Nov. 5, 1968 W. J. GARTNER 3,408,966

FIREPROOF CONTAINER

Filed Aug. 17, 1966 2 Sheets-Sheet 1

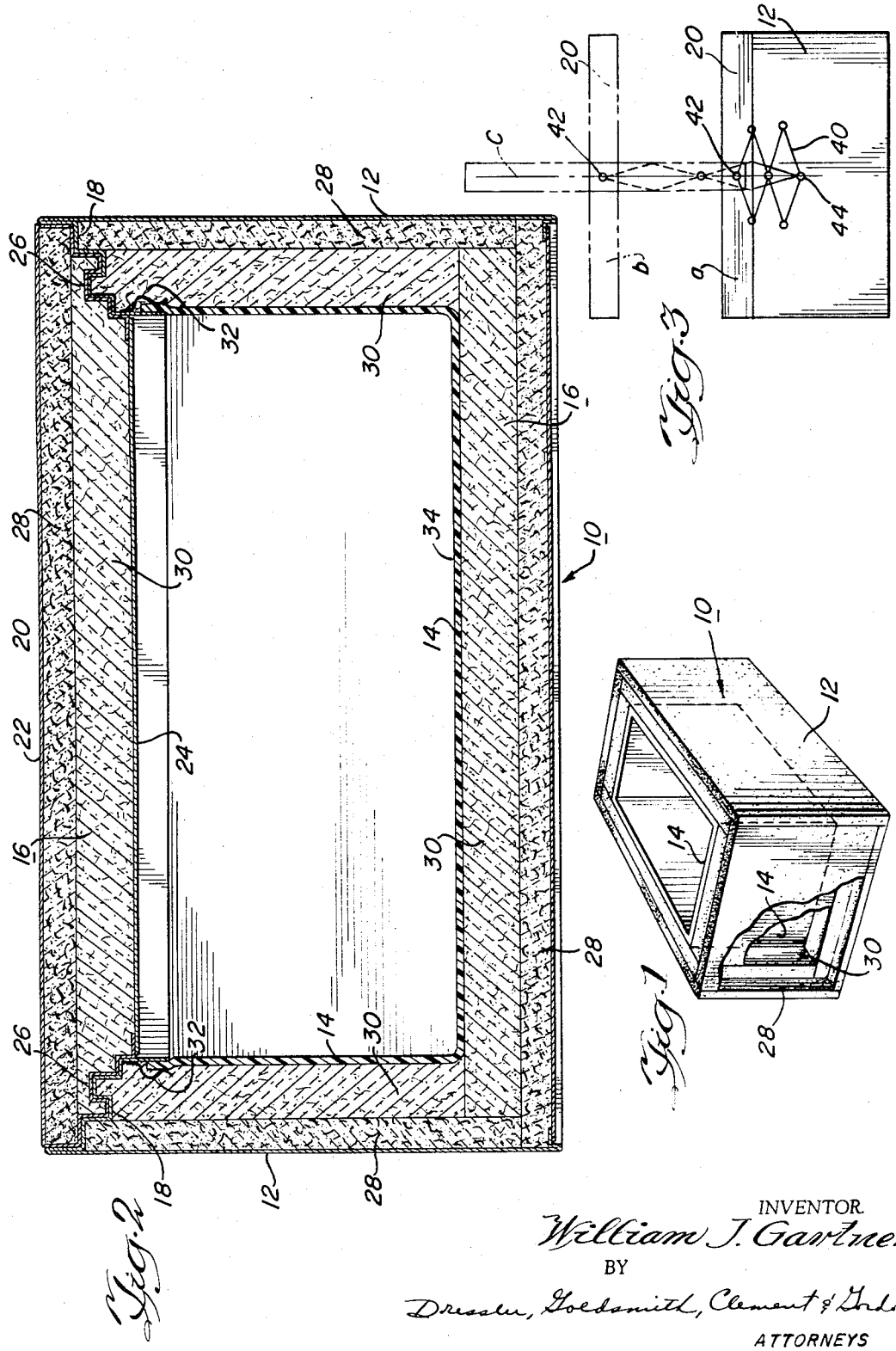


Fig. 2

Fig. 3

Fig. 1

INVENTOR.
William J. Gartner
BY
Dressler, Goldsmith, Clement & Gordon
ATTORNEYS

Nov. 5, 1968 W. J. GARTNER 3,408,966

FIREPROOF CONTAINER

Filed Aug. 17, 1966 2 Sheets-Sheet 2

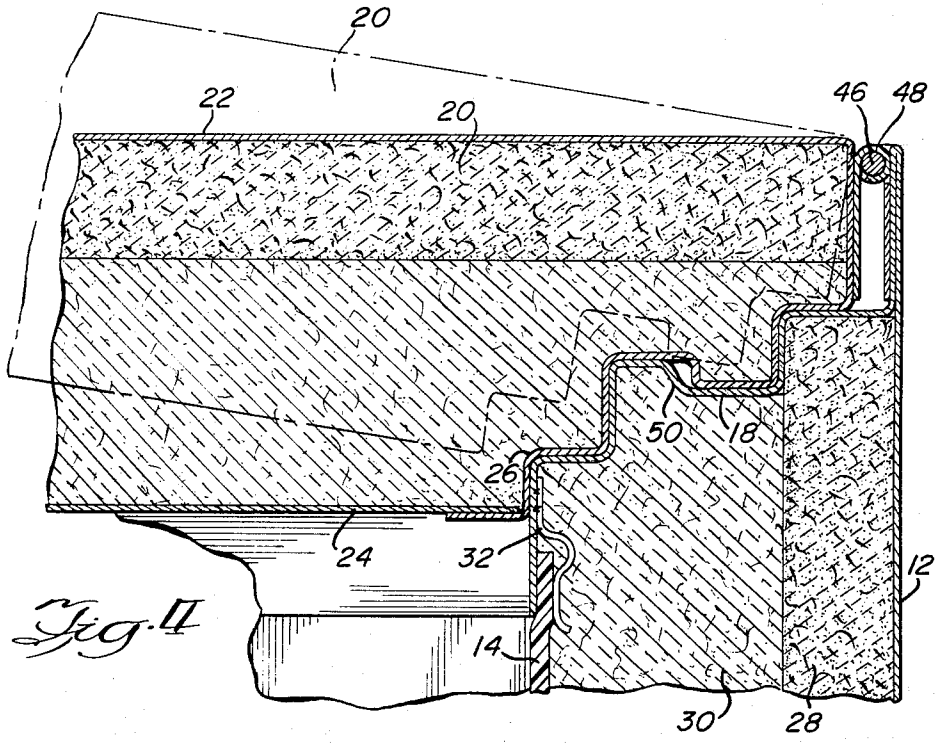


Fig. 4

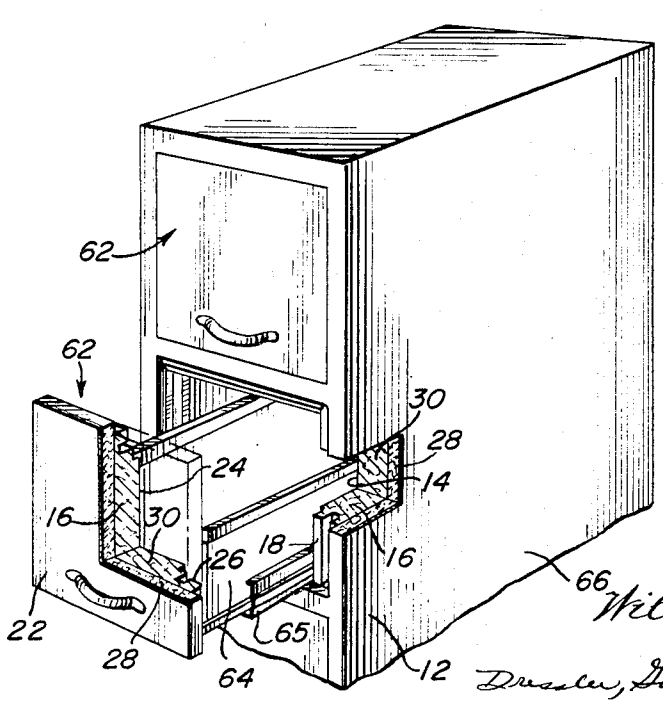


Fig. 5

INVENTOR.
William J. Gartner
BY
Dressler, Goldsmith, Clement & Gordon
ATTORNEYS

United States Patent Office 3,408,966
Patented Nov. 5, 1968

3,408,966

FIREPROOF CONTAINER

William J. Gartner, Melrose Park, Ill., assignor to
De Soto Inc., a corporation of Delaware

Filed Aug. 17, 1966, Ser. No. 573,049
27 Claims. (Cl. 109—74)

ABSTRACT OF THE DISCLOSURE

A fireproof container assembly having an inner container surrounded by an outer frame. A heat protection liner is provided between the outer frame and the inner container. The liner is formed of fibrous material, the outer portion of which has a high temperature resistance and the inner portion of which has high temperature insulative properties. A jamb having an irregular surface configuration bridges the outer frame and the inner container. A closure member having an irregular undersurface portion, an underframe and fibrous material interposed between the undersurface portion and underframe is provided and is adapted for mating relationship with the jamb, in a manner so that a narrow, tortuous path resistive to heat flow is provided between the closure and the jamb.

This invention relates to a container assembly, and more particularly, to a container assembly that is capable of protecting the contents therein from damage resulting from fire in the vicinity of the container.

