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Description

The invention relates to the packaging of articles and particularly flowable granules or liquids, or irregularly shaped articles such as but not exclusively frozen carcass meat intended for shipping overseas. The methods of the invention may be incorporated into fully automated packing lines.

The shipping of irregularly shaped articles such as frozen carcasses creates problems in the efficient utilisation of space in shipping containers. Currently there is an excessive amount of manual handling required during loading and unloading procedures particularly during unloading from storage containers at a destination. The articles are stored in containers in loose condition and therefore must be manually removed from the container.

Containerised transport of meat carcasses usually requires special cellular container ships to be used and excludes non-container vessels from carrying meat for export. Also, as container vessels can only be loaded or unloaded at ports with special container terminals and facilities, containerised meat cannot be exported from smaller non-container ports. This may increase transport costs where a meat processing plant is located distant from a container port and the containers must be transported by rail or road to the port. Another disadvantage with containerised transport of meat carcasses is that the loading and unloading of the carcasses individually into the containers is labour intensive.

The invention is also useful in the packaging of flowable granules such as plastic granules, cereals or liquids as well as for baling of waste materials with only minor modification to the construction of the system being required.

Materials of all kinds including industrial, commercial and domestic waste materials are currently handled in a variety of ways including using bags which are relatively expensive if they are to be subject to exposure to liquids and/or compacting of the contents. This is also the case in relation to Intermediate Bulk Containers (IBCs).

This also applies to flowable granule like materials such as plastic, cereals or fertilizer which are normally packed in IBCs.

It is one object of the invention to reduce packaging costs in such a situation.

To reduce packaging costs, it has been proposed in US-A-4546593 to form a container for products by building a stack of the products between leaves upstanding from a base, placing a pre-formed bag made from a shrink-wrap plastic material over the stack and leaves, shrinking the plastic with hot air and then withdrawing the leaves. The specification also suggests forming the bag around the leaves, using a strip of a plastics material. The proposals of US-A-4546593 are quite unsuitable for use with flowable materials, as they cannot be used to form a container which is closed at its lower end. Equally, the wrapping method is not suitable for

use with products which must wholly be protected from the ambient.

The present invention has as a principal objective the provision of a method and apparatus for unitising and packaging or palletising and packaging articles particularly irregularly shaped articles such as frozen animal carcasses for shipment or flowable materials, whereby wastage of space and excessive handling time is minimised and the proven load handling advantages of palletisation can be fully realised whilst providing a fully closed container for the articles.

There is provided according to the present invention a method of forming a wrapped unitized container containing flowable or solid material, comprising the steps of:

- employing an open frame to define an open space having a volume approximating to the required volume of the unitized container;
- applying plastic wrapping film to the open frame to form the container therearound with the container open at one end and closed at the bottom;
- at least partially filling the container through the open one end;
- separating the open frame from the wrapping film after the at least partial filling of the container; and
- closing the open one end of the container to form a totally closed container.

The method may include the additional step of providing a base member within the open frame, at the bottom thereof prior to the at least partial filling of the container. The base member may be left in the container on removal of the open frame. A suitable adhesive may be used to secure the wrapping film to the base.

Conveniently the frame is so arranged as to be removable after said film applying step without disturbing the contained material. Alternatively, the frame members are of telescopic construction enabling them to be retracted after use. In this case, the frame members are preferably retracted into the supporting framework for the pallet base after the wrapping step.

There is also provided according to the present invention apparatus for forming a wrapped unitised container containing flowable or solid material, which apparatus comprises:

- a support;
- a container base;
- an open frame positioned on the support and adapted to receive the container base at one end to assist in the closing of the one end;
- plastic wrapping film means associated with the support to wrapping film under tension around the sides of the open frame and around the base thereby to form a container closed at the one end and open at the other end to permit the at least partial filling of the container;

- removal means for separating the open frame from the at least partially filled container; and
- closure means to close said other end of the container thereby to form a totally closed container containing material.

In one aspect of the invention the open frame includes a substantially rigid top and sides formed of frame members which are able to flex towards each other. Stretch plastic film is wrapped around the frame to form a wall supported by the frame members, the wall being closed at the bottom to form an open topped container. The wrapping (or stretch) film may have a stretch applied thereto of between 10% and 400% dependent upon the type of stretch film used, resulting in substantial tension in the film over the frame. This tension causes the frame members of the sides to flex towards each other. Once the container is full, a lifting force may be applied to the top of the frame which causes the frame to disengage from the container. This disengagement may be assisted by inward flexing of the side frame members. When the container has been formed with the stretch film material, and has been filled and closed, the container may be loaded into a cargo or form container and if desired may be compacted therein.

As the container disengages from the open frame, the tension remaining in the stretch plastic film tightly holds the material in the container in a compacted bale. The upper edges of the container wall contract around the top of the material firmly to hold that in place. Additional stretch plastic material can be applied across the top of the bale if necessary to prevent spillage of material therefrom and to increase the strength of the container.

The stretch film may be applied to the support frame using a known wrapping machine having a rotatable platform on which the frame is securely held either in a normal or an inverted position. The film is applied to the frame from a roll mounted on the machine, the roll having braking means associated therewith so that the film is stretched between the roll and the frame while the frame is rotated.

Conveniently the base supports a pallet within the volume defined by the upstanding framework.

Preferably the film wrapping is carried by spiral wrapping or a combination of spiral wrapping and parallel wrapping. The width of the parallel may be relatively wide say of 1 to 2.5 metre whilst the spiral wrap may be of 1/3 to 1/2 metre.

Meat carcasses packaged by the method and apparatus of this invention may be transported by non-container or dual-function ships. It is envisaged that each complete pack will weigh in the range of 0.3 to 2.0 tonnes and preferably about 0.7 to 1.2 tonnes.

It will be appreciated the invention has application to packaging of various types of irregularly shaped articles such as half carcasses or parts of carcasses such as joints or meat packs and other article types such as

pipes or rods, etc.

