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Arnold

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[54] **PORTABLE REFRIGERATED WORK HOLDER**

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[52] **U.S. Cl.** **62/458;** 62/457; 62/430; 62/257; 62/437; 62/529; 32/39

[51] **Int. Cl.²** **F25D 13/00**

[58] **Field of Search** 62/530, 457, 430; 32/39; 62/257, 458, 529, 437

[56] **References Cited**

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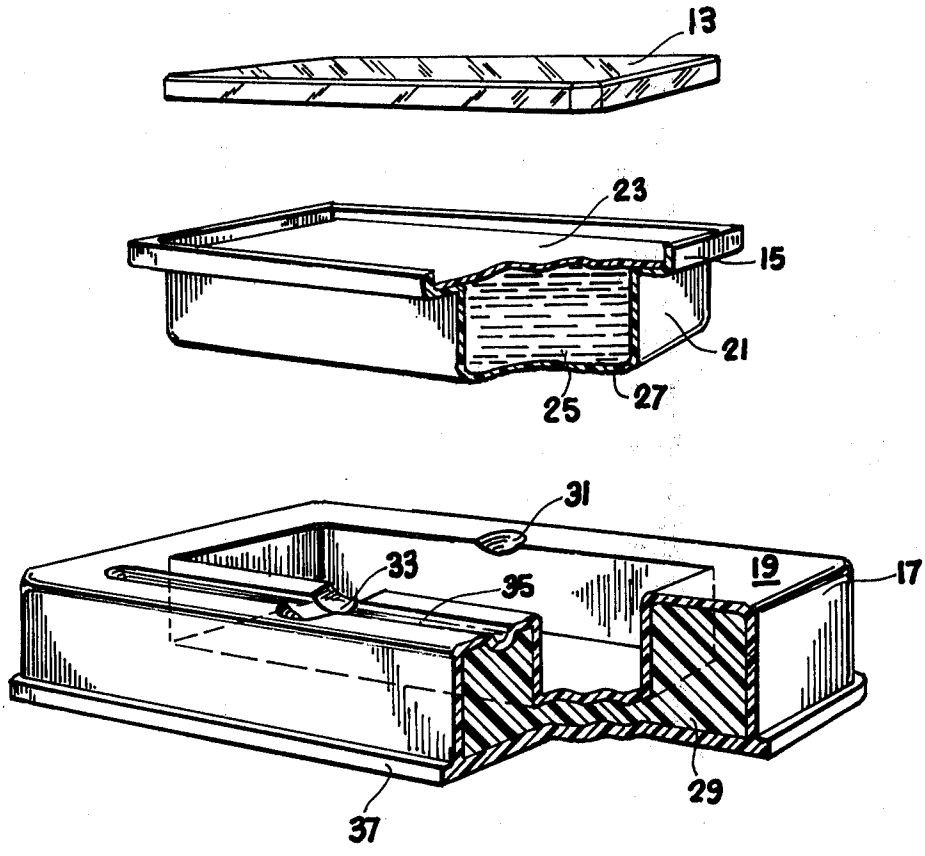
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[57] **ABSTRACT**

A refrigerated work holding system wherein refrigeration is supplied by a cooled substance within a closed container immediately below a work surface. The container is nested within an insulated tub, which maintains thermal insulation for the cooled container.

