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Ghione

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[54] **MODULAR MAILING CONTAINER SYSTEM AND PROCESS**

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[52] **U.S. Cl.** **206/223;** 220/23.83

[51] **Int. Cl.** **B65d 71/00**

[58] **Field of Search** ..... 206/223, 505, 514, 501; 220/4 B, 4 E, 23.83

[56] **References Cited**

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Primary Examiner—William I. Price
Assistant Examiner—Steven M. Pollard

[57] **ABSTRACT**

A mailing container system consisting of three dimensionally standardized modules and corresponding folding paperboard cartons therefor is described. Each module is constructed of plastic material and consists of a base with a mating lid member. Both the internal and external surface planes of each module are uninterruped at the lid closure line, and each module is self-sealing and reusable. Each container is formed by the plastic module and an outer paperboard mailing carton cover. The modules are dimensioned preferably in sizes of about 3½ × 5 × 1½ inches; 5 × 7 × 2½ inches; and 7 × 11 × 6½ inches. A packaging system in kit form is also disclosed consisting of an assortment of modules disposed within a single large module, together with the appropriate folded mailing carton covers packed within for each of the two smaller-size modules.

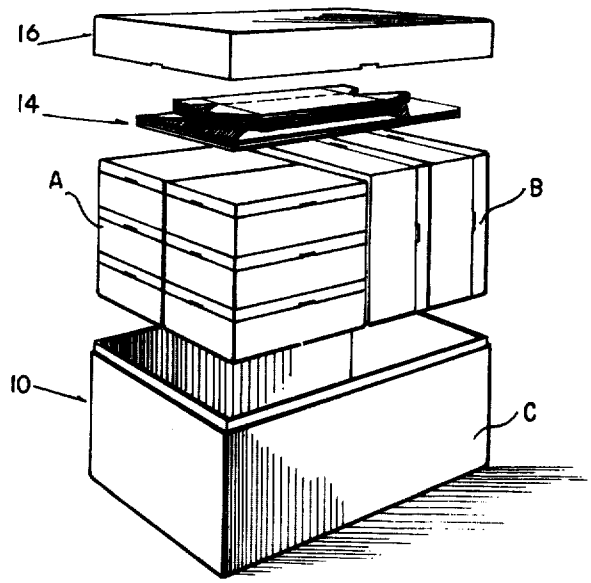
More specifically, although not necessarily limited to,

A modular mailing container system for most parcels not exceeding a length and girth of 10-inches by 25-inches respectively; offering an assortment of containers in three standard sizes all modular in nature, each made of a plastic material forming a molded set-up box with separable lid cover held intact through vacuum and friction, each then packed with respectively sized paperboard mailing carton.

A method of packaging as stated above, in kit form and ready for use as packed, comprised of self-sealing plastic modules with folding paperboard mailing cartons. It is organized to allow the user, regardless of his degree of familiarity, to quickly assemble anywhere sturdy and rigid packaging without additional apparatus for parcels of assorted size, ready for mailing, with assured safety to contents. Utilizing such standardized packaging parcels are able to be handled by any postal system having facilities using either a conventional or a reciprocally automated mail processing method. Sealing tape is optional for use in any postal system which requires the complete closure and sealing of parcels to qualify for mailing in classes such as registered mail.

Failsafe and modular to the third dimension, each standardized container when prepared for mailing is acceptable by any postal system in the world equipped for the automated machine processing of parcels using the cubic volume method of parcel containment, and mechanical conveyancing, handling and shipment, which is the preferred application of this invention.