The invention will be described in greater detail by having reference to the accompanying sketches (in which Figure 1-4, 11-14 and 19-25 show arrangements not falling within the scope of the appended claims):

Figure 1 is an exploded view of palletising apparatus;

Figure 2 is an assembled view of the loaded palletising apparatus;

Figure 3 is a view showing the wrapping step;

Figure 4 shows the final package after removal of the open frame;

Figure 5 is an alternative embodiment of the invention showing an open frame with telescopic legs;

Figure 6 shows a frame of an embodiment of the present invention;

Figure 7 shows the frame of Figure 6 having stretch plastic film wrapped therearound to form an open-topped container;

Figure 8 is a detail view showing one form of frame member;

Figure 9 shows a frame of a second embodiment with stretch plastic film wrapped therearound forming a container;

Figure 10 shows a first preferred form of frame forming a temporary physical support means, when empty;

Figure 11 shows the stacking of carcasses onto a pallet on the frame of Figure 10;

Figure 12 shows the wrapping of the stack of carcasses contained by the frame of Figure 10;

Figure 13 shows the separation of the frame from the wrapped stack of carcasses;

Figure 14 shows the completed wrapped pack;

Figure 15 shows a second preferred form of frame forming a temporary physical support means;

Figures 16 to 18 sequentially show the wrapping and removal of a stack of carcasses on the frame of Figure 15;

Figures 19 to 21 show the wrapping of a stack of carcasses contained by a third preferred form of frame comprising a temporary physical support means, the stack shown being a 1/2 unit pack which is subsequently joined with another similar 1/2 unit pack to form a single unit load or pack;

Figure 22 shows two 1/2 unit packs each prepared using the frame of Figures 19 to 21 joined to form a single unit load or pack;

Figures 23 to 25 show an alternative way of wrapping of a stack of carcasses contained in the third preferred form of frame of Figures 19 to 21 to form a 1/2 unit pack; and

Figures 26 to 28 show the application of a bag or areas of protective material to a unit pack or load formed in accordance with the invention.

The invention has been described with specific reference to the packaging and palletising of frozen meat

carcasses however it will be appreciated that the invention is applicable to the storage and packing of any articles particularly irregularly shaped articles.

With reference to the Figures the apparatus of the present invention embodies a framework base 10 and open framework 11 releaseably secured to the framework base. The framework base may itself be in the form of a pallet for convenient handling by a forklift vehicle.

The size and dimension of the framework base 10 and the spacing between the upstanding uprights 12 of the open framework is such as to accommodate a standard sized pallet 13 as shown on the framework base 10 within the confines of the open framework uprights 11.

Upon assembly of the pallet 13 onto the frame base 10 and the upstanding framework 11 irregularly shaped articles such as frozen lamb carcasses 14 or the like as shown may be stacked onto the pallet within the confines of the upstanding framework. Once filled the frame base 10 is rotated by a suitable means such as a turntable 15 as shown in Figure 3 and during the turning operation stretch film 16 which is commercially available particularly self adhesive stretch film may be applied to the loaded upstanding framework volume as shown in Figure 3. In this way a tight wrapping of the load is achieved over the vertical distance of the loaded articles. Subsequent to this wrapping step the open framework may be simply removed by lifting from the loaded structure as shown in Figure 4 leaving the articles mounted in tightly wrapped formation on the pallet. The loaded pallet can then be easily manoeuvred by the use of a conventional forklift truck for loading into storage containers for shipment. Preferably the vertical sides of the loaded pallet only are wrapped however if desired the entire load may be wrapped along the horizontal surfaces to more completely wrap the load.

It will be appreciated that the storage and transport of irregularly shaped articles such as beef and sheep carcasses in full or part portions is simply achieved by the invention. When the upstanding framework members are removed from the support frame base the carcasses are left tightly wrapped in the plastic. Any slack left by the removal of the open framework is easily taken up by the resilience of the stretch film which will tighten around the load after the frame has been removed.

Whilst the invention is in one form adapted for use in storage and transport of frozen carcasses, which are by nature irregularly shaped, it will be appreciated that the apparatus and method is applicable to shift goods and articles including packaged goods and fresh produce of all kinds that requires unitization for storage and transport. Furthermore the invention is applicable for overseas transportation of goods as well as in short distance and storage applications the wrapping procedure as devised in reference to Figure 3 using a turntable may be varied as described. For example wrapping may be carried out by a rotating or swinging arm (not shown) upon which is mounted the reel of stretch film to effectively

wrap the stacked articles as described. Of course it may be intended to simply carry out the wrapping manually where small job lots are involved.

With reference to Figure 4 it is envisaged that the construction of the open framework 11 be modified to allow the wrapped pallet load to be simply lifted from the frame base clear of the framework as an alternative to the lifting of the framework clear of the load. In this construction four or more upstanding poles without cross members 12a would achieve the support for the articles.

With reference to Figure 5 the poles 20 forming the open framework are of telescopic construction having their base in the framework base 10. In the projected position the poles form an accessible space into which irregularly shaped articles may be loaded and stacked and after the wrapping step shown in Figure 3 the poles are retracted into the framework base to an out of the way position whereby the loaded pallet 13 can be removed for stacking in a cargo hold or the like.

Referring to the drawings, in Figures 6 and 7 there is illustrated a simple form of the present invention in which the support frame 32 is formed of welded tube members 33 to define an open top 34 and two spaced, depending side frame sections 36 and 37.

The bottoms 38 of the frame sections 36 and 37 are of triangular shape with the apex 39 thereof lowermost. This shape facilitates the wrapping of stretch film about the base of the frame to form a closed container.

As shown in Figure 7, stretch plastic wrapping film 41 is wrapped about the tube members 33. The stretch plastic film has a stretch applied thereto of between 10 and 400% so that the film is under tension between the frame members 33. The film has a width such that a number of circumferential passes needs to be made in order to form the container with several plies of overlapping film.

Because of the tension in the stretch film when applied to the support frame 32, the side frame section 36 and 37 flex inwardly towards each other. This facilitates subsequent removal of the film container from the support frame 32 when the container is filled with material to be packed.