This invention provides a container that is capable of storing and protecting valuable documents and certificates from fire damage, and is relatively inexpensive and light in weight. It also provides a container having a large useful volume in porportion to the overall dimensions of the assembly.

Prior art fire-resistant containers, or "fire-proof safes" as they are commonly called, have been found to be disadvantageous in certain respects. Although many fireproof safes have provided protection to the contents stored therein against destruction by fire, the relatively high cost, high weight to volume ratio, and small usable volume to overall dimensions ratio have been serious impediments to widespread use of such fireproof safes in smaller offices and homes. Prior to this invention, these disadvantages were considered to be a necessary concomitant to adequate fire protection.

One of the major causes of the disadvantageous cost and construction of prior art safes is the insulation material that has been used to fill the space between the steel inner container and the steel outer frame of the fire-proof safe. The filling for prior art safe liners has generally included a cementitious or dried slurry material which contains free and/or combined water. The cementitious material absorbed heat, first by liberation of combined water and then by vaporization of the liberated water; and the absorption of heat in this manner served to protect the contents of the container from excessive temperature rise until all the water present was turned to steam. Once all the water was vaporized, the cementitious material became a very poor insulator and the interior temperatures of the safe rose rapidly. Since the cementitious material is dense and since large amounts of it had to be used to provide enough water to delay heat transfer for a reasonable length of time, it is easy to see why the prior art safes were necessarily heavy and thick-walled.

To partially compensate for the rapid heat rise in prior art safes after the water was vaporized and to avoid excessive pressure between the outer and inner walls, means were generally provided in such safes for venting the steam from the space between the walls into the inner compartment. The high specific heat of the steam served

to slow down the temperature rise in the inner compartment to some extent but produced an additional disadvantage in that it caused some of the inks on the documents stored to run and thereby produced illegibility in the documents.

The container assembly of the present invention obviates the above-mentioned disadvantages of prior art fireproof safes. The illustrated embodiment is up to 80% lighter in weight than prior art fireproof safes having the same overall dimensions and its usable volume is greater than the usable volume of prior art fireproof safes saving the same overall dimensions. The container assembly of the present invention is relatively inexpensive to manufacture, and because of its low weight, is inexpensive to ship. Further, the container assembly of the present invention is constructed so that the venting of steam is generally unnecessary, thereby alleviating the danger of running ink as is present with prior art fireproof safes. In addition to these advantages, it affords fire protection that is comparable, and in some cases better, than the protection given by prior art fireproof safes.

