Aug. 29, 1944. W. R. WHITING 2,356,804

SAFE DEPOSIT VAULT

Filed Nov. 8, 1941

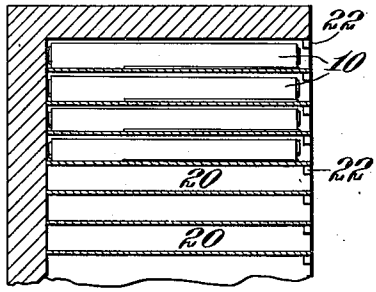


Fig. 5

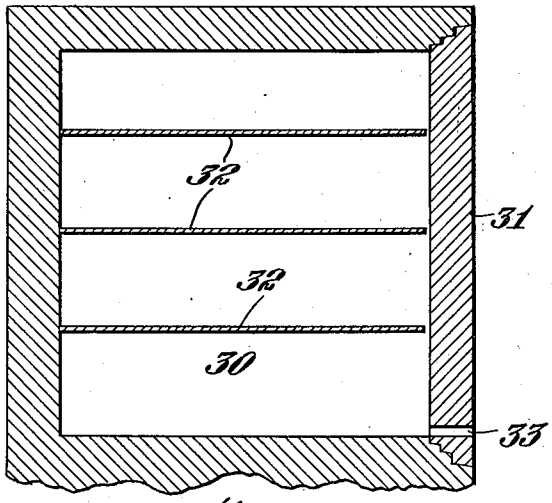


Fig. 6

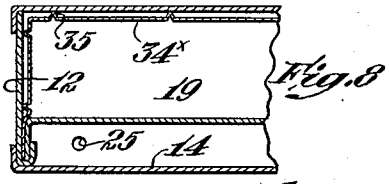


Fig. 8

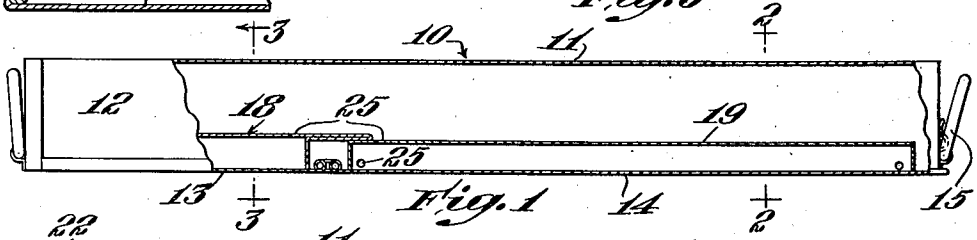


Fig. 1

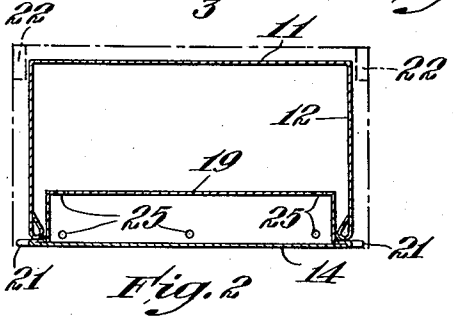


Fig. 2

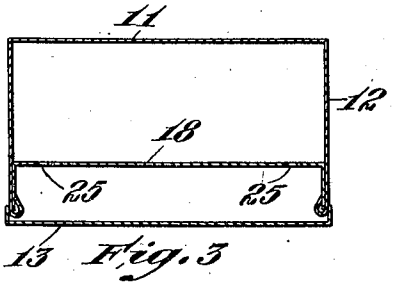


Fig. 3

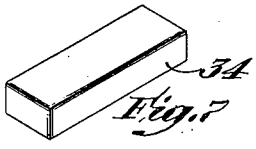


Fig. 7

Fig. 4

Inventor
Walter R. Whiting
by Roberts Cushman & Woodbury
Attys.

Patented Aug. 29, 1944

2,356,804

UNITED STATES PATENT OFFICE

2,356,804

SAFE-DEPOSIT VAULT

Walter R. Whiting, Hingham, Mass., assignor to Dorothy G. Burpee, Hingham, Mass.

