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Le Beau

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[54] **COMPOSITE PACKAGE**

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[52] **U.S. Cl.**..... **206/320,** 206/45.33, 206/446, 206/497, 217/65, 229/DIG. 12

[51] **Int. Cl.**.. **B65d 65/16,** B65d 81/00, B65d 85/00

[58] **Field of Search**..... 206/46 FN, 46 H, 46 M, 206/65 R, 45.33, 65 S; 229/DIG. 12, 23 C; 217/65

[56] **References Cited**

UNITED STATES PATENTS

2,210,162	8/1940	Boeye	206/65 R
2,457,262	12/1948	Norquist	217/65
2,835,381	5/1958	Ackermann et al.	206/65 R
2,932,438	4/1960	Smith	206/46 FN
3,193,095	7/1965	Martino et al.	206/65 R
3,372,796	3/1968	Foote et al.	206/45.33

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[57] **ABSTRACT**

A composite package for enclosing a cylindrically shaped object such as a water heater. Substantially rectangular end members provide locating depressions to receive the ends of the cylindrical object while a substantially rectangular intermediate member provides a circular opening and encircles an intermediate portion of the cylindrical object. Four elongated reinforcing members are positioned to engage locating notches formed at the corners of the intermediate member and extend toward and are positioned within corner depressions formed within the end members. A bi-axially oriented heat shrunk synthetic transparent film is extended externally around the end, intermediate and reinforcing members to hold such members in assembled relation and protect the cylindrical object while permitting visual inspection thereof.

