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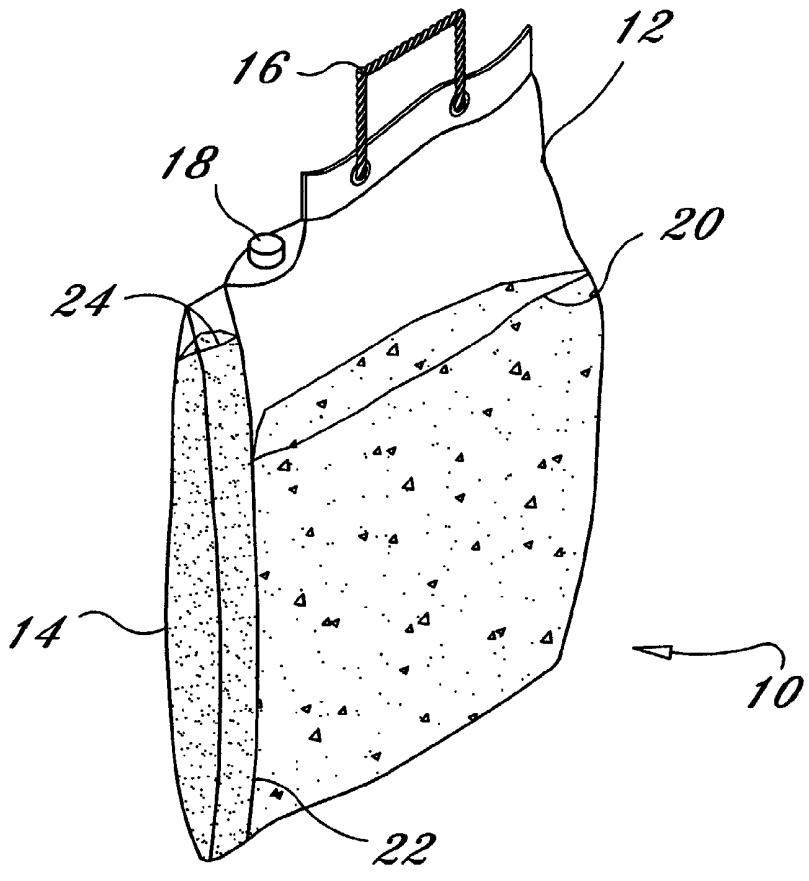
WO 02/12080 A1

(54) Title: PACKAGING AND METHOD FOR MIXING DEACTIVATED CEMENT



(57) Abstract: The present invention relates to a sealed storage medium (10) for deactivated cement. A chemical activator compartment (14) is provided adjacent a wet cement compartment (12) so that the two may be transported together until the components are to be mixed by the user.

Packaging and Method for Mixing Deactivated Cement

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to cement packaging and more specifically to methods of storing and mixing temporarily deactivated concrete with a chemical cement activator stored in a separate but attached storage medium.

2. Description of Related Art

Conventional concrete package mix products are sold as dry mixes. The primary ingredients of these mixes are cement, stone, and sand, which are dried prior to their insertion into a bag. For economic reasons the product is most always inserted into a paper bag, and at times a paper bag with a plastic liner. The product is then poured into a mixing device (wheelbarrow), water added, mixed, and then applied. Dry concrete package products most always are dusty, both in the store and out, and require the user to add their own water in order to mix the concrete, and require certain tools to mix.

Packaged building materials have historically been composed of paper or a combination of paper and plastic. Usage of paper in packaged building materials comprised nearly 90% of the total field by trends found in the European theater to focus on source

reduction as a means of controlling waste, and advancements in the flexible plastic packaging industry have opened up otherwise closed markets to plastic-based materials.

Concrete or cement related products are typically packaged into either paper, cardboard or rigid plastic containers. The choice of paper has primarily been due to cost and the production and storage concerns. Traditional packaging methodology involves the use of valve pack paper bagging system that blows concrete/cement related products into a paper bag.

Traditional concrete mix or cement related-package products require a moisture-free environment both during production, transportation, and storage, while certain rigid plastic containers afford some degree of moisture protection of the storage, the most prevalent being paper. Industry standards for paper bags are a three-layer construction consisting of three layers of paper and a thin moisture barrier. Holes located throughout the bags allow for pressure relief.