That material may be compacted into the support frame 32, as would be the case with say waste material. For this purpose, the support frame 32 may be held by a secondary frame or support to hold the support frame 32 with the open top 14 uppermost. Compaction may take place using an appropriate compacting weight lowered into the support frame 32, or by using any other suitable compaction means. If desired, an appropriate compaction machine could be provided in which the support frame is mounted after being wrapped with the stretch plastic wrapping film.

Once the container formed by the stretch film has been sufficiently filled, the container is removed from the support frame 32 by applying appropriate forces between the frame and the material within the container whereby, due to the tapering nature of the flexed side frame sections 26 and 37, the container slides easily

from the tube members 33.

Referring to Figure 8, to reduce the frictional contact between the stretch film wrapped around the tube members 3, the tube members 33 may be provided with longitudinally extending ribs 42 which space the stretch film 41 from the tube members 33 and provides a relatively small area of contact thus reducing the friction and making it easier for the filled container to slide from the tube members 33. It will be appreciated that the tube members 33 may be formed of any suitable shape or have any suitable rib or the like attached or formed integral therewith in order to provide minimal surface contact between the stretch film and the support frame members. Alternatively, the tube members 33 may be provided with rollers, endless belts or other means for facilitating the removal of a filled container from the support frame 32.

The stretch film wrapping preferably extends around the frame to a distance of up to about 1 metre above the proposed filling height of the container leaving several upper layers of film above the height of the filling material.

Once the filled container is removed from the support frame 32, the upper layers of stretch film 41 contract around the upper edges of the material within the container. These upper edges can then be gathered and tied or sealed to form a closure for the top of the container. Alternatively stretch film may be applied thereto to prevent spillage of material from the container, or prior to removal of the container from the frame a top sheet may be placed over the surface of the filling material to provide a cover prior to tying or sealing. Alternatively, prior to removal of the container from the frame 32, a top sheet may be fitted over the surface of the material being baled.

Because the stretch plastic wrapping film 41 has "cling" properties whereby the film adheres to itself, the containers so formed are liquid tight. By appropriately forming the bottom of the container when wrapping the film about the support frame 32, the container so formed will be able to be used for flowable material which includes some liquids. Care must be taken, however, that liquids which react with the material of the stretch film are not placed within a container formed in accordance with the present invention.

Referring to Figure 9, there is illustrated a modified form of support frame 32 in which the open top 34 is defined by a circular frame member 44 having downwardly extending side members 46 which are fixed to the circular frame member 44. When the wrapping film 41 is wrapped about the side members 46, they may flex inwardly, as shown in Figure 9, and may form a tapering container. The base 30 is formed of impervious material depending on the nature of the flowable or liquid material to be packaged. The base 30 comprises a disc shaped floor portion 30a and an upstanding cylindrical flange portion 30b. The base 30 should be made of a material which will seal against the wrapped film in use.

Alternatively the support frame 32 and the base 30 may be of any other desired plan view such as a square or rectangular plan view. Such a support frame and base combination would include a square frame member (equivalent to the frame member 44 of Figure 9) and a suitably configured square base 30. Such a frame may only require downwardly extending members at each corner of the square but may include additional downwardly extending side members disposed along each side of the square frame member. The film is then wrapped around the base and frame assembly. The film may be wrapped several times (up to from 5 to 10 times) circumferentially in overlapping layers around the circumference of the base and partially under the base to ensure that the film is securely attached to the base. The wrapping of the film is then continued spirally up the frame. When the combination is filled to the appropriate level by the desired material the frame may be withdrawn and the film extending above the fill level be drawn together and tied or otherwise sealed to retain the contents in the combination.

It will be appreciated that the present invention may be utilized in many different forms and for many different purposes. Thus, the containers so formed in the performance of the present invention may be used for baling materials such as particulate materials, i.e., fertilizer, or fibrous materials such as wool, or for any other baling purpose. Because of the ease in forming the container using the stretch plastic film wrapped about a support frame, the system of the invention may also be used for household waste disposal and in commercial and office situations for waste disposal purposes. Because the cost of stretch plastic film is substantially less than the cost of commercially available waste disposal bags, the present invention has substantial cost benefits for waste disposal. In addition, the waste material is securely baled in such a way that it is easily handled either manually or by a machine.

Referring to Figure 10, the first preferred form of temporary physical support means comprises a frame 51 and a base 52. In the preferred form apparatus the frames 1 comprises as shown four legs 53, two on either side, which are joined at the top of the frame by cross-members 54. The bottom end of each leg 53 fits into a hole 55 in the base 52 but is not otherwise fixed to the base, so that the frame may be separated from the base by lifting. Other arrangements for releasably connecting the legs 53 or the equivalent to the base 52 are possible.

A third cross-member 56 is provided at the top of the frame as shown beneath which, for example, the forks of a forklift may be passed to enable the frame to be lifted from the base. The base of the frame has legs 57 on either side enabling the forks of a forklift to pass under the base to lift the base and frame and carcasses stacked thereon.

For packing carcasses in accordance with the method of the invention, a pallet 13 is placed on the base 10 of the frame. A number of carcasses are then

stacked on the pallet as shown. The number of carcasses (and the size of the same) may be as desired for any application and most preferably the carcasses are stacked one carcass deep. This could alternatively be 1 1/2 or 2 carcasses deep using a frame of appropriate dimensions. A one carcass deep pack may typically be approximately 1.2 metres square and 2 metres high and weigh approximately 0.6 tonne for example. In order to fit an optimum number of carcasses of different sizes into the frame, different stacking patterns may be employed. The width of the frame may be adjustable by providing a series of spaced holes 55 in the base 52 at each corner and a sliding connection at the top of each leg 53 to the cross members 54 or equivalent, or by any other suitable arrangement. An adjustable frame allows specific frame width sizes to be set for different grades of carcass so that the same preferred upright head-to-tail stacking patterns can be used for each grade, thereby improving unit shape and reducing unit width, since necks may protrude when carcasses are stowed on their sides.