9 Claims, 2 Drawing Figures



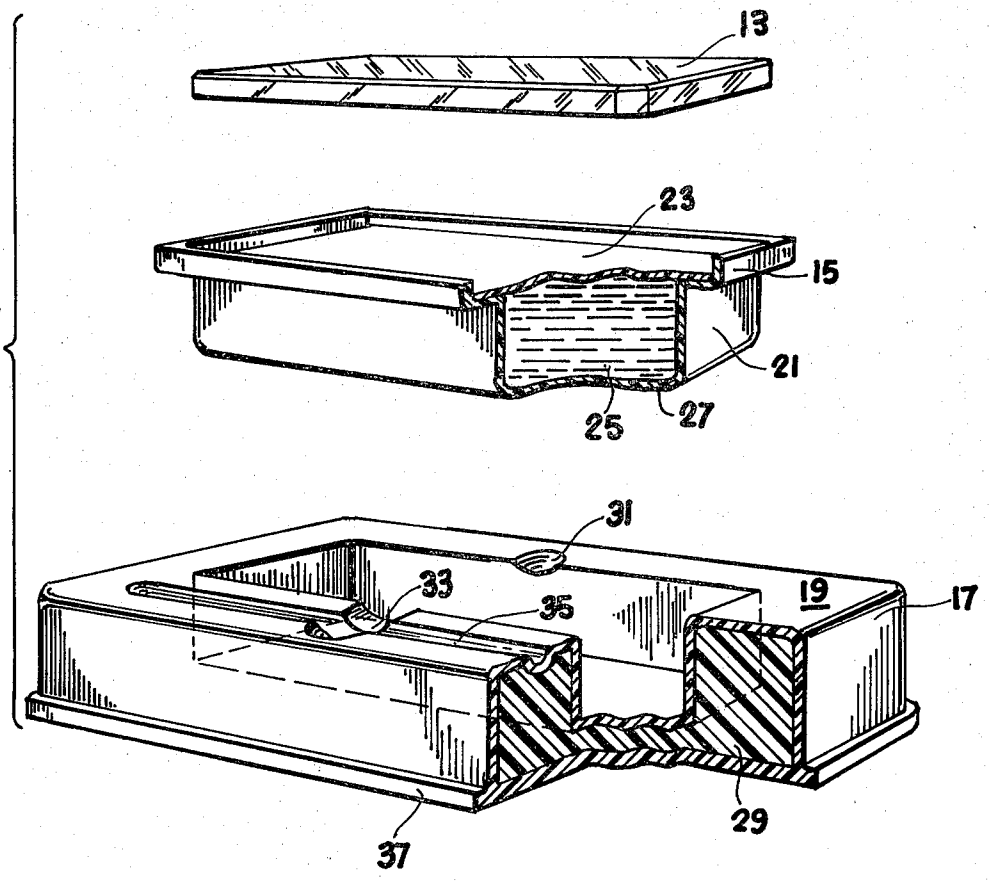


Fig. 2

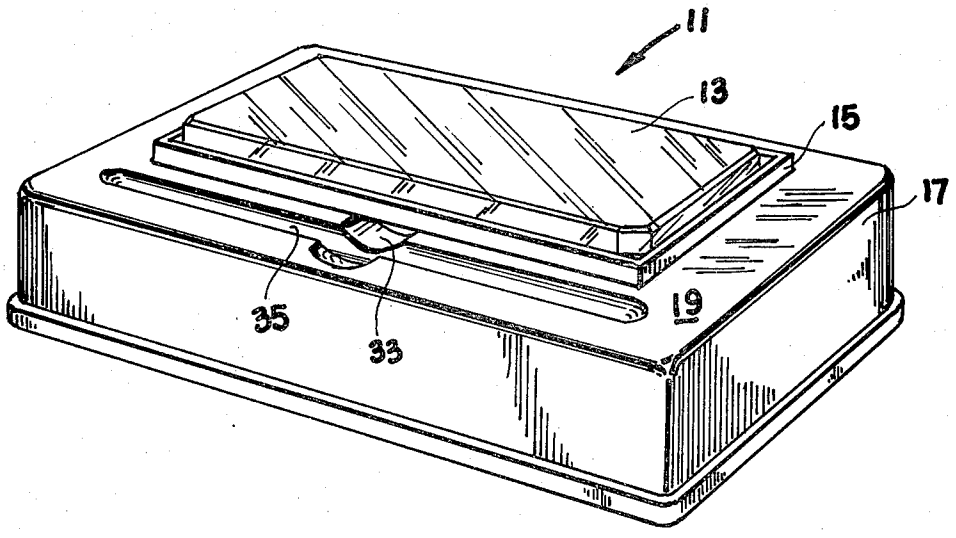


Fig. 1

PORTABLE REFRIGERATED WORK HOLDER

BACKGROUND OF THE INVENTION

1. Field

The invention relates to refrigeration apparatus and more particularly to a portable apparatus for maintaining a working surface at a refrigerated temperature.

2. Prior Art

In the practice of dentistry, there are many materials which are mixed by dentists immediately prior to use. Many of these materials lose their desirable properties upon exposure to elevated temperatures. For example, certain adhesives and tooth filling materials begin to harden upon exposure to air and such hardening may only be reduced by limiting the exposure to air and by lowering the temperature to slow the hardening reaction.

Apart from dentistry, catalytic adhesives have been developed which are mixed immediately before using. Once mixing has occurred, certain of these adhesives tend to immediately harden or set. Once this process occurs, the adhesives lose some of their desirable properties. This degradation can be retarded by providing refrigeration for the mixed adhesive.

It is therefore an object of the invention to develop a compact apparatus for refrigerating a work surface for materials which would deteriorate upon exposure to environmental factors at ambient temperatures.

SUMMARY OF THE INVENTION

The above object is achieved by providing a work surface in immediate contact with a closed refrigerated container nested within an insulated tub. Refrigeration is maintained in the closed container by a refrigerant substance therein which substantially fills the container. The refrigerant is preferably a frozen material which has heat of fusion approximately equal to that of water, or preferably greater.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the apparatus of the present invention.