Flexible plastic mediums have been averted from package production of concrete/cement related items due to the inability of plastic to withstand high packaging temperatures, lack of field related polymer laminate technology and the high cost associated with such.

The concrete product is based on the concept of taking a ready-mixed concrete, the type of concrete that would come from a concrete mixer, deactivate it temporarily, and then, through

the introduction of a chemical activator or some other carrier, activate it, so that it can be used just like freshly batched concrete.

Traditional, dry, powder cement must be mixed with water in a mixing device. Typically, this might be a wheelbarrow. Unused cement hardens in the wheelbarrow and ruins the wheelbarrow for other uses.

The concept of stabilizing concrete or deactivating it has been utilized in the concrete industry and the additives that have been created to do this have been patented. The same applies for the activator chemical.

Wet-Mixed Portland Cement Based Packaged Products are Portland cement based construction materials mixed in the same manner as ready mixed concrete. These mixtures incorporate a specified dosage of a hydration-stabilizing admixture to halt the water/cement chemical reaction. These mixtures are produced at a slump of 0 to 2 inches and are packaged in a flexible medium for distribution and sales. Standard cement is sold in bulk and transferred in a transit mixer. These mixers are impractical for small jobs or jobs where the large container cannot be taken directly to the site such as the basement of an already-built house.

There have been attempts in the industry to provide a storage medium comprising an attached compartment to house a

product wherein the product requires separation from another product stored within the storage medium.

U.S. Patent No. 3,860,219 issued to *Nickerson, Jr.* discloses a process for mixing cement and liquid wherein the bag is converted from a medium for storing the cement, into a mixing medium. *Nickerson*, however, fails to teach a package having two compartments, removably attached to each other, wherein each compartment houses components, separated during transport, to be mixed within one of the existing compartments.

U.S. Patent No. 3,330,091, issued to *Quin*, discloses a disposable box for on-site mixing of dry cement. The box does not contain all of the ingredients and the product cannot be shipped therein.

U.S. Patent No. 5,804,265, issued to *Saad et al*, discloses a bag within a bag that helps to prevent freezer burn of stored meat. *Saad*, however, does not contemplate storing materials between the bags, and the patent goes so far as suggesting that the outside bag should contain a hole.

U.S. Patent No. 5,511,665, issued to *Dressel et al.*, discloses a child-resistant package made with two layers to form an inner pocket. *Dressel* does not contemplate containing materials between the two layers.

U.S. Patent No. 4,671,413, issued to *Peterson*, discloses pre-measured dry mix cement enclosed by a water soluble material having a water reservoir. *Peterson* discloses a form that

contains dry cement and aids in the measurement of water to form the proper mixture. The invention is not usable at cites lacking water. Further, the invention does not disclose separating the ingredients - in fact the separator or "casing" used is dissolvable.

U.S. Patent No. 4,657,133, issued to *Komatsu et al.* and U.S. Patent No. 4,579,223, issued to *Otsuka et al.*, disclose packages that selectively allow ambient air into the packages.

U.S. Patent No. 3,366,233, issued to *Roediger*, discloses a packaging for asphalt. The package discloses two layers but does not suggest storing anything between the layers.

Finally, U.S. Patent No. 2,682,465, issued to *Witala, et al.*, discloses a method of storing a bag within a bag having other contents. However, the inner bag is permeable.

Accordingly, what is needed in the art is a packaging apparatus which can be conveniently carried and which separately houses wet-mixed concrete and a chemical cement activator and provides a method to mix the concrete with the chemical activator in a flexible and sealable medium wherein the flexible medium is also used to store the concrete thereby eliminating the need for a separate mixing medium.

It is, therefore, to the effective resolution of the aforementioned problems and shortcomings of the prior art that the present invention is directed.

BRIEF SUMMARY OF THE INVENTION

The present invention encompasses packaging for deactivated cement and cement activator and a method of in-package mixing of deactivated cement and cement activator. For the purpose of clarity, cement and concrete are interchangeably an refer to any construction product consisting of Portland cement, mineral or chemical admisxtures, sand, stone and lime.

The chemical activator would be packaged in a small flexible medium, removably attached either within or proximate the larger flexible medium. The wet mixed concrete would be packaged in a type of flexible medium that would allow the actual wet mixing to take place inside the bag, once the activator was added.

A consumer would then buy this bag of wet mixed concrete, locate the smaller bag of activator, pour its contents into the larger bag, and then massage or roll the bag for a prescribed amount of time, so as to provide a mixing affect. After mixing, the consumer would then fully open the bag and then pour out the concrete for use.