Application November 8, 1941, Serial No. 418,277

11 Claims. (Cl. 109—58)

This invention relates to the protection of the contents of receptacles, for example in a bank or safe deposit vault.

Much damage and loss has been suffered in safe deposit vaults, banks, business houses and the like by the action of water upon the contents of receptacles stored therein, as through floods, breaks in the water system or the use of water in fighting fires, explosions and the like. Such receptacles are not hermetically sealed to prevent the entrance of the water but, on the contrary, include lids, covers or doors which are opened from time to time to permit insertion or removal of documents and other contents intended for safe keeping in the receptacles.

The primary object of this invention is to provide for the protection of the contents of such receptacles against damage by water in a practical, inexpensive and effective way. Briefly stated, the improved procedure of the present invention comprises placing the documents or the like in the upper portion of a receptacle hermetically sealed at its top and sides to prevent the escape of air therefrom but provided with apertures or other openings in or near its bottom at such a distance below the contents that although water can enter the lower portion of the receptacle, it will trap the air therein, the receptacle being of such depth and the trapped air being of such volume as to check the rise of the water before it reaches the level of the contents of the receptacle.

In accordance with one embodiment of the invention a typical safe deposit box, slightly modified as will hereafter be described, is employed. Such a box as ordinarily made has a body, made of sheet metal, and a top also of sheet metal, and comprising a stationary section and a hinged section or lid which may be lifted to give access to the interior. In the practice of the present invention the box is used in inverted position, that is to say, with the part which ordinarily constitutes the box bottom uppermost, and the box is modified by providing both the stationary and hinged sections of the top (which now constitute the bottom wall of the box) with hollow platforms on which the contents of the inverted box may rest at a level above said bottom wall. The box body is either made leak-tight itself or provided with a leak-tight liner, and, since the box when in use is confined in a pigeonhole having rigid walls so that the box cannot float, the accidental rise of water to a level above that of the box can cause no injury to the box contents because any water which may enter around the hinged lid can rise only to a limited extent and not up to the upper surface of the platforms by reason of the entrapment and compression of a considerable body of air within the upper part of the leak-tight inverted box body.

In order to prevent introduction of the box into its pocket or pigeonhole except after the box has been inverted, one or both side walls of the box may be provided with stops designed to engage portions of the wall of the pigeonhole in such a way that the box can only be inserted in the pigeonhole when in proper position.

In accordance with another embodiment of the invention the protective receptacle has a door in one side wall. For example, the receptacle may be a vault or safe having one or more elevated shelves on which the contents may be supported in the upper portion of the safe or vault chamber. The upper part of the body of the safe or vault is made leak-tight, for example by a leak-tight lining or otherwise as desired, and the upper part of the door is provided with suitable packing to prevent leakage, but at its lower part the safe body or the door is provided with apertures opening into the lower portion of the chamber so as freely to admit water. The entry of water into the lower part of the chamber compresses air in the leak-tight upper part of the chamber, thus limiting the entry of water and preventing its reaching the documents or other contents resting upon the elevated shelves even though the safe may be completely immersed.

In the accompanying drawing various embodiments of the invention are illustrated by way of example, in which

Fig. 1 is a side elevation of a safe deposit box of a common type but modified in accordance with this invention;

Figs. 2 and 3 are sectional views to larger scale on the lines 2—2 and 3—3 of Fig. 1, the outline of the pocket or pigeonhole in which the box is stored being shown in dotted lines in Fig. 2;

Fig. 4 is a view similar to Fig. 1, showing the box in the customary upright position with the lid partially raised for the insertion or removal of documents and the like;

Fig. 5 illustrates in cross section a stack of pockets or pigeonholes with boxes in certain of said pockets;

Fig. 6 is a cross-sectional view of a safe adapted for carrying out this invention;

Fig. 7 is a perspective view of a seamless liner which may be used in the practice of the invention; and

Fig. 8 is a fragmentary section, similar to Fig. 3, but to larger scale, illustrating the use of a liner generally similar to that of Fig. 7.