Once a stack of carcasses of the desired size within the frame has been formed, the base and frame and stack of carcasses are carried, for example by way of a forklift truck, onto the platten 59 of a spiral wrapping machine 60, and stretch plastic material is wrapped about the stack of carcasses as shown in Figure 12. Spiral wrapping of a sheet of strip material around the stack of carcasses may be employed as shown, or alternatively the stretch film might be large enough that a single width of material the same height as the stack could be used. In that case the film could be stretched in two dimensions, by a WRAPMAN machine for example, to further assist in holding the stack.

During wrapping as shown, the material overwraps the legs 53 of the frame 51. The number of layers, the properties of the plastic wrapping material itself, and the tension to which it is wrapped should be such that a self-supporting unit pack of carcasses is formed, with sufficient inherent strength to withstand the rigours of loading, unloading and transport. In trials it has been found that four layers of wrapping preferably with extra layers of wrapping in regions approximately one third and two thirds the height of the stack is very effective and therefore desirable. Suitable wrapping materials include high tensile stretchwrap film, of which 100% linear low density polyethylene (LLDPE) of about 35 microns thickness has been found particularly effective. Typically wrapping may require 25 revolutions of the wrapping machine.

After wrapping the frame 51 is lifted vertically, so that the legs 53 of the frame slide out from between the stack of carcasses and the wrapping material, as shown in Figure 13. Despite the adhesive nature of the wrapping material and the tension to which it is wrapped the frame may be withdrawn with reasonable ease. A low friction finish (such as food grade polytetrafluoroethylene PTFE-TEFLON) may be applied to the legs 53 of the frame to aid frame removal.

In the first preferred form of frame the two legs 53 on either side may be replaced by a single, wide flat leg, or by any other suitable arrangement of one or more legs on any two or even three sides. Also, instead of lifting the frame from out of the pack, the members 54 and 56 or equivalent bridge across the top of the frame might be removable so that the pack may be lifted out of the frame. In another variation the legs of the frame may have a spigot joint that allows a top segment (e.g. half) of the frame to be lifted out after wrapping and the load then lifted from the remaining bottom part. Other arrangements of temporary support means are possible and the preferred forms shown in the drawings are given by way of example. Also, rather than the first preferred form of frame being lifted by a fork lift, in a purpose built plant it is possible that a lifting means above the frame could be provided for lowering and raising the frame.

A resulting self-supporting pack is shown in Figure 14. The packs each on a platten 58 may readily be handled, by way of lifting slings or fork lifts trucks for example. The packs may be wrapped and stored at a meat processing plant and the degree of insulation and need for refrigeration will depend on the distance to be travelled in covered trucks. When the packs are delivered alongside a ship they may then be lifted into the ships hold and stowed. The packs' regular unit size allows for efficient utilisation of hold space. Because after packing into unitized form, the carcasses are not to be handled individually, handling costs may reduce significantly and loading rates will be increased.

While the pack shown in Figures 11 to 14 has one pallet at the base of the pack, a second pallet could if desired be provided at the top of the stack to assist in providing a flat top surface for stacking other packs of carcasses, or to make the pack effectively "reversible" for each of handling. The pallets employed need not necessarily be conventional wooden pallets but could be lightweight disposable pallets, formed of cardboard tubes for example. Ideally the design of the pallet and the base of the frame should be such as to positively locate the pallet on the base.

Figure 15 shows a second preferred form of frame/temporary physical support means and Figures 16 to 18 show the use of this second frame in accordance with the method of the invention. In this arrangement the pack is stacked horizontally rather than vertically as described with reference to Figures 10 to 4. The second preferred form of support means comprises a frame generally indicated at 61 pivotally supported on a bed 60. The frame comprises spaced longitudinal members 62 and uprights 63 at each end thereof. The frame 60 through the longitudinal members 62 and 64 is pivotally connected to the bed 61 as shown.

In use, a bottom pallet 65 and optionally a top pallet 62 are placed on the frame 60 at either end as shown in Figure 16. A stack of carcasses is formed on the frame between the uprights 63 and pallet(s) and then a number of lengthwise wraps of stretch plastic material are applied as indicated at 67 in Figure 17. The appara-

tus is then operated (for example by hydraulic rams or any suitable mechanical arrangement - not shown) to pivot the frame 60 supporting the stack of carcasses in the direction of arrow X in Figure 17 to the position shown in Figures 18. The stack of carcasses is then removed from the frame and horizontal wrapping applied about the stack as indicated at 68 to form the finished pack in a similar way as described in relation to Figures 10 to 14, for example on a spiral wrapping machine or the like. Also shown in Figures 16 to 18 is an alternative form of lightweight disposable pallet, comprising half cardboard tubes with wooden cross members. Other forms of such lightweight disposable pallets could be employed.

Figures 19 to 21 show the wrapping of a stack of carcasses utilising a third preferred form of frame/physical support means. As shown in Figure 19, the third form of frame comprises a base 70 and fixed uprights 71. The uprights 31 may be a similar height to the legs 53 of the first preferred form of frame of Figures 10 to 14 or, alternatively and as shown in Figures 19 to 21, may be a shorter height for forming a half unit pack as will be described.

A suitable pallet 72 is placed on the base of the frame between the uprights 71 and a stack of carcasses is formed on the pallet. The carcass stack is then wrapped as indicated at 73 in Figure 20, again for example by placing the frame and carcass stack on and using a spiral wrapping machine to form a complete half pack. Again, sufficient wrapping is applied to render the pack self supporting and the pack is then removed as indicated by arrow Y from the frame, for example by lifting with a forklift truck (not shown). Two such half packs may then be stacked one on top of the other as shown in Figure 22 to form a standard unit pack and further wrapping applied as indicated at 74 to hold the two half packs together. Forming completed packs of two half packs as shown may have advantages at the destination where packs of smaller numbers of carcasses may be more convenient to the end user.