In accordance with the instant invention, a container assembly is provided which comprises an inner container and an outer frame enclosing a major portion of the assembly. A heat protective liner is interposed between the outer frame and the inner container, which liner comprises fibrous material, at least the outer portion of which has a high temperature resistance and at least the inner portion of which has high temperature insulative properties.

The container assembly further includes means for securing the inner container to a fixed position within the outer frame, and a jamb which bridges the outer frame and the inner container. A closure member is provided, which member is adapted for mating relationship with the jamb. The closure member has an irregular undersurface portion which is adapted for engagement with an irregular surface of the jamb, so that a narrow, tortuous path resistive to heat flow is provided between the closure and the jamb.

The closure member includes an outer frame, the irregular undersurface portion, an underframe, and a heat protective liner interposed between the outer frame and the underframe. In a preferred embodiment of the invention, the irregular surface of the jamb and the irregular undersurface portion of the closure member are in a snug, mating relationship so that the closure member is removable from the jamb only in a direction that is perpendicular to the surface of the inner container facing the closure underframe.

In one form of the invention, the inner container of the assembly is formed of a high temperature resistant molded plastic composition, such as a glass fiber or asbestos-filled polyester composition. The plastic inner container is much lighter than the steel inner container utilized in prior art construction, and in addition does not require corrosion protection or painting for beauty.

A more detailed explanation of the invention is provided in the following description and claims and is illustrated in the accompanying drawings, in which:

FIGURE 1 is a perspective view, partially broken, of a container assembly in accordance with the present invention, without the lid attached thereto;

FIGURE 2 is a vertical sectional elevation of a container assembly in accordance with the principles of the present invention;

FIGURE 3 is a diagrammatic side elevational view of a lid-connection system in accordance with the present invention;

FIGURE 4 is a fragmentary, enlarged sectional elevation of a lid and jamb arrangement of a modified form of the present invention; and

FIGURE 5 is a fragmentary perspective view, partially broken, of a file cabinet construction in accordance with the teachings of the present invention.

Referring to FIGURES 1 and 2 in particular, a container assembly **10** is provided, having an outer frame **12** and an inner container **14**. Interposed between the outer frame **12** and the inner container **14** is a heat protective liner, generally designated as **16**. A jamb **18** is provided for bridging the outer frame **12** and the inner container **14**.

The container assembly includes a lid **20** comprising an outer frame **22**, an underframe **24**, and an undersurface portion **26** bridging the outer frame **22** and the underframe **24**. The heat protective liner **16** is interposed between the lid outer frame **22** and the underframe **24**.

From FIGURE 2 it is seen that the jamb **18** has an irregular surface configuration which closely conforms to the irregular configuration of the undersurface portion **26** of the lid **20**. The jamb **18** and the undersurface portion **26** of the lid define a narrow, tortuous path resistive to heat flow.

The linear **16** comprises a first fibrous material **28** having a high temperature resistance, positioned adjacent the outer frame **12**, and a second fibrous material **30** having high temperature insulative properties, positioned between the first fibrous material **28** and the inner container **14**.

By providing appropriate materials **28** and **30**, a heat protective liner is formed having both high resistance to temperature and low thermal conductivity. To achieve this result, the material **28** is a fibrous material having a high temperature resistance, such as a temperature resistance enabling it to withstand a temperature of at least 1700° Fahrenheit, and preferably a temperature of at least 2000° Fahrenheit, indefinitely. The material **30** has good temperature insulative properties at high temperatures and preferably a thermal conductivity factor of less than 0.65 B.t.u. inch per square foot per degree Fahrenheit per hour when measured at 1000° Fahrenheit. Of course, other things being equal, the lower the thermal conductivity factor, the more preferable the material. In a specific embodiment, material **28** consists of a ½ inch thick layer of ceramic fiber, sold under the trade name Johns-Manville Cerafelt, having a density of 12 pounds per cubic foot. The material **30** consists of one inch thickness of glass fiber matte, which was sprayed with a one percent starch solution to provide bound moisture. Glass paper containing 25% asbestos fiber is also satisfactory. It is preferred that the fibrous material **28** be between about ¼ inch and about one inch in thickness and the fibrous material **30** be between about ½ inch and about 2½ inches in thickness.