The modified safe deposit box **10** (Fig. 1) selected to illustrate one type of receptacle by which this invention can be carried out, comprises a body having a substantially horizontal top wall **11** and upright side walls **12** hermetically sealed at their lines of joinder, for example by solder, and a bottom wall preferably comprising a stationary section **13** and a lid or closure **14**. The lid **14** is hingedly joined to the section **13** and may be locked to an end wall by a latch **15**, the illustrated form of which comprises a loop **16** and button **17**. The top section **13** and the lid **14** are provided with elevated platforms **18** and **19**, respectively. These platforms may be made of sheet metal or the like and are hollow, providing within them substantial bodies of air. As illustrated by way of example, the platforms are located at approximately one-third the height of the box, which would be sufficient to guard the contents against entry of water under approximately a 17 foot head, but the height of this platform relative to the depth of the box will in any given instance be so determined with reference to the maximum depth of water in which the box might by any possibility be submerged, as to afford ample protection to the contents of the box. The minimum safe height of the platform above the bottom of the box may readily be calculated for any given head of water by the formula: $h^2=h-h^1$, where h=the total height of the chamber within the receptacle; h^2=the height of the platform above the box bottom, and

$$h^1=\frac{B^p\times h}{B^p+0.35H}$$

where B^p=the mean atmosphere pressure at the place of use and H=the head of water in feet above the box bottom.

The platforms are here shown with solid side and top walls, and it has been found advisable to provide a plurality of apertures **25** therein in order to facilitate free movement of the air in and out of the interior of the platforms.

As shown in Fig. 4 the box is in the conventional upright position for the insertion or removal of documents, etc. which form the contents. After the documents have been inserted, the lid is latched and the box inverted so as to occupy its normal position, as shown in Fig. 1, the documents now resting on the platforms **18** and **19** and being within the upper portion of the box which, as stated above, is hermetically sealed.

According to the usual practice the boxes **10** are placed in pockets or pigeonholes **20** arranged in tiers in a rigid case or rack, as shown in Fig. 5, and when thus confined the boxes cannot float, even though completely immersed in water. In order to insure that the boxes **10** are in the proper operative position of Fig. 1 when placed in the pockets **20**, stop means may be provided. One such means is illustrated in Figs. 2 and 5, wherein the side edges **21** of the lid **19** project beyond the side walls **12** of the box, and the upper corners of the pigeonhole or pocket are provided with stop blocks **22**. The space between the blocks **22** is less than the extreme width of the lid including the extension edges **21**, so that in order to place the box in the pocket, it is essential that it be in the position shown in Figs. 1 and 5.

If accidentally water should flow into the vault or other room in which the boxes are stored, the water would freely enter the box around the lid **14**. However, due to the hermetic sealing of the upper portions of the boxes and the depth of the body portion, the air within the box would be trapped and the pressure of the trapped air would increase until eventually it would stop further rise in the water level within the box, the upper level of the water being below the top of the platforms **18** and **19** so that the water would not reach the contents of the boxes. The apertures **25** in the platforms allow the water to flow into them thereby forcing out the air from within the platforms, thus insuring an adequate body of air for compression.

Fig. 6 shows a protective receptacle **30** in the form of a safe having a door **31** in one side. Elevated shelves **32** within the safe are designed to support the contents. The walls forming the safe are hermetically sealed or provided with a waterproof lining and the joinder of the top and side edges of the door and the body of the safe are suitably formed and treated, as by the provision of packing, so that they too are hermetically sealed at the upper portion of the safe when the door is closed. Apertures **33** lead into the interior chamber of the safe so that if water rises in the space in which the safe is placed, the water can freely enter the lower portion of the safe but because of the trapping of the air (due to the hermetic sealing of the upper portion) the water cannot rise in the safe sufficiently to harm or damage the material on the shelves.

Since ordinary safe deposit boxes are not leak-tight it may be preferred, rather than to attempt to close all of the crevices in an existing box, to arrange a leak-tight, preferably seamless lining in the box. Such a lining **34** is indicated in Fig. 7 and is there shown as an inverted, pan-like receptacle shaped and dimensioned to fit snugly within the body of the box and consisting, for example, of thin pressed or folded metal, moulded plastic or any other suitable substance.