Alternatively the third type preferred form frame comprising fixed uprights with an open top may be utilized as shown in Figures 23 to 25, by placing a pallet 72 against the uprights 71 on one side of the frame as shown in Figure 23, stacking the carcasses in position and wrapping the stack as shown in Figure 24 in one or both directions, and tipping the frame and separating the frame from the pack as shown in Figure 25, to form either a half or a whole pack depending on the size of the frame.

In yet a further embodiment of the invention, legs equivalent to the legs 53 of the first preferred form of frame of Figures 10 to 14 or the uprights 71 of the third preferred form of support means of Figures 19 to 21 may be telescoping, so that to withdraw the legs from the completed pack they may be caused to telescope downwardly into the base (for example in Figures 10 to 14), or upwardly into an overhead platten. Such telescoping legs may suitably be pneumatically or hydraulically

operated for example.

When the packs are not in a refrigerated environment, to limit the flow of radiant heat into the load, the emissivity of the wrap may be lowered by co-extruding a highly reflective metalized laminate with the plastic sheet, or including a light-coloured pigment in the plastic composition.

To limit temperature rise from convectional heat flow when the packs are unrefrigerated, and alternatively to further protect the carcasses from physical damage, an envelope of bubble laminate (vacuum formed from plastic film) may be employed, as shown by way of example in Figures 26 to 28. In Figure 26 a bag 90 of bubble laminate has been pulled over the pack 91. The bubble bag 90 could be secured in place by a further wrap of stretch film. Alternatively, the amount of bubble film used may be reduced if adhesive-backed patches 92 are strategically applied to raise points on the sides of the packs and strips used on the corners, as shown in Figures 27 and 28. Appropriate pigmentation (e.g. white) of at least the outer layer of the bubble film is advantageous, especially for the top of the unit load.

For maximum effect, the two methods of insulation (i.e. pigment or metallised stretch film and pigmented bubble film) may be used in combination. The additional cost of such wrapping may be offset by savings if either or both of the stockinet and polybag presently used to cover each carcass during handling and shipping are not used.

As another approach, a more elaborate and removable cover may be used to temporarily enshroud and thermally protect unit loads when exposed to the ambient environment, and once the covered packs are aboard ship their covers may be removed and repeatedly returned for reuse.

Claims

1. A method of forming a wrapped unitized container containing flowable or solid material, comprising the steps of:
 - employing an open frame (32,44) to define an open space having a volume approximating to the required volume of the unitized container;
 - applying plastic wrapping film (16,41) to the open frame (32,44) to form the container therearound with the container open at one end (34) and closed at the bottom;
 - at least partially filling the container through the open one end (34);
 - separating the open frame (32,44) from the wrapping film after the at least partial filling of the container; and
 - closing the open one end (34) of the container to form a totally closed container.
2. A method as claimed in claim 1, wherein stretch plastic wrapping film (16,41) is employed and is

tightly applied to the frame (32,44) in a stretched condition, to form the container therearound.

3. A method as claimed in claim 1, wherein adhesive plastic film is employed and is applied under tension to the frame (32,44) to form the container therearound. 5
4. A method as claimed in any of the preceding claims, wherein the frame (32,44) is non-expandable and defines an open space of the volume of the required unitized container. 10
5. A method as claimed in claim 4, wherein the open frame (32,44) is adapted (38,39) to form the closed bottom of the container as the plastic film is wrapped therearound. 15
6. A method as claimed in any of the preceding claims, wherein the open frame (32,44) is adapted to form a rectangular volume, the open frame providing support for the film at the corners of the volume. 20
7. A method as claimed in any of the preceding claims, which additionally includes the step of providing a base member (13) within the open frame (32,44) at the bottom thereof prior to the at least partial filling of the container, which base member (13) is left within the container on removal of the open frame. 25 30
8. A method as claimed in claim 7, wherein the base member (13) is impervious to the contained material. 35
9. Apparatus for forming a wrapped unitised container containing flowable or solid material, which apparatus comprises: 40
 - a support (10,30);
 - a container base (13);
 - an open frame (12,44) positioned on the support and adapted to receive the container base (13) at one end to assist in the closing of the one end; 45
 - plastic wrapping film means associated with the support to wrapping film (16,41) under tension around the sides of the open frame and around the base thereby to form a container closed at the one end and open at the other end to permit the at least partial filling of the container; 50
 - removal means for separating the open frame (12,44) from the at least partially filled container; and 55
 - closure means to close said other end of the container thereby to form a totally closed container containing material.

Patentansprüche

1. Verfahren zur Ausbildung eines umwickelten, zusammengefaßten Behälters, der fließbares oder festes Material enthält, welches die folgenden Schritte umfaßt:
 - Verwenden eines offenen Rahmens (32,44) zur Bildung eines offenen Raums mit einem Volumen, das annähernd dem erforderlichen Volumen des zusammengefaßten Behälters entspricht;
 - Anbringen von Kunststoff-Einwickelfolie (16,41) am offenen Rahmen (32,44) zur Bildung des Behälters um diesen, wobei der Behälter an einem Ende (34) offen und am Boden geschlossen ist;
 - wenigstens teilweises Füllen des Behälters durch das offene Ende (34);
 - Trennen des offenen Rahmens (32,44) von der Einwickelfolie nach dem mindestens teilweisen Füllen des Behälters; und
 - Verschließen des offenen Endes (34) des Behälters zur Bildung eines vollständig geschlossenen Behälters.
2. Verfahren nach Anspruch 1, bei welchem reckbare Kunststoff-Einwickelfolie (16,41) verwendet und in einem gereckten Zustand dicht auf den Rahmen (32,44) zur Bildung des Behälters um diesen aufgebracht wird.
3. Verfahren nach Anspruch 1, bei welchem klebende Kunststoffolie angewendet und unter Spannung auf den Rahmen (32,44) zur Bildung des Behälters um diesen aufgebracht wird.
4. Verfahren nach einem der vorangehenden Ansprüche, bei welchem der Rahmen (32,44) nicht ausdehnbar ist und einen offenen Raum mit dem für den zusammengefaßten Behälter erforderlichen Volumen bildet.
5. Verfahren nach Anspruch 4, bei welchem der offene Rahmen (32,44) zur Bildung des geschlossenen Bodens des Behälters beim Wickeln der Kunststoffolie um diesen geeignet ist (38,39).
6. Verfahren nach einem der vorangehenden Ansprüche, bei welchem der offene Rahmen (32,44) zur Bildung eines rechteckigen Volumens geeignet ist, wobei der offene Rahmen eine Unterstützung für die Folie an den Ecken des Volumens bildet.
7. Verfahren nach einem der vorangehenden Ansprüche, welches zusätzlich den Schritt umfaßt, daß ein Basisteil (13) innerhalb des offenen Rahmens (32,44) an dessen Boden gebildet wird, bevor der Behälter wenigstens teilweise gefüllt wird, wobei

der Basisteil (13) beim Abnehmen des offenen Rahmens innerhalb des Behälters belassen wird.