When a starch solution is utilized, there is some heat absorption due to latent heat of vaporization of the solution, but such absorption is not the principal mechanism for retarding heat flow and the system of the present invention is not dependent upon it. This permits materials to be used having inherently good thermal insulating properties, without relying upon the latent heat of vaporization as with prior art liners.

In the illustrated embodiment, the outer frame **12**, lid outer frame **22**, jamb **18** and lid undersurface **26** were formed of 20 gauge cold rolled steel (.035 inch in thickness). The inner container **14** is formed of 0.100 inch asbestos-filled polyester resin, which is molded to shape. The inner container **14** is suspended from the jamb **18** and is fastened thereto by means of suitable fastening members **32**. It has been found that suspending the plastic inner container from the steel jamb provides very effective resistance to heat flow, since no direct supports between the inner container and the outer frame are utilized. The lid underframe **24** also is composed of asbestos-filled polyester resin, which is 0.10 inch in thickness. The underframe **24** is secured to the lid undersurface **26** by means of screws.

In a specific embodiment, the outer frame **28** is 12½ inches by 16 inches by 9 inches, and the inner container **14** is 9½ inches by 13 inches by 6 inches.

The heat protective liner and the lid-jamb seal cooperate to achieve a highly effective container assembly. Because of the relatively light weight of the lid of the instant invention due to the relatively light weight heat protective liner, it is possible to lift the lid in a direction that is perpendicular to the bottom surface **34** of inner container **14**. In this manner the irregular configuration of jamb **18** can precisely conform with the irregular undersurface **26** so as to provide an excellent seal and hence an extremely narrow and tortuous path which impedes heat flow. This is in sharp contrast to prior art fireproof safe constructions, wherein hinged closure members were necessary due to the great weight of the closure members, thereby requiring necessary space between the jamb and the closure for pivotal movement of the closure with respect to the jamb. Further, the excellent seal provided by the precise conformity of the irregular configuration of jamb **18** with the irregular undersurface **26** allows the use of a lesser amount of heat protective liner material than the amount needed in prior art fireproof safes.

In FIGURE 3 a connection of the lid **20** to the remainder of the container assembly is illustrated. It can be seen that a scissors-type hinge **40** is provided whereby the lid can be lifted from position *a* to position *b* and then pivoted about pivot **42** to position *c* for allowing access to the contents within the inner container **14**. The scissors hinge **40** is connected to the frame **12** by fastener **44**.

In FIGURE 4 there is shown a modified construction wherein the lid **20** is pivotable about the pinle **46** of hinge **48**. It can be seen that the jamb **18** is angled at **50** in order to provide a space for the undersurface **26** of the lid **20** to pivot. The hinged arrangement of FIGURE 4 is particularly useful where a perpendicularly removable lid would be inconvenient.

A fireproof file cabinet construction in accordance with the present invention is illustrated in FIGURE 5. The file cabinet **60** includes drawers **62** having conventional sliding means **64** connected to trays **65**. The cabinet body **66** includes steel outer frame **12** and heat protective liner **16**, which liner comprises first fibrous material **28** having a high temperature resistance and second fibrous material **30** having high thermal insulative properties. Common numerals in the various figures designate identical materials.

An inner lining **14** is provided, and the outer frame **12** and inner lining **14** are bridged at the opening surface by a jamb **18**. The drawers **62** each include an outer frame **22**, an underframe **24**, and an undersurface portion **26** bridging the outer frame **22** and the underframe **24**. The heat protective liner **16** is interposed between the drawer outer frame **22** and the underframe **24**. It can be seen that the undersurface portion **26** has a configuration which closely conforms to the irregular configuration of the jamb **18** to define a narrow, tortuous path resistive to heat flow when the drawer is closed.