20 Claims, 13 Drawing Figures



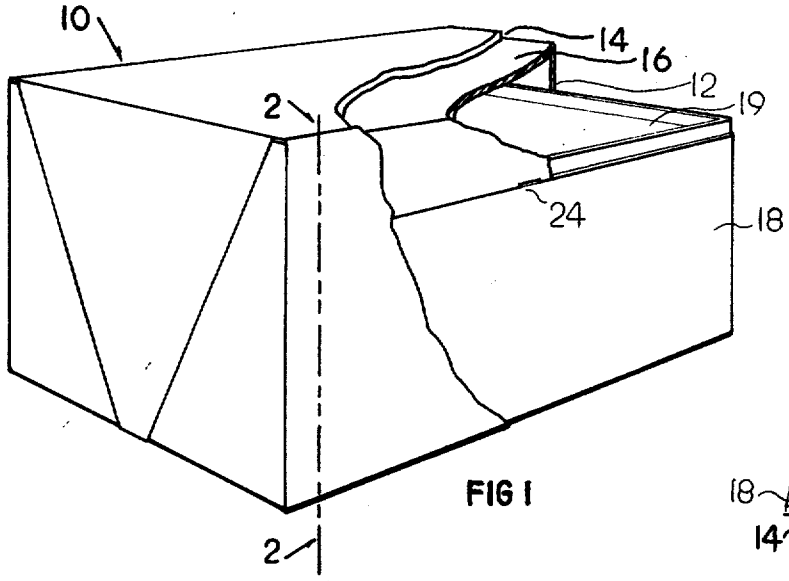


FIG 1

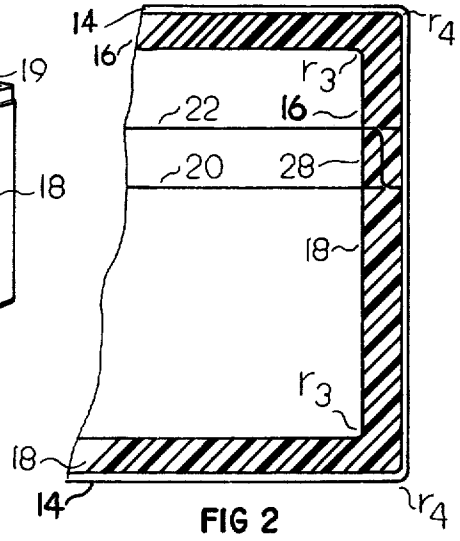


FIG 2

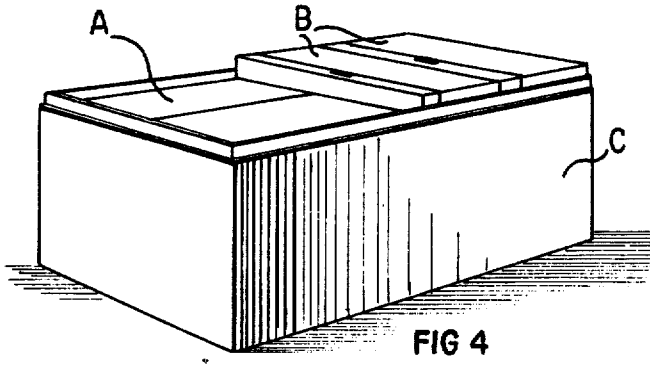


FIG 4

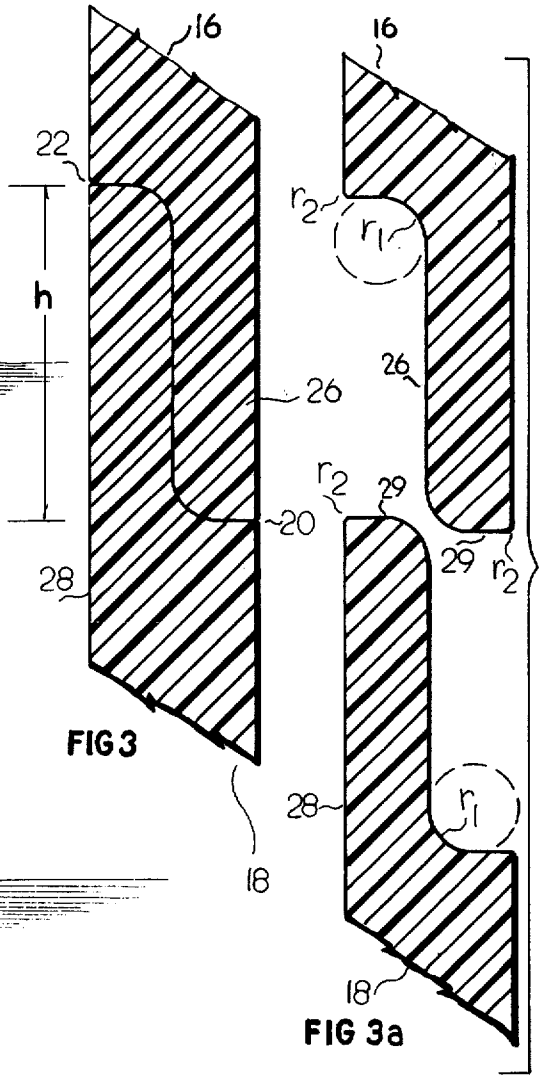


FIG 3

FIG 3a

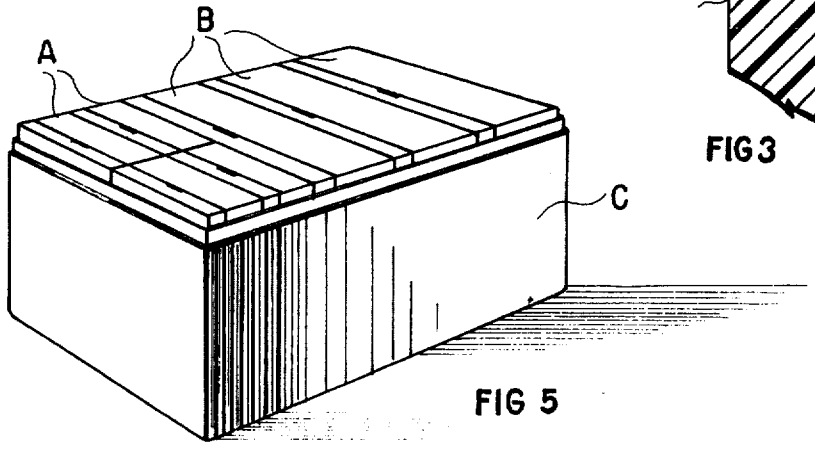


FIG 5

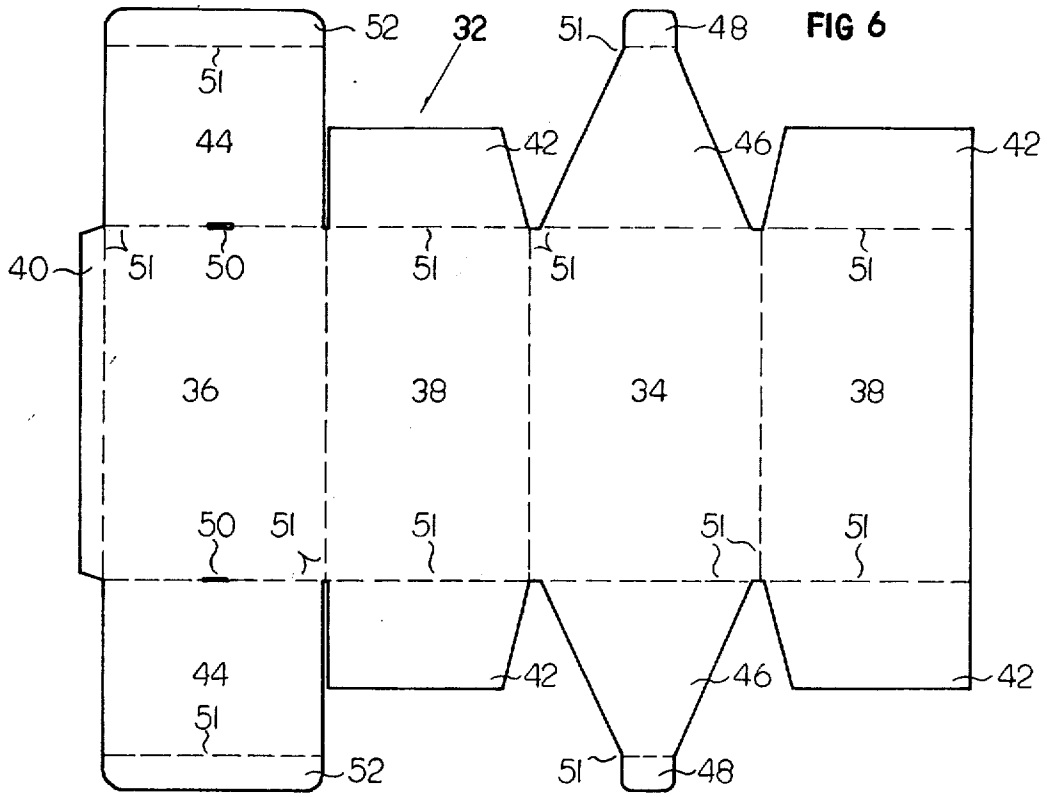


FIG 6

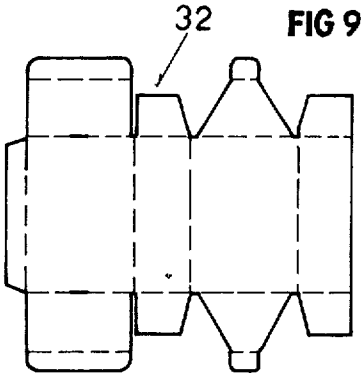


FIG 9