In its purchased state, the bag of wet mixed concrete already has a certain level of moisture in it, and the consumer is simply taking the additional chemical/water solution and achieving a workable mixture without ever having to use an outside water source, a mixing device, or a mixing tool. This would be of significant use to consumers in outlying areas where

water supplies are scarce. Through the introduction of an advanced flexible medium, it is conceivable, as part of this invention, to deliver a package material that is substantially stronger than any other current package in the packaged-concrete products industry, thus reducing product inventory loss. The cement, sand, and/or stone, which are the primary ingredients in a concrete mix, would all be wet.

The product conceived for storage in the package medium would be a wet concrete capable of being stabilized and then activated. The benefit of the package medium in this case is that it would allow for the product to be mixed in the package and not in the wheelbarrow thus eliminating unnecessary and messy steps associated with conventional concrete package product. Prior to use, another small package containing an activating agent would be introduced giving the concrete a "ready-mixed" freshly-batched look and feel.

Using miniature-sized mortar fractions, set-time evaluations were performed to determine if existing admixtures were available to stabilize the hydration process of Portland cement and water for a longer-term basis. Upon initial success of long-term hydration stabilization, the development of a hydration activator began. After trying a variety of existing accelerating admixtures, a new activator was developed that could successfully be used to activate the concrete and keep the

physical properties of the Portland cement based products very close to those of a freshly batched mixture.

The analysis of physical properties for the activated mixtures included slump, temperature, workability, finishability, air content, unit weight, strength evaluation and set-time evaluation. The analysis of physical properties for the stabilized mixtures included slump, temperature, and stabilization duration.

Therefore, it is an object of this invention to provide a method for mixing deactivated cement and a cement activator, requiring minimal mixing when compared to dry packaged Portland cement-based products.

It is another object of the present invention to provide the user with a easy-to-transport portable packaging system for mixing cement and a cement activator which has never been available in a dry packaged product while providing increased aesthetics and purchase appeal.

It is still another object of this invention to assist in reducing project construction time.

It is still yet another object of this invention to provide a flexible package with improved barrier properties which provide longer storage life and less package loss during shipping and on shelves.

It is still another object of the present invention to provide a storage and mixing system which can safely store its

contents in an open-air environment during certain times of the year (ambient temperatures between 50 and 90 degrees F).

It is still another object of the present invention to provide easy-to-follow instructions printed on the bag and to provide ease of handling with a rope handle all on a product which can be easily disposed of in the resealable bags.

It is still another object of the present invention to provide an environmentally and health-friendly product by eliminating PM10 type dust, and, since the Portland cement is encapsulated by water at batch time, eliminate the consumer's exposure to these harmful particulates.

In accordance with these and other objects which will become apparent hereinafter, the instant invention will now be described with particular reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Figure 1 shows a perspective view of the preferred embodiment of the present invention.

Figure 2 shows a perspective view of the preferred embodiment with smaller pouch **14** detached.

Figure 3 shows a perspective view of an alternate embodiment of the present invention.

Figure 4 shows a perspective view of an alternate embodiment of the present invention having an inner smaller

pouch 14A.

DETAILED DESCRIPTION OF THE INVENTION

The present invention will now be described in detail utilizing one embodiment for example.

Figure 1 shows package 10 having a large storage section 12, an attached smaller storage section 14, a rope handle 16 and a screw fitment 18. Package 10 is a flexible bag made of waterproof plastic and is designed to hold approximately forty pounds of wet cement 20. The cement is purchased in this bag and resides in large storage section 12.

In the preferred embodiment, smaller storage section 14 is removably attached to larger storage section 12 via a perforated seal 22. Seal 22 is shown in Figure 1 running along the longitudinal vertical edge of package 10 and more specifically, along the interface of the edges of larger storage section 12 and smaller storage section 14. However, in other embodiments, smaller storage section 14 can be attached virtually anywhere on or within package 10. Figure 4 shows an alternate embodiment where the smaller storage area is a small pouch, located within larger storage section 12.

Package 10 is a strong, water proof plastic bag. The bag may comprise a series of different polymer layers. In the preferred embodiment of the present invention, the bag comprises

the following layers: PET, LDPE, PE and polyester, and Metalicine.