Because of the relative light weight of the materials used in the construction of a file cabinet as illustrated in FIGURE 5, it can be readily seen that a fireproof file cabinet can now be manufactured with similar ease of handling as is conventional with prior art file cabinets not having fireproof properties. The drawers can be slid without difficulty and as a result of the rectilinear movement of the drawers with respect to the cabinet body it is possible to utilize conforming closure and jamb configurations having extremely close tolerances.

Although a few illustrative embodiments have been shown and described, it is clear that various modifications and substitutions may be made without departing from the

spirit and scope of the instant invention. It is to be understood that no limitation is intended with respect to any dimensions or the position of the closure, other than as defined by the following claims.

Similarly, with respect to materials of construction, it is to be understood that substitutions may be made within the teachings of this invention, as will be apparent to those skilled in the art. For example, the high temperature resistance material **28** may be made of slag fibers or quartz fibers in place of or in admixture with the ceramic fibers disclosed above. The material **30** of good high temperature insulation may be made of asbestos fibers in place of or in admixture with the glass fibers disclosed above. And both materials **28** and **30** may be of woven construction, if desired, as well as the non-woven matte construction described above.

Although the heat protective liner **16** is usually made up of two separate fibrous materials **28** and **30**, as described above, it is within the purview of this invention to make a protective liner from a single fibrous material, provided that it has both the high temperature resistance of material **28** and the high temperature insulative properties of material **30**. Fibrous potassium titanate is an example of a suitable material having both high temperature resistance properties and high temperature insulative properties. Although this material is inorganic, it is fibrous in nature having fiber lengths which may range from about 10 microns or less to about 0.1 millimeter, or more. Fibrous potassium titanate may be formed into paper or into blocks with from 0–5% of a suitable binder, such as calcium silicate and may provide, without any additional material, a suitable heat protective liner.

What is claimed is:

1. A container assembly which compirses: an outer frame enclosing a major portion of the assembly; an inner container; first heat protection means interposed between said outer frame and said inner container, said first protection means comprising fibrous material having outer and inner portions, said outer portion having a high temperature resistance and said inner portion having high temperature insulative properties; means for securing said inner container to a fixed position within said outer frame; a jamb bridging said outer frame and said inner container, said jamb having an irregular surface configuration; closure means adapted for mating relationship with said jamb, said closure means having an irregular surface configuration of said jamb whereby said irregular surface configuration and said irregular undersurface portion define a narrow, tortuous path resistive to heat flow; said closure means comprising an outer frame, said irregular undersurface portion, an underframe and second heat protection means interposed between said closure outer frame and said underframe; said second heat protection means comprising fibrous material having outer and inner portions, said outer portion having a high temperature resistance and said inner portion having high temperature insulative properties.

2. A container assembly as described in claim **1** wherein said inner container is formed of a high temperature resistant molded plastic composition.

3. A container assembly as described in claim **2**, wherein said plastic composition comprise asbestos-filled polyester resin.

4. A container assembly as described in claim **1**, wherein said first and second heat protection means each consist of a fibrous material having a high temperature resistance and a fibrous material having high temperature insulative properties.

5. A container assembly as described in claim **4**, wherein said high temperature resistant fibrous material of said first and second heat protection means is between about ¼ inch and about one inch in thickness and said high temperature insulative fibrous material of said first and second heat protection means is between about ½ inch and about 2½ inches in thickness.

6. A container assembly as described in claim **4**, wherein said high temperature resistant fibrous material of said first and second heat protection means comprises a refractory fiber that is about ½ inch in thickness and said high temperature insulative fibrous material of said first and second heat protection means is about one inch in thickness and comprises a glass matte composition.

7. A container assembly as described in claim **6**, wherein said inner container comprises an asbestos-filled polyester resin.

8. A container assembly as described in claim **1**, wherein said irregular surface configuration and said irregular undersurface portion are in a snug mating relationship whereby said closure means is removable from said jamb only in a direction that is perpendicular to the surface of said inner container that is facing said closure underframe.

9. A container assembly as described in claim **8**, including means for movably connecting said closure means to the other portion of said container assembly.

10. A container assembly as described in claim **1**, including means for securing said inner container to said jamb, whereby said inner container is suspended therefrom.