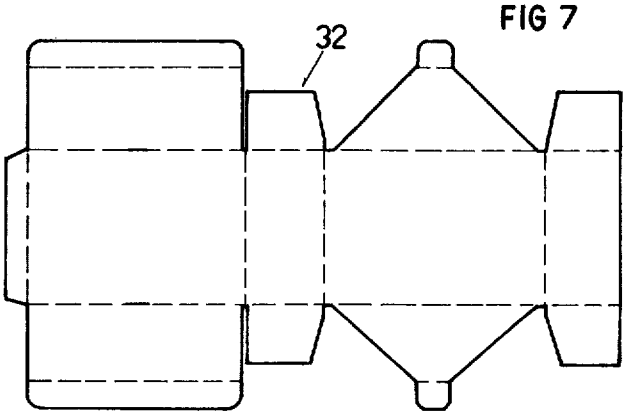


FIG 7

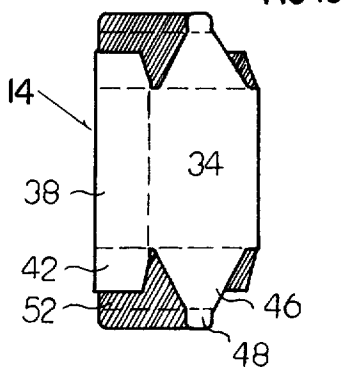


FIG 10

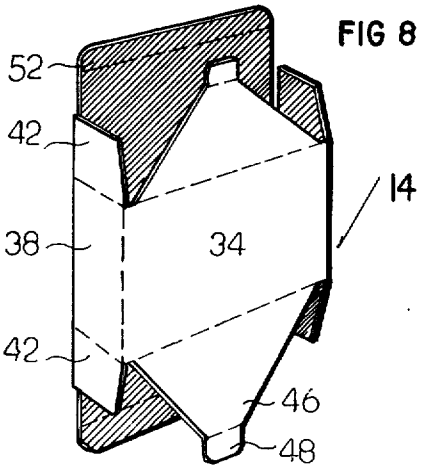


FIG 8

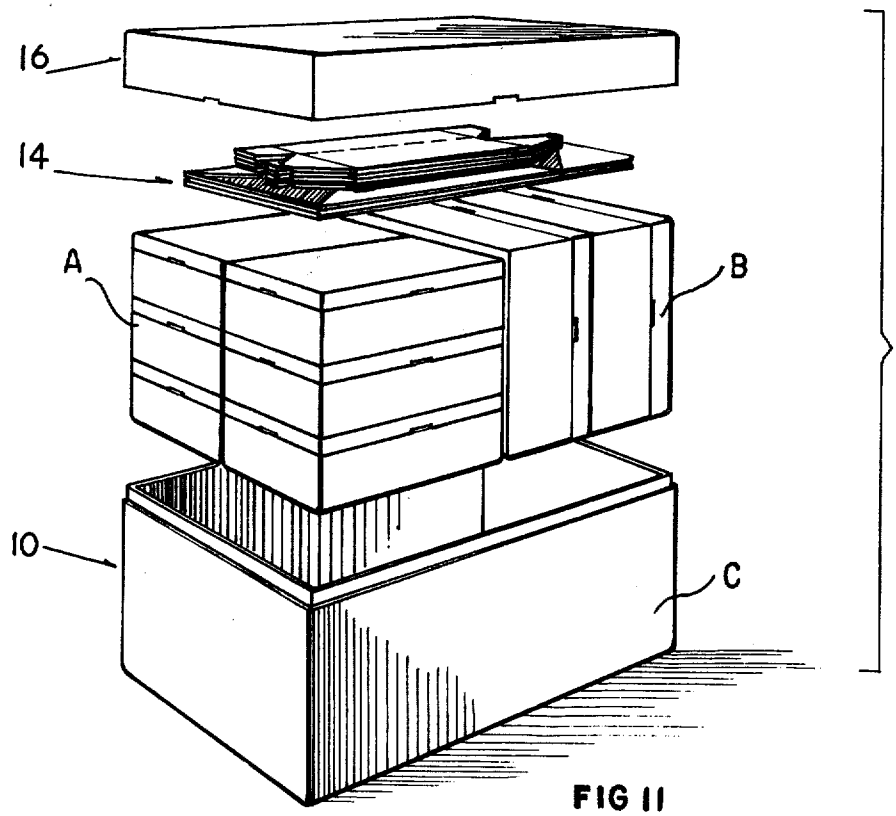


FIG 11

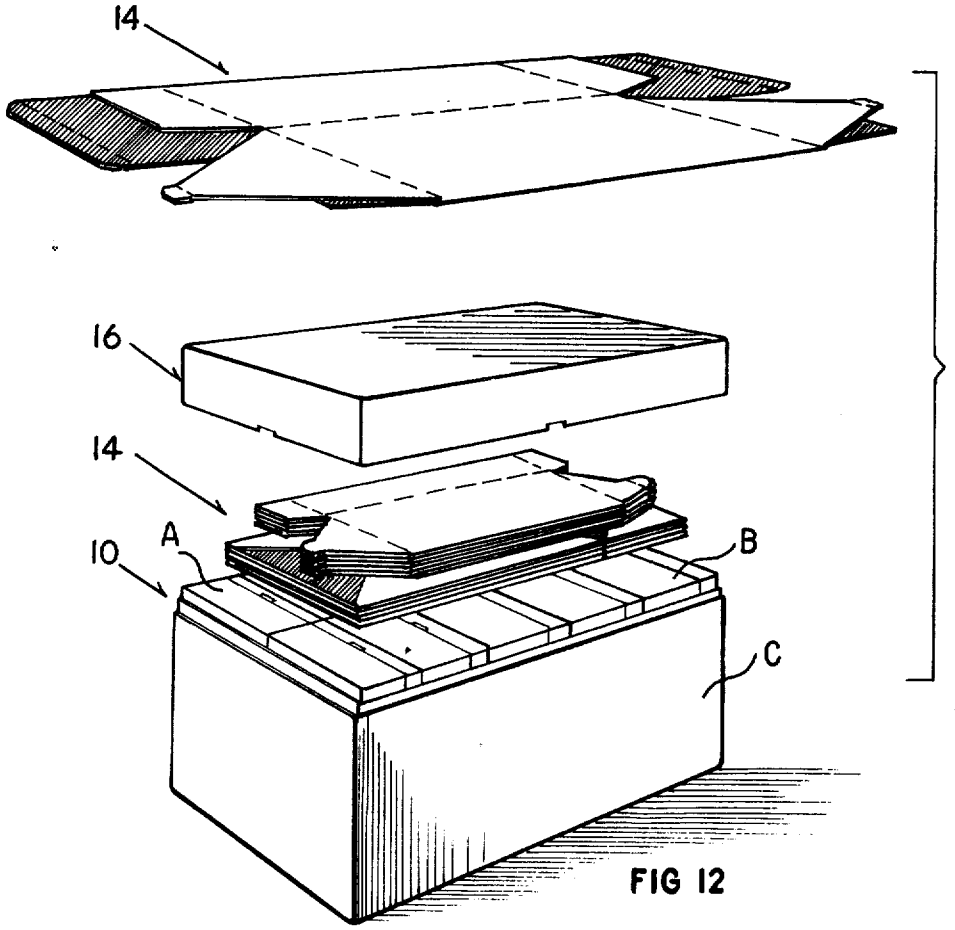


FIG 12

MODULAR MAILING CONTAINER SYSTEM AND PROCESS

This invention relates to a mailing container system and to a mailing container packaging kit consisting of self-sealing, plastic modules in standardized sizes and shapes, and folding outer cartons of light gauge paperboard for each module. The modules are in three standard sizes only and have sufficient strength and rigidity for repeated reuse. Parcels utilizing the system of this invention then are able to be handled by any postal system having facilities using either a conventional or a reciprocally automated mail processing method.

