Jan. 21, 1958 E. E. NABAL ET AL 2,820,616

PRESSURIZED ELECTRONIC CASE

Filed Sept. 3, 1952

FIG. 2

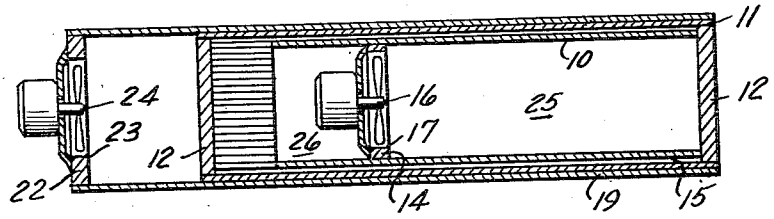
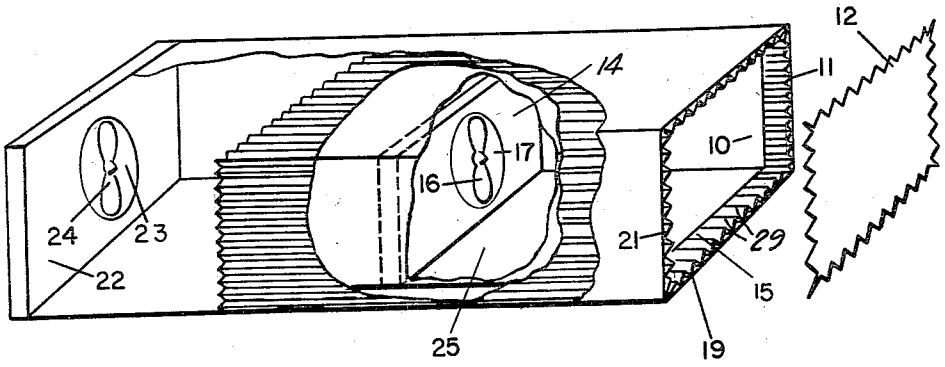


FIG. 1



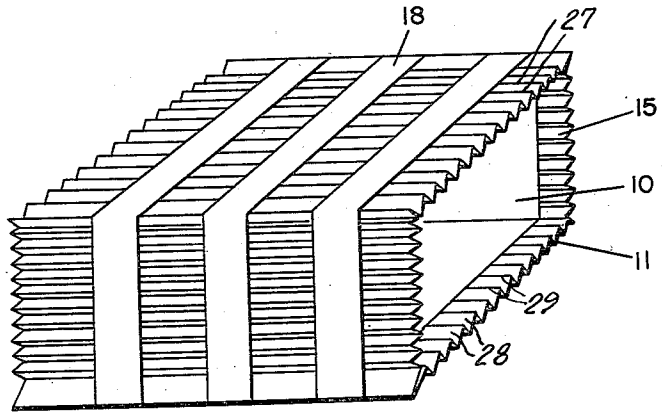


FIG. 3

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PRESSURIZED ELECTRONIC CASE

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1 Claim. (Cl. 257—250)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to pressurized electronic cases and more particularly to a pressurized electronic case constructed to more efficiently dissipate the heat generated by the electronic equipment housed in said case.

In prior art devices of this type the pressurization of the case rendered the heat dissipation very inefficient with the attendant rapid deterioration of the components housed within the case.

The present invention provides a case constructed to provide an inner pressurized section and an outer section open to the atmosphere with a heat exchange means between the sections.

It is an object of this invention to provide a pressurized case which facilitates the dissipation of any heat generated by components housed within it.

A second object of this invention is to provide a lightweight rectangular pressurized case for an electronic unit.

A third object of this invention is to utilize the advantages of corrugated sheet metal strengthened by band members to provide a lightweight trusswork construction.

A fourth object of this invention is to provide an electronic case construction having heat exchanging features.

A fifth object of this invention is to provide an electronic case construction that will dissipate the heat given off by an enclosed electronic unit.

A sixth object is to provide an easily manufactured pressurized case which has the required dimensional stability.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

Fig. 1 shows an isometric view of the case with the end removed, illustrating the interior structure schematically.

Fig. 2 is a sectional view taken along a longitudinal axis of Fig. 1.