11. A container assembly as described in claim **4**, wherein said high temperature resistant fibrous material of said first and second heat protection means has a temperature resistance enabling it to withstand a temperature of at least 1700° F.

12. A container assembly as described in claim **4**, wherein said high temperature insulative fibrous material of said first and second heat protection means has a thermal conductivity of less than 0.65 B.t.u. inch per square foot per degree Fahrenheit per hour when measured at 1000° F.

13. A container assembly as described in claim **1**, wherein said outer portion of said first heat protection means is formed of a material different from the material which forms said inner portion of said first heat protection means.

14. A container assembly as described in claim **1**, wherein said outer portion of said second heat protection means is formed of a material different from the material which forms said inner portion of said second heat protection means.

15. A container assembly as described in claim **1**, wherein said outer and inner portions of said first heat protection means are formed of identical material.

16. A container assembly as described in claim **1**, wherein said outer and inner portions of said second heat protection means are formed of identical material.

17. A file cabinet which comprises: an outer frame enclosing a major portion thereof; an inner lining; first heat protection means interposed between said outer frame and said inner lining, said first heat protection means comprising fibrous material having outer and inner portions, said outer portion having a high temperature resistance and said inner portion having high temperature insulative properties; means for securing said inner lining to a fixed position within said outer frame; a jamb bridging said outer frame and said inner lining, said jamb having an irregular surface configuration; a file drawer comprising a file carrying tray and closure means adapted for mating relationship with said jamb, said closure means having an irregular undersurface portion for engagement with said irregular surface configuration of said jamb whereby said irregular surface configuration and said irregular undersurface portion define a narrow, tortuous path resistive to heat flow; said closure means comprising an outer frame, said irregular undersurface portion, an underframe and second heat protection means interposed between said closure outer frame and said underframe; said second protection means comprising fibrous material having outer and inner portions, said outer portion having a high temperature resistance and said inner portion

having high temperature insulative properties; and means for slidably connecting said drawer to the outer portion of the file cabinet.

18. A file cabinet as described in claim **17**, wherein said inner lining is formed of a high temperature resistant molded plastic composition.

19. A file cabinet as described in claim **17**, wherein said irregular surface configuration and said irregular undersurface portion are in a snug mating relationship whereby said closure means is movable with respect to said jamb only in a rectilinear direction.

20. A file cabinet as described in claim **17**, wherein said first and second heat protection means each consist of a fibrous material having a high temperature resistance and a fibrous material having high temperature insulative properties.

21. A file cabinet as described in claim **20**, wherein said high temperature resistant fibrous material of said first and second heat protection means has a temperature resistance enabling it to withstand a temperature of at least 1700° F.

22. A file cabinet as described in claim **20**, wherein said high temperature insulative fibrous material of said first and second heat protection means has a thermal conductivity of less than 0.65 B.t.u. inch per square foot per degree Fahrenheit per hour when measured at 1000° F.

23. A file cabinet as described in claim **20**, wherein said fibrous materials of said first heat protection means are identical to said fibrous materials of said second heat protection means.

24. A file cabinet as described in claim **17**, wherein said outer portion of said first heat protection means is formed of a material different from the material which forms said inner portion of said first heat protection means.

25. A file cabinet as described in claim **17**, wherein said outer portion of said second heat protection means is formed of a material different from the material which forms said inner portion of said second heat protection means.

26. A file cabinet as described in claim **17**, wherein said outer and inner portions of said first heat protection means are formed of identical material.

27. A file cabinet as described in claim **17**, wherein said outer and inner portions of said second heat protection means are formed of identical material.

References Cited

UNITED STATES PATENTS

1,347,118	7/1920	Bartels et al.	109—77
2,492,422	12/1949	Vovan	109—80
2,554,399	5/1952	Bremer	109—77
2,635,563	4/1953	McBride	109—58
2,660,965	12/1953	Landau	109—58
2,803,203	8/1957	Henkel	109—76
3,106,307	10/1963	Morrison.	

REINALDO P. MACHADO, *Primary Examiner.*