Facsimile transmission, possibly by telephone line, will quite likely replace letter carriers to a large extent in the near future. Facsimile transmission would be a cheaper, more reliable, and more rapid means for conveying information.

Goods, however, in contrast to information, will continue to require physical conveyance from place to place, and accordingly parcels, and a parcel post service will continue to be used in transmitting goods. Although the volume of parcel post business done by the United States Postal Service has decreased over the last few years, it is not contemplated that parcel post will become obsolete. The decline in parcel post business is, instead, due to high rates, slower service and an increasing amount of damage to such dimensional mail during its mail processing and handling. These factors reflect only a minimal application of efficient or streamlined procedures, implementing modern technology, as well as a lack of suitable packaging up to this time designed specifically for consumer use and convenience.

It has been recognized that containers of standardized sizes for mailing, as well as being of lightweight and rigid construction, are essential to streamlining or automating the parcel post. Containers of standardized sizes could be readily adapted to optical character coding and reading requisite to automated sortation, and could be more rapidly faced, cancelled, cubed up and safely conveyed in large numbers to be binned, palletized and containerized. In addition, mailing containers of standardized shapes could be more rapidly and economically retailed through coin vending machines everywhere, as well as containerized for shipment using the cubic volume method of containment in mail movement, now becoming popular with air as well as surface transport.

Even though a need for standardized containers, especially for smaller parcels, has existed for several years, an inexpensive, sturdy container or plurality of containers modular in nature in convenient, standard sizes, has not been developed prior to this invention.

It has now been discovered, however, that a mailing container system of wide commercial application may be implemented according to the process of this invention so that inexpensive containers may be made conveniently available to the public everywhere.

Accordingly, the process of this invention includes the formulation of a mailing container system which may contain a plurality of assorted modular containers packaged in a single, larger container module for commercial usage. Each container module is constructed of a rigid plastic material, susceptible to mass production and reuse. The containers are preferably injection molded polystyrene, and the kit also contains a fold-up paperboard carton for encasing each module. This

outer carton may bear the address and postage, and other necessary indicia, and may be discarded after a single use. The plastic module, however, is available for reuse with a replacement paperboard mailing carton.

The design of each module is specifically adapted to a modernized system of parcel containment in that both the internal and external surfaces are unbroken by hinges, clasps, or similar protrusions, to spoil their solidity and surface plane. Also, the design contemplates that such mailing containers must remain modular to the third dimension when made ready for mailing, and not susceptible to overpacking nor compaction by the user; and that once in the mail stream each parcel so contained will maintain reliable dimensional stability through all phases of high-speed, automated mail processing. In addition, the module is designed to have a lid portion with a depending peripheral lip and a mating upstanding rim on the base portion so that the module will be self-sealing when closed. Furthermore, as will be subsequently described, the mating lip and rim portions of the lid and the base are specifically designed with radial junctures to the walls thereof to minimize stress on the module and thereby provide a three-dimensional module of rigid and durable construction.

Finally, it has been discovered that mailing modules for small parcels of three specific sizes will meet most needs, and in addition, provide the necessary interchangeability so that an assortment in kit form will be acceptable to the public and yet adaptable to containerization and conventional or automated mailing techniques. Such mailing containers may also be sold individually, and made immediately ready for mailing by postal patrons.

Accordingly, it is an object of this invention to provide a mailing container system in kit form for containing, mailing, and shipping a wide variety of merchandise, articles and the like of relatively small sizes and shapes.

It is another object of this invention to provide a modular packaging system completely kitted comprising standardized modular units and respectively sized paperboard mailing cartons, compatible with conventional or reciprocally automated mail processing facilities.

It is another object to provide a mailing container module of self-sealing and rigid construction which will be light in weight, inexpensive, and compatible with modern concepts of material handling, containerized storage, modes of carriage, and transportation facilities and means of delivery.

It is a further object of this invention to provide a completely self-contained packaging kit comprising a plurality of modular packaging units which may be assembled conveniently, easily and rapidly for mailing, without the use of additional materials such as glues, moistening agents, sealing tapes, twine, wire, and the like, and which will not require additional packing materials such as excelsior, shredded paper, and foam to protect the article being shipped.

It is still a further object of this invention to provide a mailing container system including assorted modules in standardized sizes adapted to articles of dimensional size up to a length and girth of about 10 inches by 25 inches, respectively, each of said containers being compatible with the principles of modular packaging and automated machine processing of parcels for rapid, au-

tomated conveyancing, sorting, handling, and shipment.

It is yet another object of this invention to provide a mailing container kit including salvable, reusable, and self-sealing modular packaging units constructed of inexpensive, rigid plastic material, each module having an unbroken external and internal surface, said kit further including fold-up paperboard cartons for encasing said modular units and for receiving identifying indicia and the like for mailing.

It is a further objective of this invention to provide a process of packaging, in kit form and ready for use as packed, so organized as to allow the individual user, regardless of his degree of familiarity, to quickly assemble anywhere sturdy and rigid packaging which is essentially a salvable and reusable product with retentive value, as to its major component, indefinitely retaining its self-sealing and easy to open characteristics; which would be a form of packaging not requiring disposal as waste, nor the depletion of natural resources, the waste of human energy nor the municipal costs incident to the treatment and processing of solid waste and refuse now associated with various paper pulp products in packaging once discarded.