As illustrated in Fig. 8, such a lining **34×** may be of very thin material as compared with that of the box body, in fact, so thin as to conform itself to the interior surface of the box body or other receptacle which houses it when subjected to sufficient pressure but, on the other hand, it may be desirable to provide such a thin lining with corrugations, or ribs or other supporting elements **35** designed to stiffen the lining and also, as illustrated, to bear against the inner surface of the box proper so as to support the lining against internal pressure. If desired, the receptacle itself, whether lined or not, may be provided with similar ribs or outwardly directed supporting elements designed to bear against the wall of the pigeonhole or other enclosure which houses it, in order to enable the receptacle to withstand the outward pressure of the enclosed air.

While two types of receptacle which can be employed to carry out this invention have been shown and described, it will be understood that the invention is not limited thereby, and that other types may be employed within the spirit and scope of the invention as defined in the following claims.

I claim:

1. A safe deposit receptacle comprising a housing defining a chamber which is proof against leakage of air therefrom except adjacent to its bottom wall portions through which water and air may enter into and drain from the interior

of the chamber, said receptacle having a hinged closure providing access to said chamber, and a platform within the receptacle for supporting articles at a level above the bottom of the receptacle, the distance between the bottom of the receptacle and the article-supporting surface of the platform being substantially in accordance with the formula $h^2=h-h^1$, where h=the total height of the chamber; h^2=the height of the platform above the box bottom, and

$$h^1=\frac{B^p\times h}{B^p+0.435H}$$

where B^p=the mean atmosphere pressure at the place of use and H=the head of water in feet above the box bottom.

2. A safe deposit box for use in a safe deposit vault having a plurality of box-receiving pockets, said box being of sheet metal and having side and top walls which define a chamber and which are so constructed that air under pressure cannot leak from the chamber except near the bottom of the latter, the box having a bottom wall comprising a movable closure by which access may be had to the chamber, and a hollow platform supported by the bottom wall and on which platform the contents of the receptacle rest when the receptacle is placed in the pocket assigned thereto in the vault.

3. A safe deposit box for use in a vault provided with a rigid-walled pigeonhole for the box, the receptacle having therein a chamber whose walls are so constructed that air under pressure cannot escape from the chamber except near the bottom thereof, the box including a hinged lid by which access is had to the chamber, said lid being at the bottom of the box, a hollow platform carried by said lid within the box and on which platform the contents of the box are supported when the box is placed in the pigeonhole assigned thereto in the vault, said platform having apertures through which apertures air can enter and leave the space between the lid and the contents-supporting portion of the platform.

4. A protective receptacle for documents or the like, said receptacle being of thin material and having substantially rigid top and side walls and a bottom wall, said walls being so constructed and arranged as to define an interior chamber which is proof against leakage of air at the junctions of the side and top walls, means within said chamber for supporting the documents to be protected at a level above the chamber bottom, the bottom wall comprising a stationary section and a movable section, the latter giving access to the chamber and being so designed and arranged as, when closed, to permit water freely to enter the lower portion of the chamber when the receptacle is immersed in water, a hollow platform carried by each section of the bottom wall, the upper surfaces of said platforms being located at approximately one-third the height of the chamber above the floor of the latter and being designed to support the documents.

5. A safe deposit box for use in a safe deposit vault provided with a rigid-walled pigeonhole for the boxes, the box being of thin but rigid material and hermetically sealed except at its bottom, the lower wall of the box comprising a stationary section and a hinged closure by which access may be had to the interior of the receptacle, and hollow platforms carried by said section and said closure, respectively, and on which platforms the contents of the box rest when the box is placed in the pigeonhole assigned thereto in the vault, said platforms having apertures in their walls through which apertures air can enter and leave the space between the bottom of the box and the contents-supporting portions of said platforms.

6. A safe deposit box designed to safeguard valuable documents from injury by water when stored in a vault or the like having a box-receiving pocket, said box being of sheet metal and having a hollow body portion including upright side walls and a top wall defining a chamber for the reception of the documents, means within said body portion for supporting documents within the chamber but above the bottom thereof, the walls which define the chamber being so constructed and arranged as to prevent outward leakage of air from said chamber, except adjacent to its bottom, the box having provision for admitting water to and draining water from the lower part of said chamber, the box and the pocket having cooperating elements constructed and arranged to prevent improper positioning of the box in the pocket.