7 Claims, 2 Drawing Figures

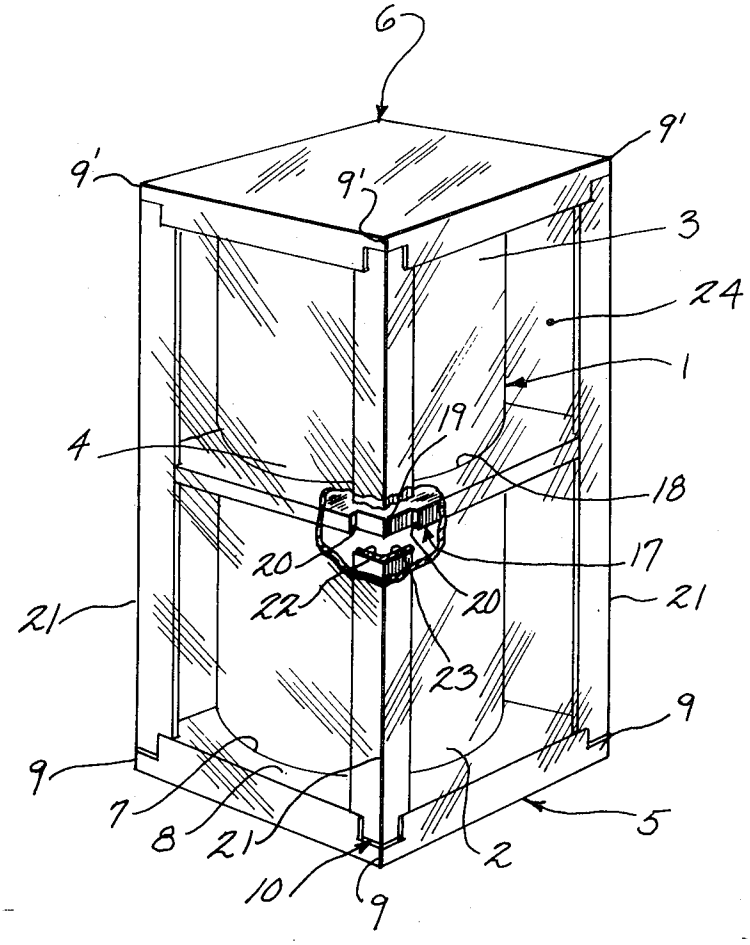

Fig. 1

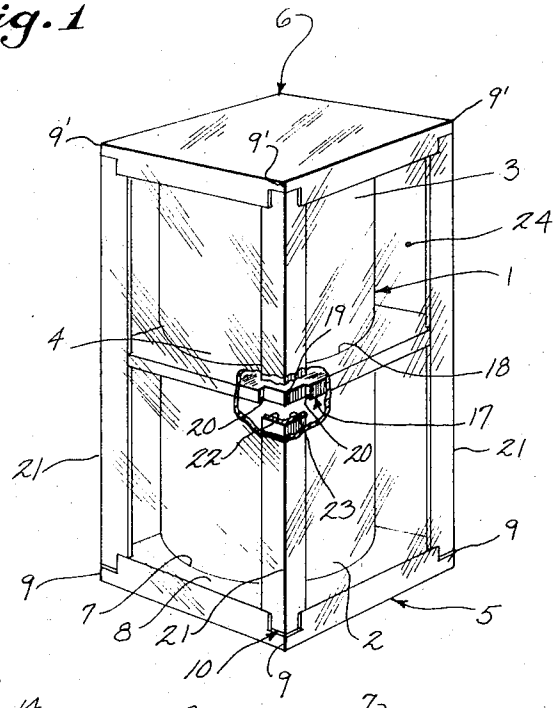
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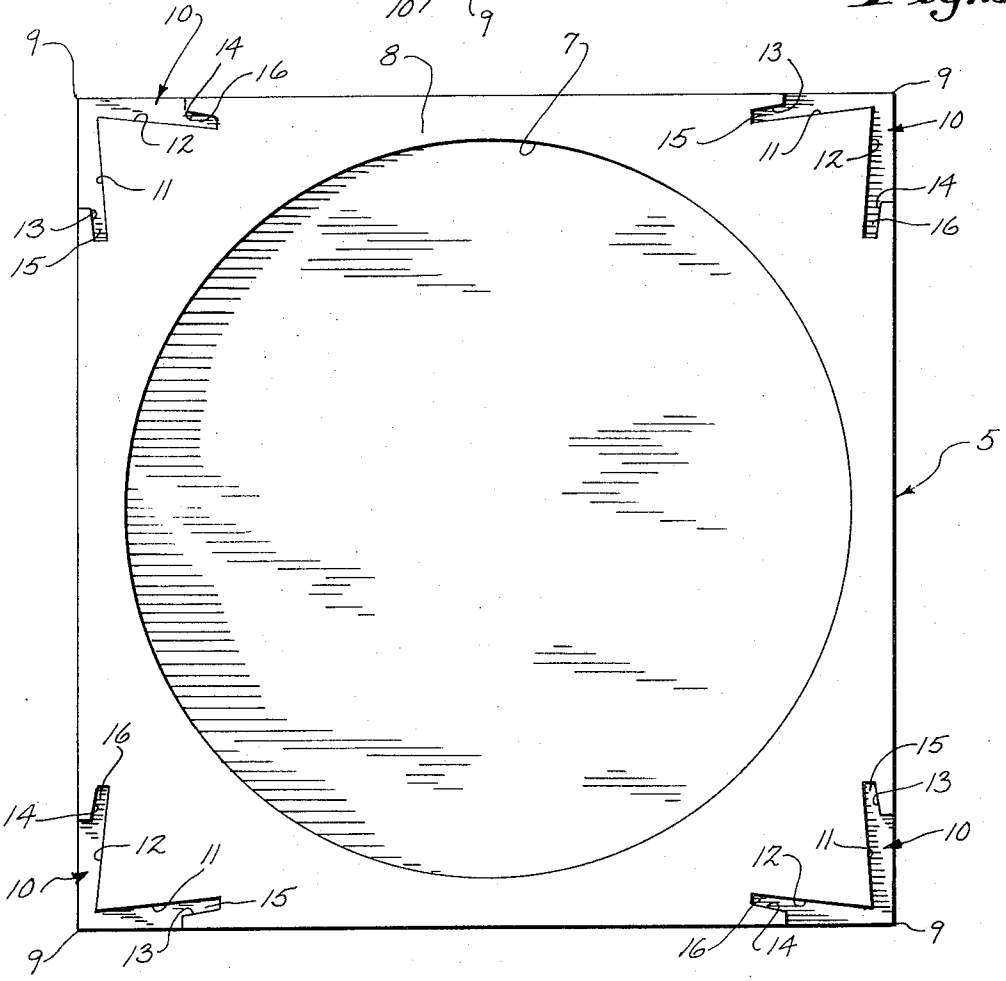
Fig. 2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COMPOSITE PACKAGE

BACKGROUND OF THE INVENTION

This invention relates to a composite package utilizing a heat-shrunk film. This invention is particularly advantageously utilized in packaging cylindrical objects or products, such as water heaters, although the invention is not so limited.

The packaging, transportation and storage of bulky items such as commercial water heaters for home or business use frequently presents numerous marketing problems. It is essential to provide a package which protects the product from damage when in storage and during transportation. For instance, substantial storage space is normally required to accommodate such a product, and it is not uncommon to store such products outside until they are sold or placed on display. Thus, unless proper packaging is provided, the product is often times exposed to severe weather conditions which adversely affect the operation, appearance and/or marketability of the product. In addition, fork lift trucks, cranes or other lifting and transporting devices are utilized with the product which frequently apply stresses and impacts which may render the product unmarketable if not properly packaged. Furthermore, it is desirable to readily detect a damaged product which may not readily be ascertainable when the package consists of many conventional wrapping materials which hide the product from external view.