It is a further objective of this invention to provide a process of packaging which is of rugged yet simple construction, made of an inexpensive organic material, as to its major component, composed of carbon and hydrogen (polystyrene) which is made from petroleum products, some of which had little value before being used to make plastics; and which in addition thereto is economical to manufacture in modern high-speed injection molding machines for thermoplastics using sophisticated tooling and automated controls; and which in addition thereto is a product that can be distributed and sold at low-cost, in individual units or as complete mailing container systems, by use of coin-operated vending machines without human attendance.

These and other objects will become readily apparent with reference to the drawings and following description wherein:

FIG. 1 is a perspective view in partial section of a mailing container of this invention;

FIG. 2 is a cross-sectional fragmentary view taken along line 2—2 of FIG. 1;

FIGS. 3 and 3a is a fragmentary enlarged sectional view of a portion of FIG. 2;

FIG. 4 is a perspective view of an embodiment of a partial kit of this invention of modules only having the lid portion of the largest module removed;

FIG. 5 is a perspective view of another embodiment of a kitted array of this invention having the lid removed;

FIG. 6 is a plan view of the folding paperboard mailing carton blank, or template, for the largest module;

FIG. 7 is a plan view of the folding paperboard mailing carton blank, or template, for the intermediate module;

FIG. 8 is a perspective view of the carton of FIG. 7;

FIG. 9 is a plan view of the folding paperboard mailing carton blank, or template, for the smallest module; and,

FIG. 10 is a plan view of the carton of FIG. 9 partially assembled;

FIG. 11 is an exploded view of an embodiment of the system, or kit, of this invention; and,

FIG. 12 is a semi-exploded view of yet another embodiment of the system, or kit, of this invention.

With attention to the drawings and to FIGS. 1–3 in particular, the mailing container **10** of this invention comprises typically an inner module **12** constructed, preferably, of opaque high impact polystyrene, or other comparable rigid plastic material with an outer paperboard covering **14.** Module **12** consists of a lid **16** and a base portion **18** containing an object **19** as shown in FIG. 1. As shown in FIGS. 2 and 3 the external lid closure line **20** and the internal lid closure line **22** are, respectively, in the external and internal vertical planes of the side walls of lid **16** and base **18** of module **12.**

Lid **16** may have a wedge indentation **24** at opposite edges thereof and all four sides, to facilitate removal of lid **16** from base **18,** which is a feature typical to all modules. The wedge indentation typically is ½-inch long by 1/16-inch in height, and is recessed in the lid **16,** only, throughout the thickness of the depending lip described below.

In the preferred embodiment of this invention three sizes and shapes of modular mailing containers **10,** only, are presented. The external dimensions of the modules are approximately 3½ inches × 5 inches × 1½ inches thick; 5 inches × 7 inches × 2½ inches thick; and 7-7/16 inches × 11-1/16 inches × 6-7/16 inches thick. Hereinafter the modules for the corresponding containers will be referred to as modules A, B, and C, respectively, as they progress upwards in size.

Module A in the preferred embodiment is constructed with walls one-eighth-inch thick. Module B is preferably also constructed having walls one-eighth-inch thick, but module C in view of its substantially larger size may be constructed with walls three-sixteenth-inch thick for additional strength.

An essential feature of the module **12** of this invention, which is a feature typical to all modules, is a self-sealing feature described as follows. Lid **16** is assembled on base **18** by a press fit of depending lip **26** on rim **28** integral with lid **16** and base **18,** respectively. It has been discovered that the height *h*, in order to insure the self-sealing feature, should be greater than the wall thickness, or about twice the thickness. Accordingly, the height *h* for module A is preferred to be three-sixteenths-inch, the height *h* for module B, in view of its slightly larger size is preferred to be five-sixteenths-inch, and the height *h* for module C is preferred to be three-eighths-inch.

Another important aspect of the self-sealing feature of the mailing container modules **12** of this invention is the provision of a quarter-round radius r_1 at the internal juncture of lip **26** with lid **16** and rim **28** with base **18.** As shown in FIGS. **2** and **3** the radii r_1 must form mating surfaces with adjacent portions of lip **26** and rim **28** in order to insure that the lid closure lines **20** and **22** will be flush with the internal and external vertical planes of the sides of the module **12.** With modules A and B, the radius of all edges of those parts forming mating surfaces, r_1 and r_2, is preferred to be a minimum of 0.010 inch, and the radius of module C is preferred to be a minimum of 0.015 inch, both of which dimensions are consistent with good mold design. By providing rounded radial junctures on mating portions **26** and **28,** as well as a flat horizontal plane, i.e. flat seating surface **29,** shearing stresses will be minimized, and vertically imposed compressive forces and impacts will be uniformly transmitted through the sides of the module

12. These radial junctures will also facilitate operativeness and ease of handling during assembly of the module.

Accordingly, the mailing container module **12** of this invention due to the design of its self-sealing feature, should be extremely resistant to impact, and will be much stronger than conventional cardboard containers. If module **12** is fractured or broken, failure will normally be expected to occur on one of the faces of the module **12** rather than at the overlapping portions **26** and **28** of the joint.

