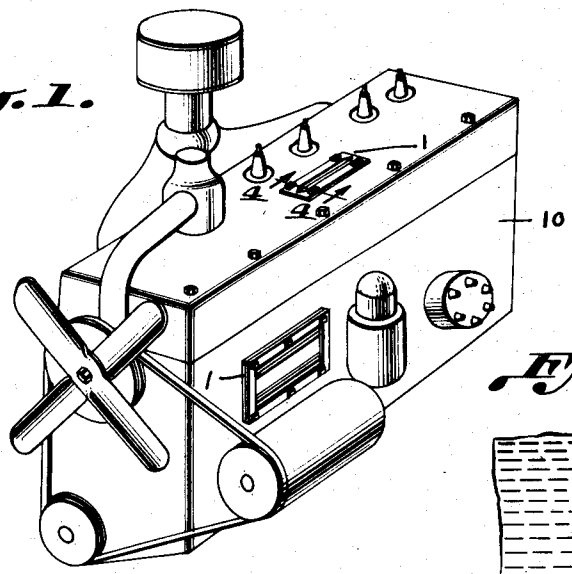


Fig. 3.

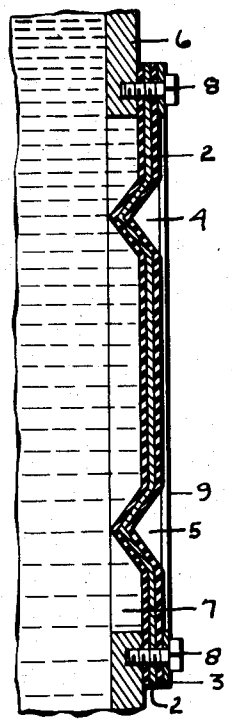


Fig. 2.

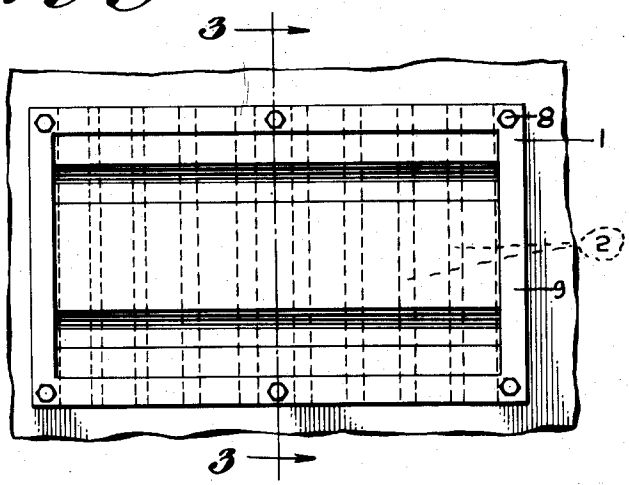
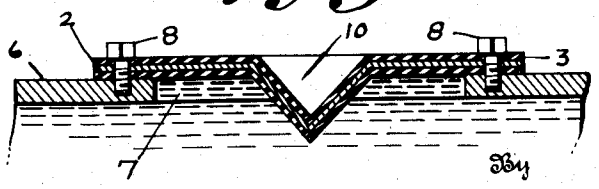


Fig. 4.



Inventor

WILLIAM W. BABER

By Horace Bell

Attorney

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EXPANSION CLOSURE DEVICE

William Wilmer Baber, Albermarle County, Va.

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2 Claims. (Cl. 220—24)

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This invention relates to a new and useful improvement in an expansion device, and more particularly to such devices used in operative relation with containers housing a liquid, and which liquid is subjected to freezing in its container.

It is a well known fact that when liquids are housed in a closed rigid container, for instance an automobile engine, and when such liquid freezes, its expansion; which is approximately one eighth of its volume, causes said container to break. The breakage, of course, is due to the expansion of the frozen liquid being greater than the expansion of the closed container.