8. Verfahren nach Anspruch 7, bei welchem der Basisteil (13) für das enthaltene Material undurchlässig ist.

9. Vorrichtung zur Bildung eines umwickelten zusammengefaßten Behälters, der fließbares oder festes Material enthält, wobei die Vorrichtung aufweist:

- einen Träger (10,30);
- eine Behälterbasis (13);
- einen offenen Rahmen (12,44), der am Träger angeordnet und geeignet ist, die Behälterbasis (13) an einem Ende aufzunehmen, um das Verschließen des einen Endes zu unterstützen;
- mit dem Träger verbundene Kunststoff-Einwickelfolienmittel zum Wickeln von Folie (16,41) unter Spannung rings um die Seiten des offenen Rahmens und rund um die Basis, um dadurch einen Behälter zu bilden, der an einem Ende geschlossen und am anderen Ende offen ist, so daß ein wenigstens teilweises Füllen des Behälters möglich ist;
- Beseitigungseinrichtungen zum Trennen des offenen Rahmens (12,44) von dem wenigstens teilweise gefüllten Behälter; und
- Verschlusseinrichtungen zum Verschließen des anderen Endes des Behälters und dadurch Ausbilden eines Material enthaltenden, vollständig verschlossenen Behälters.

Revendications

1. Procédé pour former un conteneur à unité de charge emballé, contenant un matériau solide ou fluide, comprenant les étapes suivantes:

- utilisation d'un cadre ouvert (32,44) pour définir un espace ouvert dont le volume est approximativement égal au volume requis du conteneur à unité de charge;
- application d'un film d'emballage plastique (16,41) sur le cadre ouvert (32,44) pour former le conteneur autour de ce dernier, le conteneur étant ouvert à une extrémité (34) et fermé dans la partie inférieure;
- remplissage au moins partiel du conteneur par l'extrémité ouverte (34);
- séparation du cadre ouvert (32,44) du film d'emballage après le remplissage au moins partiel du conteneur; et
- fermeture de l'extrémité ouverte (34) du conteneur pour former un conteneur entièrement fermé.

2. Procédé selon la revendication 1, dans lequel un film d'emballage plastique (16,41) à étirer, est

employé et est étroitement appliqué sur le cadre (32,44) alors qu'il est en position étirée, pour former le conteneur autour de ce dernier.

3. Procédé selon la revendication 1, dans lequel un film plastique adhésif est employé et appliqué sous tension sur le cadre (32,44) pour former le conteneur autour de ce dernier.

4. Procédé selon l'une quelconque des revendications précédentes, dans lequel le cadre (32,44) n'est pas extensible et définit un espace ouvert du volume du conteneur à unité de charge requis.

5. Procédé selon la revendication 4, dans lequel le cadre ouvert (32,44) est adapté (38,39) pour former la partie inférieure fermée du conteneur alors que le film plastique est enroulé autour de ce dernier.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel le cadre ouvert (32,44) est adapté pour former un volume rectangulaire, le cadre ouvert fournissant un support pour le film aux angles du volume.

7. Procédé selon l'une quelconque des revendications précédentes, qui comprend en outre l'étape consistant à fournir un élément formant base (13) à l'intérieur du cadre ouvert (32,44) dans la partie inférieure de ce dernier, avant de remplir au moins partiellement le conteneur, lequel élément formant base (13) est laissé à l'intérieur du conteneur lorsque le cadre ouvert est retiré.

8. Procédé selon la revendication 7, dans lequel l'élément formant base (13) est étanche au matériau contenu.

9. Appareil pour former un conteneur à unité de charge emballé contenant un matériau fluide ou solide, lequel appareil comprenant:

- un support (10,30);
- une base de conteneur (13);
- un cadre ouvert (12,44) positionné sur le support et adapté pour recevoir la base du conteneur (13) à une extrémité pour faciliter la fermeture de l'une des extrémités;
- un moyen formant film d'emballage plastique associé au support du film d'emballage (16,41) sous tension autour des côtés du cadre ouvert et autour de la base, formant ainsi un conteneur fermé à une des extrémités et ouvert à l'autre extrémité pour permettre le remplissage au moins partiel du conteneur;
- des moyens de retrait pour séparer le cadre ouvert (12,44) du conteneur au moins partiellement rempli; et
- des moyens de fermeture pour fermer ladite

autre extrémité du conteneur, formant ainsi un conteneur entièrement fermé contenant le matériau.