Consistent with good mold design sharp edges on module **12** should be avoided. However, in order to insure the self-sealing feature and avoidance of shearing stress at the lid closure lines **20** and **22**, there should be adherence to close tolerances, and a quarter-round radius at r_1 and a minimum radius at r_2, which will provide a flush fit of the parts, as well as a flat seating surface on a horizontal plane **29** for a portion of the mated parts.

The internal and external corners of module **12**, as shown in FIG. **2**, should be at an inside radius r_3 which preferably is one-half the wall thickness of the module, and an outside radius r_4 which preferably is 1½ times the wall thickness of the module. Accordingly, the radius r_3 for modules A and B is preferred to be one-sixteenth-inch, and for module C 3/32-inch; and the radius r_4 for modules A and B is preferred to be three-sixteenths-inch, and for module C at nine thrity-seconds-inch.

If desired, the upper and lower external horizontal faces of module A may be of thinner gauge. These faces may be one thirty-seconds-inch thinner than the vertical walls, i.e. in the case of module A, three thirty-seconds-inch thick, which will facilitate this particular module being fitted through a mail slot not exceeding 1½ inches in height, even when encased in its paperboard mailing carton.

With attention to FIGS. **4** and **5**, the universally sized mailing container modules of this invention are adapted to be nested in one or more standard configurations for easy handling, self-containment and space economy. FIG. **4** illustrates the disposition of a pack of nine modules wherein six module A's and two module B's are nested in a single module C. FIG. **5** illustrates an alternate embodiment wherein four module A's and three module B's are nested in a module C. In addition to the versions of FIGS. **4** and **5** as will be obvious to those skilled in the art, the kit of this invention may be marketed in a unit of, for example, only module A's nested in a single module C, or only module B's nested in a single module C. It should be noted, however, that in each of the aforementioned configurations module A's or module B's may be grouped, i.e. cubed up, for containment in groups of nearly the same volumetric dimensions. In this way the modules of this invention when made ready for mailing may be readily cubed up for mail processing and shipment using well known automatic machinery.

With reference to FIGS. **6–10**, folding cartons **14** constructed preferably of light gauge paperboard are designed to be provided as part of the kit of this invention for each module **12** to provide a surface for imprinting the necessary identification and mailing indicia. A separate respectively sized paperboard mailing carton **14** will be provided for each module A, B and C in the system as will be subsequently described. However, for the purposes of description, the paperboard mailing cartons **14** pictured in FIGS. **6–10** will be identical for each of module A, B or C with the exception of the dimensions thereof.

Paperboard mailing carton **14** is formed from a blank precut to have top and bottom walls **34** and **36**, side walls **38**, and an overlapping seam **40**. Side walls **38** are provided with end closure tabs **42**. Bottom wall **36** is provided with opposed, inner end closure flaps **44**, and upper wall **34** is provided with outer, end closure flaps **46**. A tab **48** is provided on each of flaps **46** for insertion into corresponding slots **50** on fold lines of bottom wall member **36** when blank **32** is assembled.

With attention to FIGS. **8** and **10** assembly of blanks **6**, **7** and **9** into a carton **14** is achieved merely by glueing seam flap **40** to a corresponding portion of side wall **38**. The collapsed box as shown in FIG. **10** may then be made ready for receiving an appropriate module **12** merely by aligning the walls as shown in FIG. **8**. The module is inserted into either open end of the carton **14** and end flaps **42** and **44** folded in to close each end. The inner end flap **44** also has a tab portion **52**, adapted to be folded into carton **14** and disposed between wall **34** and the module **12**. Outer end flap **46** is then folded over flap **44** as shown in FIG. **1** and tab **48** inserted into slot **50** to secure the encased module for mailing.

As will be obvious to those skilled in the art the configuration of the carton may be altered merely by changing the dimensions of the portions **34**, **36**, and **38** to provide either a side-opening carton or an endopening carton, as required to minimize the plane geometry and surface area of a given folded carton for packing flat within the largest of the three modules.

With attention to FIGS. **11** and **12** the kit of this invention may comprise a plurality of modules A and B nested within a single module C, already encased in its respectively sized carton, together with a separate mailing carton **14** packed within for each module A and B. The kit then is a self-contained assortment of mailing containers, each ready for immediate assembly and use. As stated, in packing variations, the kit may include four module A's, three module B's and one of module C, or the kit may contain six module A's, two of module B's and one of module C. In the alternative the kit may contain only module A's nested in module C, or only module B's nested in module C together in each instance with the corresponding respectively sized mailing cartons.

In summary, a packaging system in kit form has been described herein. The kit includes a plurality of self-sealing plastic modules with respectively sized folding paperboard mailing cartons. The kit allows the user to quickly assemble sturdy and rigid packaging in convenient sizes and shapes without additional apparatus to construct parcels ready for mailing.

By utilizing the standard sized packaging and method of parcel containment of this invention described herein, any postal system having facilities using either a conventional or a reciprocally automated mail processing method may rapidly and inexpensively handle the parcels by using the cubic volume method of parcel containment and mechanical conveying.