A user may access a chemical cement activator **24** stored within smaller storage section **14** by tearing along the perforated seal **22**. Figure 2 shows smaller storage section **14** removed from larger section **12**. The user may then unscrew fitment **18** which allows access to the cement **20** within larger storage section **12**, and pour in activator **24**. The mixing of chemical activator **24** and cement **20** takes place within larger storage section **12** of package **10**. No other temporary or permanent storage medium is needed.

In the preferred embodiment, the type of stabilizer used are the type sold by Master Builders and W.R. Grace under the trademames DELVO® and RECOVER®.

In Figure 3, one end of package **10** is shown to be closed using a reinforced header seal **18A**. Zip lock seals may also be used to ensure proper closure of the package. One or more grommets can be inserted within small apertures within this seal. Handle **16**, in the form of a rope of other appropriate handle device can be attached through the grommets. A rope loop handle will not break under the weight of the cement in the bag as prior art plastic handles may when sewn onto paper bags of dry cement.

A plurality of zip locks may be added to the opening of the package to strengthen the closure. The closure must be strong

enough to support the contents of the package, usually forty pounds of wet cement.

Figure 4 shows package **10** in an alternate embodiment. Activator **24** resides within smaller pouch **14A** which is removably attached anywhere within the interior of large storage section **12**. Here, large section **12** is opened to reveal smaller pouch **14A** therein. Pouch **14A** is detached, its contents emptied into large section **12** to be combined with cement **20** therein.

Upon purchase and use, the consumer activates the product with the attached additive accompanied by a prescribed amount of mixing. After activating the mixture, the consumer will have a construction material with the same properties as if it were freshly batched.

Wet-Mixed Portland Cement Based Packaged Products are produced in the same manner as ready mixed concrete. After the specified mixture is batched and mixed, the product is discharged into the bagging plant and bagged per the specified size using standard bag plant procedures. The bags are then palletized and stored for delivery (50 - 90 degrees F storage temperature).

When the consumer is ready to begin the construction process utilizing Wet-Mixed Portland Cement Based Packaged Products the following instructions will be provided.

Open bag and add activator to the mixture.
Re-seal bag and mix for a minimum of 2 minutes.

Product is now ready for use.
This mixture must be used within 60 minutes of adding activator.

Other useful information can be provided to help the consumer achieve the desired results.

The instant invention has been shown and described herein in what is considered to be the most practical and preferred embodiment. It is recognized, however, that departures may be made therefrom within the scope of the invention and that obvious modifications will occur to a person skilled in the art.

CLAIMS

What Is Claimed Is:

1. A package for retaining and mixing deactivated cement and separately-stored cement activator comprising:

a first flexible sealable storage medium;

wet mixed deactivated concrete situated within said first flexible storage medium;

a second sealable flexible storage medium removably attached to said first flexible storage medium;

chemical cement activator stored within said second medium wherein said activator is stored separately from said concrete; and

carrying means for transporting said package.

2. The package of claim 1 wherein said carrying means is a rope threaded through one or more openings situated near the edge of said package thereby forming a handle.

3. The package of claim 1 wherein said first flexible storage medium is a waterproof plastic bag.

4. A package for retaining and mixing deactivated cement and a separately-stored product comprising:

a first flexible sealable storage medium;

wet mixed concrete situated within said first flexible storage medium;

a second sealable flexible storage medium removably attached to said first flexible storage medium wherein said second flexible storage medium houses a product to be mixed with said wet mixture concrete; and

carrying means for transporting said package.

5. The package of claim 4, wherein said second storage medium is housed within said first storage medium.

6. The package of claim 1 wherein said second storage medium is removably attached to said first storage medium via a perforated attachment.

7. A method of mixing deactivated cement and separately-stored cement activator within a cement-storage medium comprising the steps of:

opening a first storage medium;

opening a second storage medium containing a chemical cement activator wherein said second storage medium is releasably attached to said first storage medium;

pouring said chemical cement activator into said opened first storage medium;

sealing said opened first storage medium;

mixing the contents of said first storage medium for a prescribed length of time to create an activated wet cement mixture;

reopening said first storage medium;

pouring out said mixed contents; and

using said activated wet cement mixture within a prescribed amount of time.

8. The method of mixing as described in claim 7 wherein said prescribed amount of time to use said activated cement mixture is approximately 60 minutes.