While many modes of packaging such products have previously been proposed, many drawbacks to their use have been experienced including inadequate protection for the product from environmental surroundings such as adverse weather conditions and rough handling, unsightly and insecure packaging, and costly fabrication along with difficult assembly.

SUMMARY OF THE INVENTION

The present invention provides a highly desirable composite package in which a pair of end members are placed to engage the opposite ends of an object or structure constituting a product while an intermediate member provides an opening which surrounds an intermediate section of the object. A plurality of reinforcing members are positioned to engage the intermediate member and are confined by the pair of oppositely disposed end members. A heat shrunk film is extended around the end, intermediate and reinforcing members for holding such members in assembled relation to thereby protect the object.

In one form of the invention, the package encloses an object having a cylindrically shaped intermediate section wherein the intermediate member provides a circular opening which is positioned to encircle and engage the cylindrically shaped intermediate section. The intermediate member also provides a plurality of locating notches which confine the plurality of reinforcing members.

In another form of the invention, the intermediate member provides a substantially rectangular outer periphery having four corners displaced outwardly from the surrounded object. The oppositely disposed end members each provide a substantially flat rectangular end wall having four corners displaced outwardly from the object and further provide a confining means for receiving the reinforcing members. The reinforcing members, together with the heat shrunk film, thus retain the corners of the end and intermediate members in aligned relationship to provide a desirable composite package which may be conveniently transported by lift trucks or the like and further conveniently stacked for storage.

The confining means provided by each oppositely disposed end member includes a plurality of depressions located adjacent to the corners of the end walls which receive and confine the plurality of reinforcing members. The interrelation between the intermediate member and oppositely-disposed end members provided by the plurality of reinforcing members and the heat shrunk film has been found to provide an extremely durable composite package which may readily be transported and stored.

In a preferred form of the invention, four elongated reinforcing members each have a pair of sidewalls disposed generally perpendicular with respect to each other and engage a respective corner of the intermediate member. The reinforcing members extend toward and are positioned within the corner depressions of the end members. The side walls at the outer ends of the reinforcing members are resiliently held by the corner depressions at an angle less than 90° with respect to each other, thus permitting the side walls to exert a pinching force upon the intermediate member.

Although it is not essential to the invention, a transparent film is preferably utilized so that the packaged object may be visually inspected so that damage and defects can be readily ascertained.

The subject invention thus provides a highly desirable package construction which is economical and easy to fabricate while remaining durable during transportation and storage.

DESCRIPTION OF THE DRAWINGS

The accompanying drawing illustrates the best mode presently contemplated by the inventor for carrying out the invention.

In the drawing:

FIG. 1 is a perspective elevational view of a composite package for enclosing a cylindrically shaped water heater; and

FIG. 2 is an enlarged plan view of the lower end member of the package of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, a cylindrically shaped water heater 1 provides a pair of oppositely disposed ends 2 and 3 and a cylindrically shaped intermediate section 4.

A pair of oppositely disposed bottom and top end members 5 and 6 are positioned to engage the ends 2 and 3 respectively of the water heater 1. The end members 5 and 6 are constructed in a similar manner so that only end member 5 will be discussed in detail and the corresponding elements of end member 6 will be noted with identical numbers primed.

With reference to FIGS. 1 and 2, the end member 5 provides a circular depression 7 which is adapted to receive and engage the cylindrical end 2 of water heater 1. The end member 5 generally provides a substantially flat rectangular end wall 8 having four corners 9 which are displaced radially outward from the water heater 1.

The end member **5** further provides a plurality of locating depressions **10** which are positioned adjacent to the corners **9** and are recessed from the wall **8.** Each recess **10** provides a pair of inner walls **11** and **12** and a pair of oppositely disposed outer walls **13** and **14** which form a pair of recessed channels **15** and **16.** The channels **15** and **16** constitute corner depressions which have planes formed at an angle less than 90° with respect to each other.

A substantially rectangular intermediate member **17** provides a circular opening **18** which encircles the cylindrical water heater **1** and preferably engages the intermediate section **4.** The intermediate member **17** provides an outer periphery having four corners **19** which are displaced radially outward from the water heater **1.** A plurality of locating notches **20** are provided at each corner **19.**

Four elongated reinforcing members **21** each provide a pair of walls **22** and **23** disposed generally perpendicular with respect to each other and are positioned to engage a respective corner **19** and notch **20** of the intermediate member **17.** The reinforcing members **21** extend from the intermediate member **17** to the oppositely disposed end members **5** and **6** and are confined within the channels **15** and **16.** Specifically, the walls **22** and **23** at the ends of the reinforcing members **21** are positioned within channels **15** and **16,** respectively, and are retained in a confined position by the inner and outer walls **11–14** of the end members **5** and **6.** The angular orientation provided by channels **15** and **16** slightly deforms the substantially perpendicularly orientated walls **22** and **23** of the reinforcing members **21** to thereby impart a pinching force by the walls **15** and **16** upon the intermediate member **17** at the corners **19** and notches **20.**

Such inter-action between the intermediate and end members provided through the spaced reinforcing members retains the assembly in aligned relationship while protecting the water heater **1** from damage.