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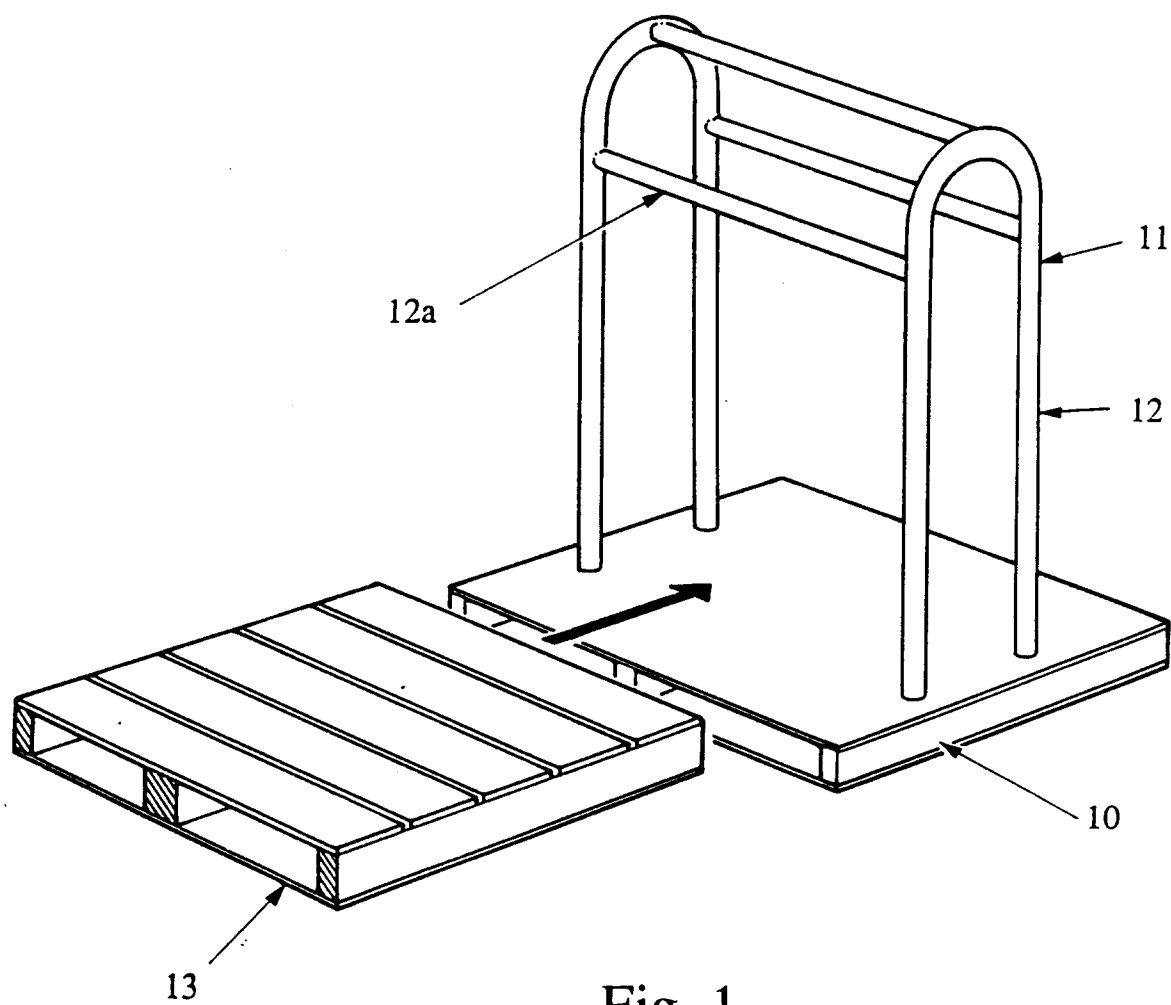