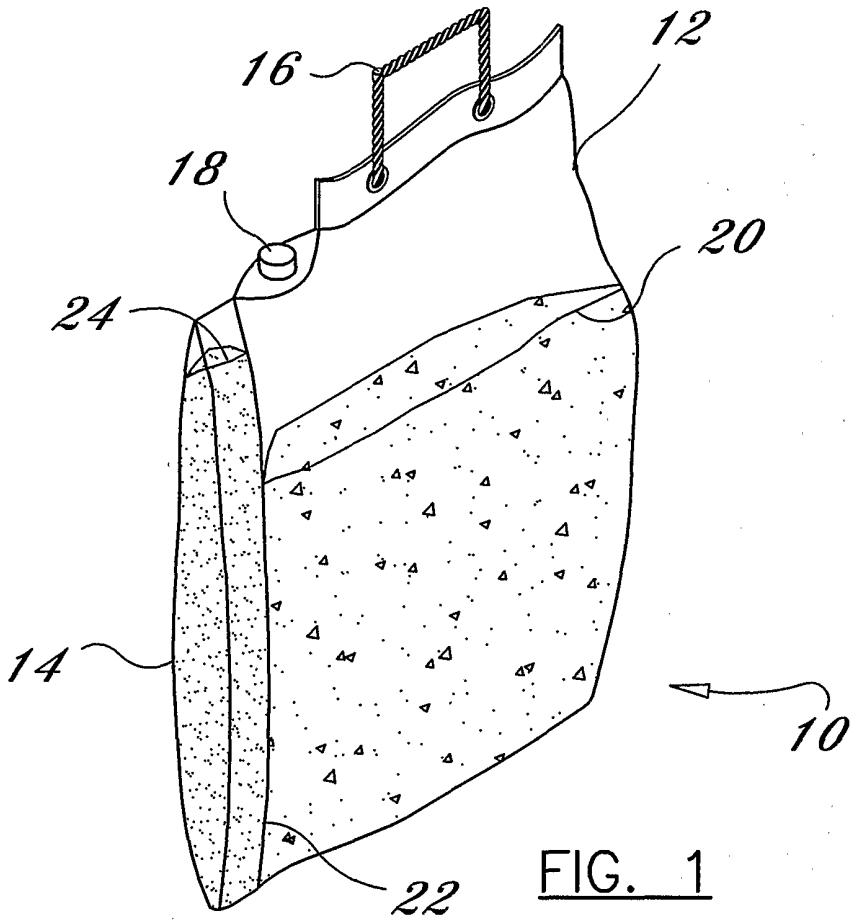


FIG. 1

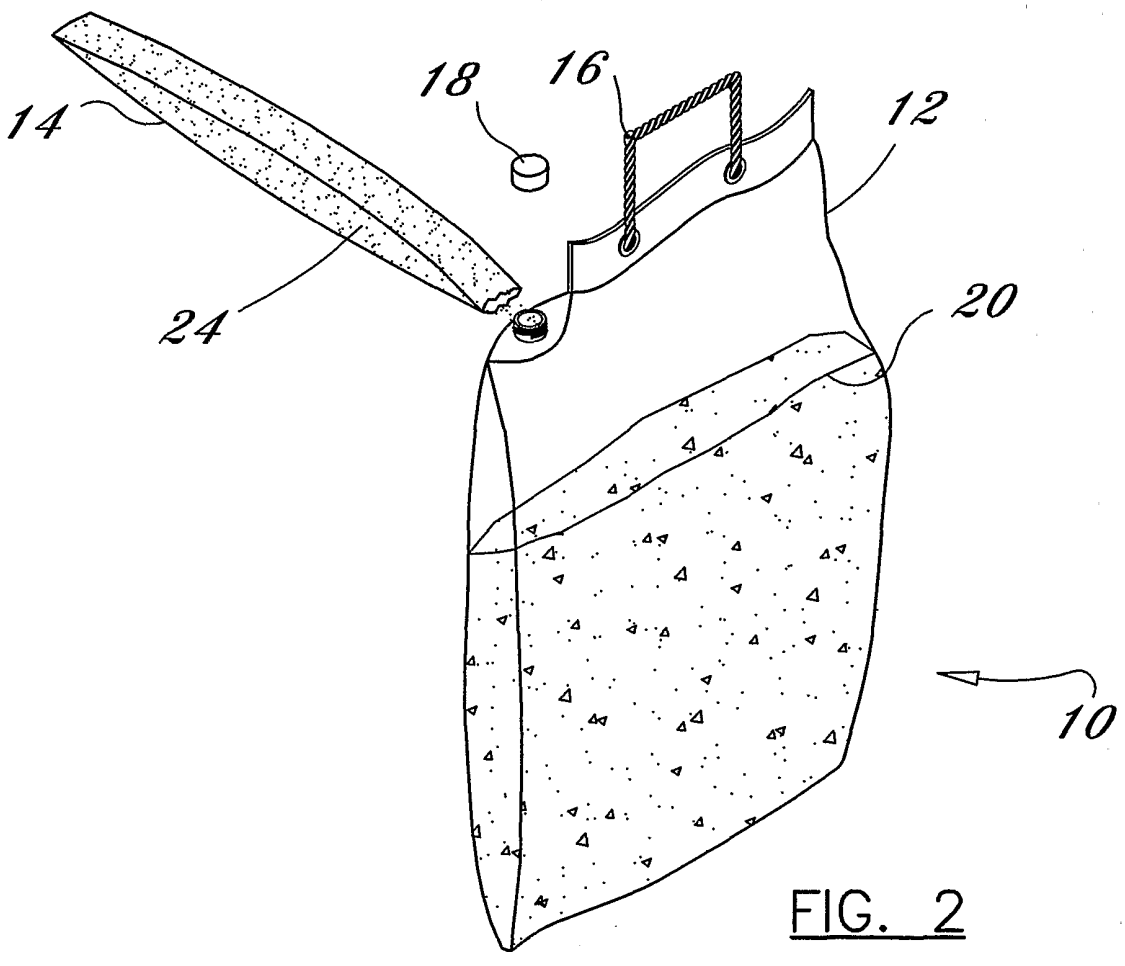


FIG. 2

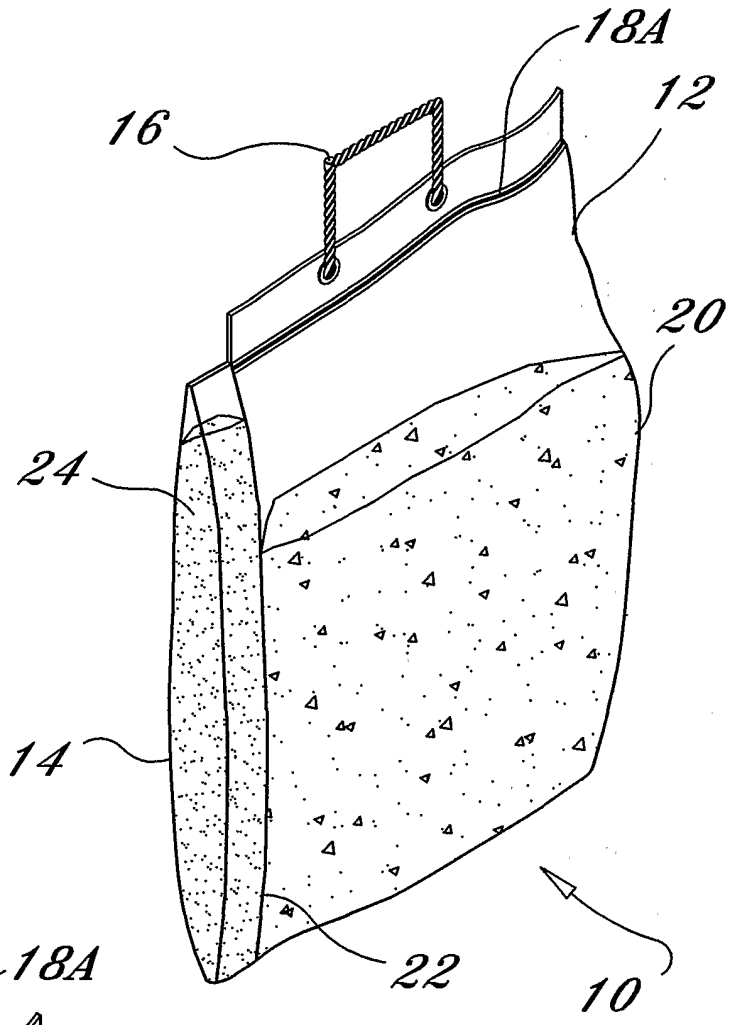


FIG. 3

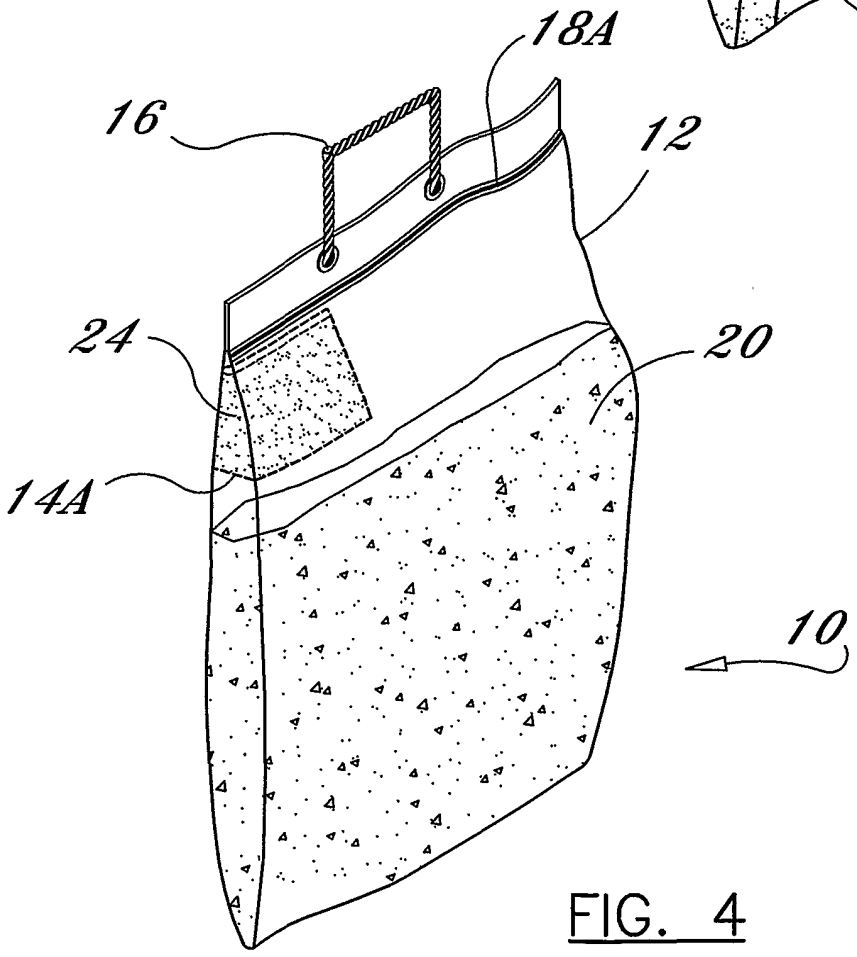


FIG. 4

INTERNATIONAL SEARCH REPORT

In ɔnal application No.
PCT/US00/21497

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/21497

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :B65D 25/08
US CL :206/219

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 206/219, 221

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,860,219 A ***(NICKERSON, JR.)*** 14 January 1975, see figures 1-4.	1-5, 7 and 8
Y	US 3,542,032 A ***(SPENCER)*** 24 November 1968, see figure 1.	1-5, 7 and 8
A	US 5,551,778 A ***(HAUKE et al.)*** 03 September 1996.	1
A	US 3,819,107 A ***(RYDER, JR.)*** 25 June 1974.	1
A	US 2,800,269 A ***(SMITH)*** 23 July 1957.	1
A	US 5,549,380 A ***(LIDGREN et al.)*** 27 August 1996.	1
A	US 5,425,447 A ***(FARINA)*** 20 June 1995.	1

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search	Date of mailing of the international search report
29 NOVEMBER 2000	28 DEC 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer DAVID T. FIDEI Telephone No. (703) 308-1148

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Paralegal Specialist
Technology Center 3700

Form PCT/ISA/210 (second sheet) (July 1998)★

INTERNATIONAL SEARCH REPORT

Ir ional application No.
PCT/US00/21497

•C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,447,245 A ***(MERHAR)*** 05 September.	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/21497

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING
This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claims 1-6, drawn to a package.
Group II, claims 7 & 8, drawn to a method.

The inventions listed as Groups I & II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The method as defined in Group II includes none of the special technical features of the package and could be carried out using two totally unrelated storage mediums.