The oppositely disposed end members and the intermediate member may be conveniently made from a synthetic plastic, such as polyethylene or polystyrene, or a fibrous material while the elongated reinforcing members may conveniently be made from a fibrous material, such as corrugated fiber boards, pressed paper extrusion or other material having some degree of resiliency.

A heat-shrunk film **24** is extended around the end, intermediate and reinforcing members and firmly holds such members in assembly.

Specifically a bi-axially oriented heat shrinkable synthetic transparent film in the form of a bag is preferably utilized which may be composed of a thermoplastic resinous material providing equal shrink in response to heat in both the longitudinal and transverse dimensions of the film. Such bi-axial orientation of the molecules serves to increase the resistance to cold cracking of the film so that it retains its flexibility at low temperatures. Many heat shrinkable types of materials may be utilized including polyethylene, polyvinyl chloride, polyvinylidene polymers, vinyl-vinylidene copolymers, rubber hydrochloride, polypropylene and polyethylene terephthalate, for example.

The interaction between the heat-shrunk film and the above described members thus retains the corners **9, 9'** and **19** in alignment to form a sturdy composite package which may be readily transported and stored. The use of a transparent film readily permits visual inspection of the water heater **1** during shipment and while in storage.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. A composite package, comprising an object having an intermediate section and a pair of opposite ends, first and second end members each adapted to engage said opposite ends of said object, an intermediate member having an opening and positioned to surround said intermediate section of said object, a plurality of reinforcing members engaging said intermediate member and confined by said end members, and a heat-shrunk film extending around said end, intermediate and reinforcing members for holding said members in assembled relation and protecting said object.

2. A composite package, comprising an object having a pair of opposite ends and a cylindrically shaped intermediate section, first and second end members each having locating depressions for receiving said opposite ends of said object, an intermediate member having a circular opening and positioned to encircle and engage said cylindrically shaped intermediate section, a plurality of reinforcing members engaging said intermediate member and confined by said end members, and a heat-shrunk synthetic film extending around said end, intermediate and reinforcing members for holding said members in assembled relation and protecting said object.

3. The package of claim **2,** wherein said intermediate member provides an outer periphery having a plurality of locating notches for confining said plurality of reinforcing members.

4. A composite package, comprising an object having a pair of opposite ends and an intermediate section, an intermediate member having an opening and positioned to surround said intermediate section, said intermediate member providing a substantially rectangular outer periphery having four corners displaced outwardly from said object, a plurality of reinforcing members engaging said intermediate member, first and second end members adapted to engage said opposite ends of said object, each of said end members providing a substantially flat rectangular end wall having four corners displaced outwardly from said object and further providing confining means for receiving said reinforcing members, and a heat-shrunk film extending around said end, intermediate and reinforcing members for holding said members in assembled relation, said reinforcing members and said film retaining said corners of said end and intermediate members, in aligned relationship.

5. The package of claim **4,** wherein said confining means includes a plurality of depressions located adjacent said corners of said first and second end members for receiving said plurality of reinforcing members.

6. A composite package, comprising a cylindrically shaped object, a bottom and a top end member each having a central depression for receiving the opposite ends of said cylindrical object and each providing a substantially flat rectangular end wall having four corners displaced radially outward from said cylindrical object, said end members each having a plurality of

corner depressions located adjacent to said corners, a substantially rectangular intermediate member having a circular opening and positioned to encircle said cylindrical object at spaced distances from said bottom and top end members, said intermediate member having four corners displaced radially outward from said cylindrical object, four elongated reinforcing members each having first and second walls disposed generally perpendicularly to one another and engaging a respective corner of said intermediate member, said reinforcing members extending toward and positioned within said corner depressions of said end members, and a biaxially oriented heat shrunk synthetic transparent film extending externally around said end, intermediate and reinforcing members for holding said members in assembled relation and protecting said cylindrical object while permitting visual inspection of said cylindrical object.

7. The package of claim **6**, wherein said sidewalls at the outer ends of said reinforcing members are resiliently held by said corner depressions at an angle less than ninety degrees with respect to each other thereby permitting said sidewalls to exert a pinching force upon said intermediate member.

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