7. A safe deposit box designed to safeguard documents from injury by water when stored in a vault or the like having a box-receiving pigeonhole, said box being of sheet metal and having a hollow body portion including upright side walls and a top wall, said walls defining a chamber which is proof against leakage of air therefrom except adjacent to the bottom, means within said body portion for supporting documents within the chamber but above the floor thereof, the box having a movable closure at its bottom giving access to said chamber, said closure fitting the box so loosely, when closed, as to permit water to enter the lower portion of said chamber, the height of the support being such that even if the receptacle be completely immersed in water, the water level within the chamber cannot rise to the level of the articles upon the support by reason of the pressure of the entrapped air, the box and the pigeonhole having cooperating abutment elements operative to prevent entry of the box into the pigeonhole except the box be disposed with its closure at the bottom.

8. A protective structure for the safe keeping of valuables, said structure comprising a relatively thick walled outer receptacle and a lining of relatively thinner material, the lining being spaced from the inner surface of the outer receptacle and defining an inner chamber for the reception of the valuables, the lining being so constructed and arranged as to be proof against leakage of compressed air from said chamber except at points near the bottom of the latter, supporting elements between the lining and the outer receptacle operative to resist outward pressure of air in said inner chamber, means providing a hinged closure giving access to said inner chamber and a support within the inner chamber for holding valuables at a level above the chamber bottom, the minimum permissible distance between the bottom of the chamber and the article-engaging surface of the support being substantially in accordance with the formula $h^2=h-h^1$, where h=the total height of the chamber; h^2=the minimum permissible height of the support above the box bottom, and

$$h^1=\frac{B^p\times h}{B^p+0.435H}$$

where B^p=the mean atmosphere pressure at the place of use and H=the head of water in feet above the box bottom.

9. A protective structure for the reception of money, documents, etc., said structure comprising a relatively thick-walled outer receptacle which is not air-tight and a lining for the receptacle defining an inner chamber of dimensions less than the internal dimensions of the outer receptacle, the lining being of relatively thin material such that it tends to conform to the inner surface of the outer receptacle when subjected to internal pressure, the lining being proof against leakage of air except at points near its bottom, abutment elements bearing against the outer receptacle and operative to limit outward movement of the lining in response to internal pressure, hinged closure means providing access to the inner chamber, and a platform within the inner chamber for supporting articles at a level above the bottom of the chamber, the minimum distance between the bottom of the chamber and the article-supporting surface of the platform being substantially in accordance with the formula $h^2=h-h^1$, where h=the total height of the chamber; h^2=the minimum permissible height of the platform above the box bottom, and

$$h^1=\frac{B^p\times h}{B^p+0.435H}$$

where B^p=the mean atmosphere pressure at the place of use and H=the head of water in feet above the box bottom.

10. A protective receptacle defining a chamber for the reception of valuables, said receptacle having a door in one side thereof, means for hermetically sealing the upper portion of the receptacle including the meeting edges of the door and door opening, and an aperture in the lower portion of the receptacle open at all times and through which water can enter said receptacle, a support on which articles rest in the upper portion of the receptacle, the minimum height of the support above the bottom of the chamber being substantially in accordance with the formula

$$h^2=h-h^1,$$

where h=the total height of the chamber; h^2=the minimum permissible height of the support above the box bottom,

$$h^1=\frac{B^p\times h}{B^p+0.35H}$$

where B^p=the mean atmosphere pressure at the place of use and H=the head of water in feet above the box bottom.

11. Protective apparatus of the class described including top and side walls forming a structure which is air-tight at its top and sides but which has provision for the entry of water at its lower portion, said structure having therein a protective compartment for the reception of articles to be protected from water, and means defining an air chamber within the structure, the air chamber communicating at its top with the protective compartment and being open at its lower part for the entry of water, the parts being so constructed and arranged that water seeking to enter the structure compresses the air in the air chamber and forces it into the protective compartment thereby so increasing the air pressure in the latter as to limit rise of water in the protective compartment to a level such that it cannot injure the contents of the protective compartment.

WALTER R. WHITING.