In addition, a unique modular mailing container has been described, constructed preferably of a molded plastic material such as high impact polystyrene. The module element of this invention includes a self-sealing capability and provides an unbroken vertical plane of

the inside and outside thereof for efficient packing and containment, as well as for a flush fit of all exterior module surfaces when aligned, stacked and packed together. The self-sealing facility is provided by a rim on the base portion and a mating lip on the lid portion. The rim and lip mate at rounded junctures so that shear forces applied to the package will be more evenly distributed. In addition, the self-sealing capability is facilitated by a substantial overlap of the mating rim and lip whereby the overlapping portion is at least three-sixteenths-inch in height and from three-sixteenths to about three-eights-inch for larger parcels.

Finally, the unique system of this invention includes standardized-sized mailing container modules adapted to receive articles of up to 10 inches in length and 25 inches in girth. The three modules of this invention are dimensioned approximately 3½ × 5 × 1½ inches, 5 × 7 × 2½ inches, and 7 × 11 × 6½ inches, adaptable to nearly all common types of small articles. The modules are rigidly constructed preferably with walls of about ⅛ to 3/16 inch thick. In addition, the smaller modules may have slightly thinner gauge top and bottom walls, if desired.

The dimensions of the various modules may vary; but it has been discovered that those dimensions disclosed above contemplate most optimumly that if, for reasons of size and/or shape a given article cannot be accommodated by the smallest module, then modules of increasing size, volume and progressively more cubic configuration may be considered until the article is accommodated. Accordingly, if an article for reasons of size and/or shape cannot be accommodated by one module, then the geometry of the next larger module within the system anticipates this. Moreover, the disclosed system accomplishes this result with adherence to the restriction of using only three sizes of modules in the interests of achieving the utmost efficiency in modular packaging in any future program towards worldwide standardization.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A mailing container system, or kit, comprising a plurality of self-sealing, plastic modules defining no more than three different predetermined sizes and shapes and a plurality of folding cartons, each of said cartons configured to correspond to and receive one of said modules to form a complete mailing container ready for mailing; each of said modules having a lid and a base, the walls thereof defining a rectangular and cross-sectional configuration with each external and internal surface of each module lying in a single plane; a plurality of at least one of said modules adapted to be disposed within at least one other of said modules together with the corresponding folding cartons thereof to form said kit.

2. The kit of claim **1** wherein a plurality of one of said modules are disposed within another of said modules.

3. The kit of claim **1** wherein said modules comprise three different sizes.

4. The kit of claim **3** wherein a plurality of two of said different sized modules are disposed within a third.

5. The kit of claim **3** wherein the external dimensions of a first set of said modules are about 1½ × 3½ × 5 inches; the external dimensions of a second set of said modules are about 2½ × 5 × 7 inches; and the external dimensions of a third set of said modules are about 6½ × 7 × 11 inches.

6. The kit of claim **5** wherein four of said first set and three of said second set are disposed within one of said third set of modules.

7. The kit of claim **5** wherein six of said first set and two of said second set are disposed within one of said third set of modules.

8. The kit of claim **1** wherein each of said modules comprises a base portion having a rectangular bottom wall and upstanding integral side walls, the distal portion thereof lying perpendicular to said bottom wall and extending upwardly to form an integral rim, said rim having a height greater than the width of said side walls; and a lid portion having a rectangular top wall and downwardly extending, integral side walls, the distal portion thereof lying perpendicular to said top wall and depending to form an integral lip, the height of the lip being equal to the height of said rim so that when said lid is placed on said base a vertical surface of the rim and the lip will mate in an abutting relationship.

9. The module of claim **8** wherein the average thickness of the rim and of the lip respectively is approximately one-half the thickness of said side walls.

10. The module of claim **9** wherein the central portion of the abutting surfaces of said rim and lip lie in planes perpendicular to the bottom and top walls of said base and lid, respectively.

11. The module of claim **10** wherein the lip and rim of said lid and base portions are formed so that when said module is assembled the lip surrounds the rim with the internal surface of the lip and the external surface of the rim juxtaposed in an abutting relationship.

12. The module of claim **11** wherein the upper and lower portions of the internal surfaces of said lip and the upper and lower portions of the external surfaces of said rim define common circular segments in cross section.

13. The module of claim **12** wherein the radius of each edge of said circular segment is at least 0.010 inch.

14. The module of claim **12** wherein the radius of each edge of said circular segment is at least 0.015 inch.

15. The module of claim **12** wherein the internal and external juncture of the side walls and bottom wall of said base and the side walls and top wall of said lid define circular segments in cross section.

16. The module of claim **15** wherein the internal and external radius of said segments is approximately one-half of the thickness of said side walls, and 1½ the thickness of said side walls, respectively.

17. The module of claim **8** wherein the side walls of said base and lid are at least one-eighth inch thick.

18. The kit of claim **1** wherein each of said cartons comprises a foldable carton of ink-receptive material, said carton adapted to receive and enclose a module for mailing, the sides thereof being dimensioned to con-

form to the configuration defined by the walls of said module.

19. The kit of claim **18** wherein each of said cartons is constructed of light gauge paperboard.

20. The kit of claim **19** wherein each of said cartons comprises top, bottom, and side walls with foldable end closure flaps attached at opposite ends thereof, at least one of said flaps having a tab and at least one of said opposite walls defining a tab-receiving slot so that when said flaps are folded over the carton end the tab may be inserted into the slot to secure said flaps in a folded, closed end position.

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