Fig. 3 is a modification of Fig. 2 wherein the outer shell is replaced by reinforcing bands.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in Fig. 1 a case having an inner shell **10** surrounded on four of its sides by an intermediate shell **11** which has channelized or corrugated side walls such that there are formed between the inner shell **10** and intermediate shell **11** spaced ducts **15** extending parallel to the longitudinal axis of the sides of shells **10** and **11**. The intermediate shell **11** is made from corrugated or reverse bended sheet metal and the peaks thereon are referred to as tops **27** and bottoms **29**. The ducts **15** result from the contact between the bottoms **29** and the inner shell **10**. These ducts provide

both reinforcement for the unit and also provide increased area for heat transfer between the intermediate shell **11** and the surrounding medium. The intermediate shell **11** extends beyond each end of inner shell **10** to allow access to these ducts **15** when the ends of intermediate shell **11** are closed by covers **12** which are constructed to conform to the configuration of the ends of intermediate shell **11**, thereby forming a case. Such an interfitting shell arrangement lends itself to simple manufacturing procedures while producing an article which is highly efficient for its intended use. Inner shell **10** of the case is divided into two compartments **25** and **26** by a partition **14** which has a motor driven fan **16** mounted in an aperture **17** in the partition **14**. Surrounding intermediate shell **11** at spaced intervals there may be placed reinforcing bands **18**, see Fig. 3, to assist in preventing deformation of the case when pressure is established within. The above construction characterizes the basic concept of the invention, but where greater heat dissipation is required an outer shell **19** may be constructed to enclose the first two shells **10** and **11** fitting in engaging contact with the tops **27** of the channels or corrugations **28** in intermediate shell **11** thus forming ducts **21** between the sides of shells **11** and **19**. Outer shell **19** preferably extends beyond one end of intermediate shell **11** and has an end member **22** having an aperture **23** with a motor driven fan **24** mounted therein. It is noted that in reference to closures **12** when it is used with the outer shell **19** it closes only those ducts **15** which lie between shells **10** and **11** and that it is closure **12** which maintains the pressure in shells **10** and **11**, when the case is pressurized.

In operation, the heat generated by an electronic component mounted within the inner shell **10** is transferred by conduction to the surrounding gaseous fluid and by conduction and radiation to the walls of inner shell **10** and through inner shell **10** to the walls of intermediate shell **11**. The fluid, when heated, also transfers heat to the walls of shells **10** and **11** by convection. This heat transfer through the fluid to the outer walls of intermediate shell **11** is accelerated by employing the fan **16** to create a forced draft which circulates the fluid over any heat generating surface in compartment **25** and then forces the heated fluid into ducts **15** by the baffle effect of one of the closures **12**. The fluid then circulates through the ducts **15** to compartment **26** while transferring the heat load to the walls of ducts **15** in passing through said ducts **15** thus forming a closed circulating system within the pressurized case. The heat may then be removed from intermediate shell **11** either by radiation and normal convection or when outer shell **19** with fan **24** is employed the forced draft from fan **24** passes through ducts **21** and carries the heat transferred from the surface of intermediate shell **11** into the surrounding atmosphere through the open ends of ducts **21**. Since the transfer of heat between surfaces is proportional to the area of contact, it follows that, by providing the channelized surface of intermediate shell **11**, the area of contact between both the heated gaseous fluid within the case and the surrounding air is increased with an attendant increase in the effectiveness of heat dissipation from any heat producing electronic component housed within the case, as well as the strengthening of the cases.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and the scope of the invention.

What is claimed is:

A pressurized case for supporting electrical components comprising; a first open ended rectangular inner shell; a partition dividing said inner shell into two compart-

ments, said partition having an aperture therein; a rectangular intermediate shell of corrugated metal having tops and bottoms, said intermediate shell being greater in length and surrounding said inner shell with the bottoms of said intermediate shell being in good heat-conducting contact with said inner shell and forming longitudinal ducts between said inner and intermediate shells; hermetic closure means for the ends of said intermediate shell; a rectangular outer shell greater in length and extending beyond one end of said intermediate shell and surrounding said intermediate shell and forming longitudinal ducts between said outer shell and intermediate shell; an end member having an aperture therein for enclosing the end of said outer shell extending beyond said intermediate shell; a fluid enclosed within said inner and intermediate shells; means mounted within said inner shell for circulating said fluid through said inner shell and

said ducts formed by said inner and intermediate shells; and circulating means mounted in said aperture of said end member for circulating air in said ducts formed by said intermediate and outer shells.

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