FIG. 2 is an exploded constructional view of the apparatus, with cutaway sections of two components.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows the portable refrigerated work holder **11** of the present invention. A work surface **13** is an insulated or heat conductive planar member **13** which is held in place by a lip **15** of a container beneath the planar member. An insulated tub **17** holds the container and has a flap upper rim **19.**

The detailed structure of the invention can be seen more clearly with reference to FIG. **2.** Planar member **13** may be seen to reside on top of a first closed container **21.** Note that when the closed container **21** is nested within insulated tub **17,** as in FIG. **1,** the upper surface **23** effectively closes the tub since the area of upper surface **23** is greater than the cross-sectional area of container **21** which permits the body of container **21** to fit within tub **17** except for the upper surface **23** which overlaps a circumferential region of the flat upper rim **19** of tub **17.** Lip **15** is connected to container **21** and extends upwardly with respect to the upper surface **23.** Lip **15** provides a means for laterally positioning planar member **13** which has a thickness

such that approximately half the thickness of planar member **13** abuts the lip **15.**

Container **21** has a refrigerant substance **25** enclosed therein. The refrigerant material does not completely occupy the plenum of container **21,** but some space is left for the expected thermal expansion of the refrigerant substance **25** upon cooling.

The refrigerant substance **25** is any material which has a relatively large heat of fusion when frozen. Since ice has a relatively high heat of fusion, it is a preferable refrigerant substance. It is desired to keep the refrigerant substance from leaking and for this purpose it is gelatinized. Various forms of gelatinized refrigerants comprising principally water are available. A typical substance comprises **15** parts water, **2** parts gelatinized starch dispersed in the water and **1** part borax. Such refrigerants and the method of preparing them are disclosed in U.S. Pat. Nos. **2,800,454** and **2,800,455.**

In assembling container **21,** it has been found that a preferred method is to have the bottom side walls and lip **15** made of one piece of plastic material and upper surface **23** of another piece. Refrigerant is then placed in the lower portion of container **21,** leaving room for expansion, and then the upper surface **23** is cemented into place.

Insulated bag **17** is seen to include insulation material **29** extending around the sides and bottom of tub **17.** Typically, tub **17** is filled with an insulation material **29** comprising liquid polyurathane foam insulation, or the like, which rapidly expands and solidifies to the limit of the inside walls of container **26.** Base **37** is cemented to tub **17** shortly after the insulation is inserted in tub **17.** Tub **17** is held in a fixture, like a vise, until the insulation has hardened. It is desirable to achieve maximum insulation density. Therefore, the above assembly procedure is intended to preclude formation of large air cells in the insulation material and to achieve high density of the insulation material. Alternate methods of forming high density insulation material **29** may also be used. For example, material **29** may be formed externally, allowed to harden and then inserted later.

The upper surface of tub **17** is seen to include first and second opposed depressions, **31** and **33,** which face container **21** when it is in position. The depressions are of such a size and shape that human fingers may easily enter for grasping container **21.** A third depression **35** extends along the length of upper rim **19** for holding tools.

In operation, container **21** is placed in a refrigerator capable of changing the phase of the refrigerant substance **25** from its liquid phase to a solidified phase, i.e., freezing the refrigerant substance. It is preferred that the planar member **13** be in place during the freezing operation. Once the refrigerant substance is frozen, it is positioned in insulated tub **17.** The relatively large heat of fusion of the refrigerant substance will maintain planar member **12** in a refrigerated condition for a relatively long period of time.

Multiple closed containers, identical to container **21,** may be similarly frozen so that when the refrigerant substance in a first container reverts to the gel phase, a second frozen container, with a cold planar member, may be substituted.

In the practice of dentistry, it has been found that a work surface having a width which may be grasped in the palm of the hand may be cooled by a container having gelatinized water therein of dimensions **14** cm. ×

7.5 cm. × 3 cm. for approximately four hours. Thus, a dentist, who places two containers **21** with planar members **13** thereon, in the freezer compartment of a refrigerator would have a refrigerated work surface available for approximately eight working hours.

What is claimed is:

1. A refrigerated work holder comprising,

an insulated tub,

a closed container nestable within said tub, said container having an upper surface which closes said tub and further having a refrigerant substance therein which substantially fills said container, said refrigerant substance having a heat of fusion at least as great as that of ice, said upper surface having an area greater than the lateral cross-section of said container.

2. The apparatus of claim **1** wherein said upper surface has an upwardly extending lip defined about the periphery thereof.

3. The apparatus of claim **1** further defined by an insulative planar member and means for registering said insulative planar member in planar contact with said upper surface.

4. The apparatus of claim **1** further defined by a heat conductive planar member and means for registering said heat conductive planar member in planar contact with said upper surface.

5. The apparatus of claim **1** wherein said insulated tub has a flat upper rim upon which the upper surface of said container is seated, said rim having first and second opposed depressions facing said container for grasping said container.

6. The apparatus of claim **1** wherein said tub has an elongated depression therein adapted to hold tools.

7. A refrigerated work holder comprising,

a closed container having a volumetric shape which may occupy the volume of a tub, said container having an upper work surface,

a refrigerant substance having a heat of fusion at least as great as that of ice, said refrigerant substance substantially filling said closed container, and

a planar member disposed in contact with said work surface and means for aligning said planar member with said work surface.

8. The apparatus of claim **7** wherein said planar member is insulative.

9. The apparatus of claim **7** wherein said planar member is heat conductive.

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