A column of ice, for instance, sealed in a cast iron pipe, will, when it freezes, generally break the sealed pipe. If, for instance, a column of ice is sealed in such a pipe; one of its ends being provided with a flexible seal, then, the ice when it freezes, will expand, and when such expansion of the frozen liquid or ice takes place, it will press against the flexible sealed end; which will expand, and thereby prevent the breakage of the pipe. In other words, the sealed flexible portion is adapted to care for the greatest possible expansion of the frozen liquid.

With the foregoing illustrations, it may be readily seen how industry has been confronted with the problems of freezing of the liquids in mechanically cooled internal combustion engines; since when the water or liquid freezes in such engine, it expands, and if the expansion is at a greater rate than the expansion of the engine; the latter generally breaks.

One of the objects of this invention is the provision of a device adapted to be used with liquid containers to permit the expansion of a frozen liquid in such container without breaking the latter.

Another object of this invention is the provision of a device in operative relation with a liquid container adapted to permit the expansion of a frozen liquid in said container, and said device to contract itself when said liquid thaws or melts; all of which is done without injury or breakage to the said container.

Other objects and features will more fully appear from the following description and accompanying drawings, in which: Fig. 1 is a perspective of an internal combustion engine showing the form of the device attached to the side of the water jacket of said engine, and a modification secured to the top of the engine head; Fig. 2 a top plan view of the invention; Fig. 3 a sectional view taken along lines 3—3 of Fig. 2 view in the direction of the arrows, and Fig. 4 a sectional

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view taken along lines 4—4 of Fig. 1 and viewed in directions of the arrows.

As is well known in the art of liquid cooled internal combustion engines, or any other type of engine, utilizing a liquid as a cooling medium; a water jacket generally encompasses the parts to be cooled.

Referring to the drawings, the invention or expansion and contraction device is designated by the numeral 1. The device may be made in plate-like fashion and consists of a plurality of resilient springs 2 which forms the frame work for an impervious and heat resisting cover 3.

The springs are embedded in the cover and detents 4—5 are formed by the springs which are shaped in angular fashion.

A water jacket 6 of the engine is provided with an aperture 7 slightly smaller than the device, as is clearly illustrated in Fig. 3, and the device is secured over said aperture and to the jacket by bolts 8. A metal flange 9 may be placed over the device to prevent the bolts from cutting into the coat and also protect its edges.

Referring to the modification, the invention is constructed in similar fashion and secured to the water jacket in like manner, except that a single detent 10 is formed by the springs as clearly shown in Fig. 4.

It is obvious from the foregoing, and with reference to Figs. 3 and 4, that when the frozen liquid begins to expand, the device being the point of least resistance, permits such expansion, thereby relieving the pressure against other parts of the engine. The detents may be varied to provide additional surface for the device to accommodate the required expansion limit.

When the frozen liquid has melted, the device will resume its normal shape due to the action of the springs.

The device may be applied to any suitable portion of the liquid cooled engine and may be shaped to conform with the space it has to cover.

The greater the expansion of the frozen liquid, the greater the device will bulge and the detents will naturally become more shallow; but when the frozen liquid is melted, the device is brought to its normal shape by the action of the springs.

Fig. 1 shows both forms of the invention applied to an engine 10.

Having described this invention, what is claimed is:

1. In a device of the character described comprising a closed rigid container adapted to hold an expanding and contracting liquid, said container having an aperture in one of its walls,

a flexible closure member secured to the edges surrounding said aperture in the container, said closure member comprising a plurality of layers of heat resistant flexible material impervious to said liquid, together with a plurality of flat spring elements having inwardly extending bulged portions embedded between said layers of flexible material, whereby said closure member is caused to flex and reflex when an internal force is applied to and released from said closure member.

2. In a device of the character described comprising a closed rigid container adapted to hold an expanding and contracting liquid, said container having an aperture in one of its walls, a flexible closure member secured to the edges surrounding said aperture in the container, said closure member comprising a plurality of layers of impervious and heat resistant flexible material, together with a plurality of resilient flat

springs having intermediate bulgeable portions embedded between said layers in parallel arrangement, thereby producing an exterior closure surface having a portion of corrugation-like design thereon, said last mentioned portion expanding outwardly on excessive internal pressure and thereby relieving the pressure against other parts of said closed rigid container.

WILLIAM WILMER BABER.

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