Fig. 1

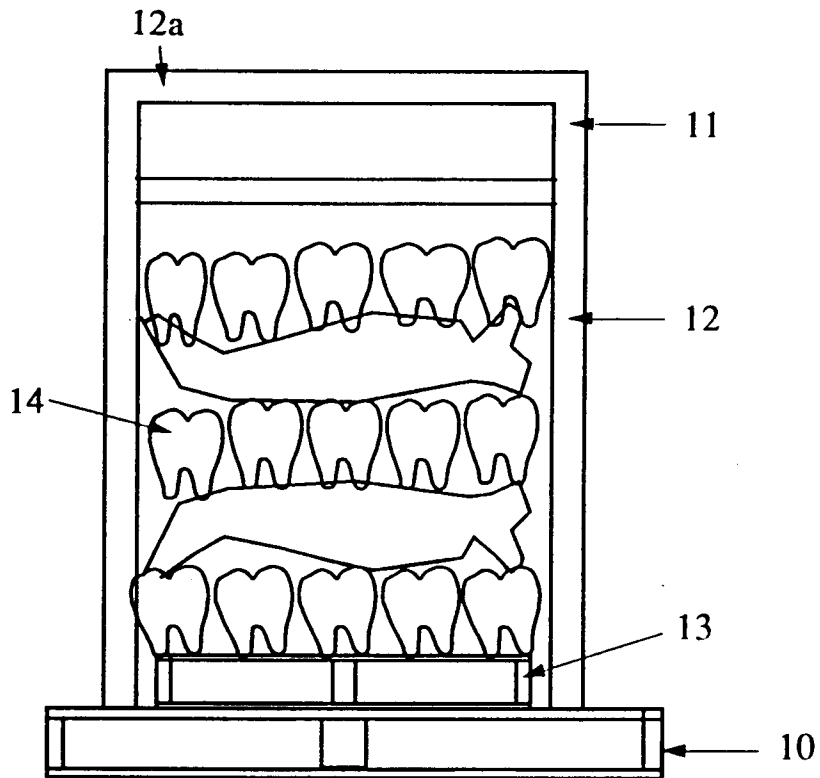


Fig. 2

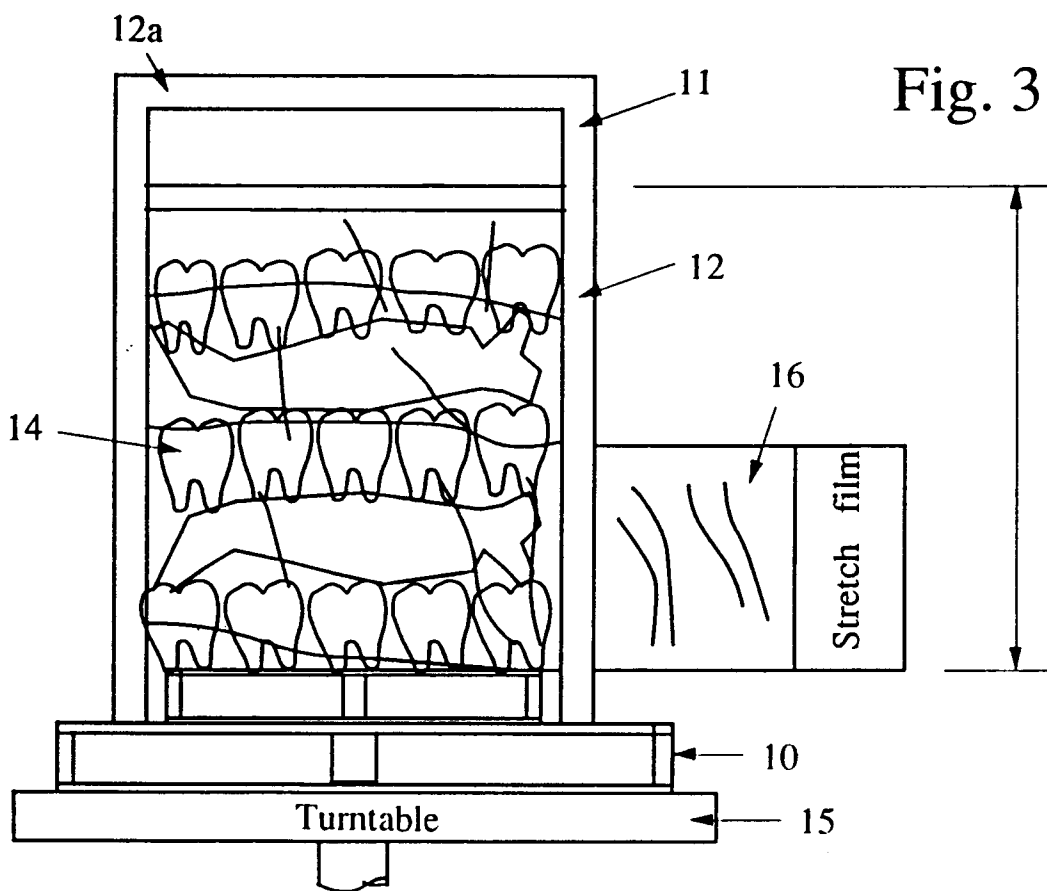


Fig. 3

Fig. 4

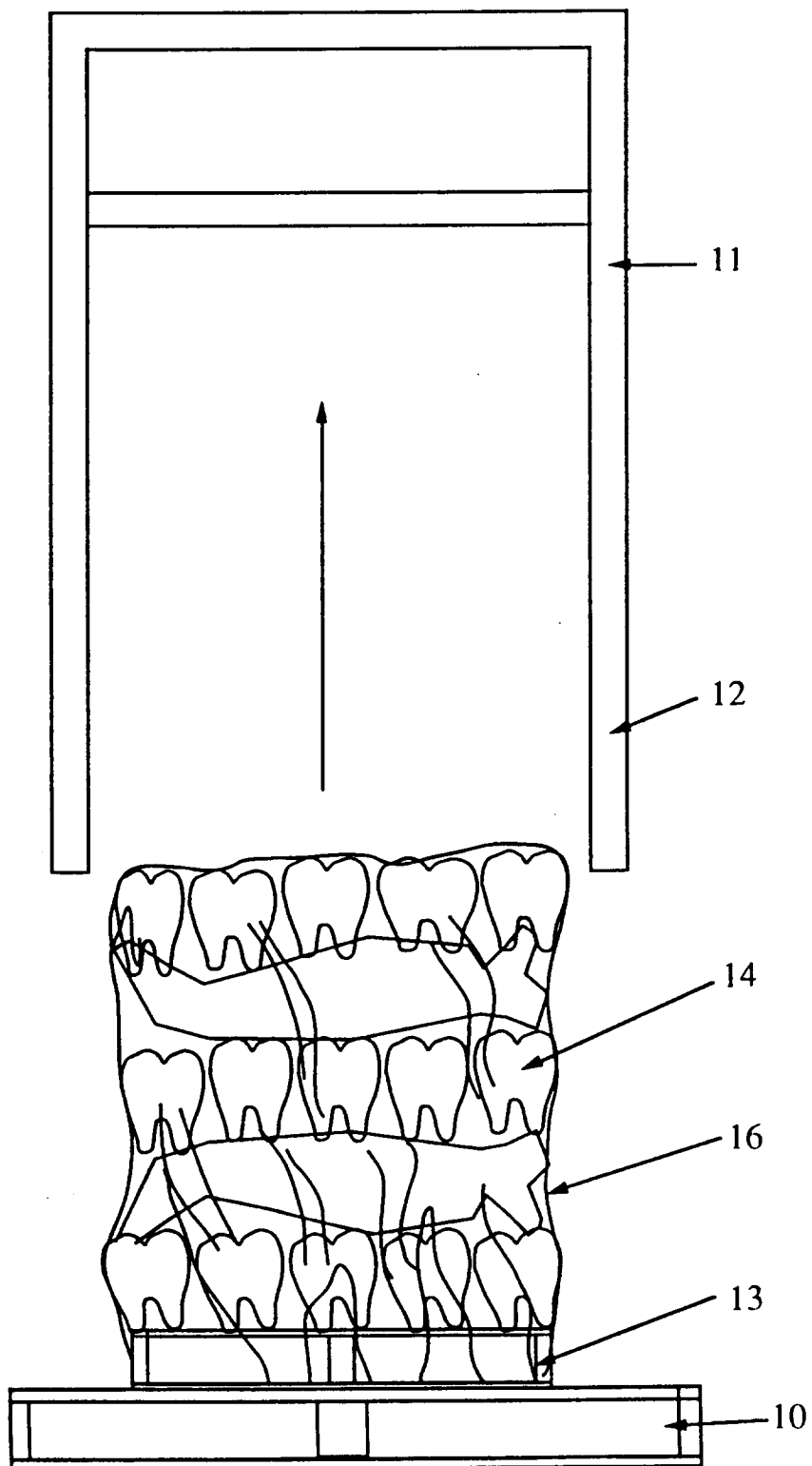
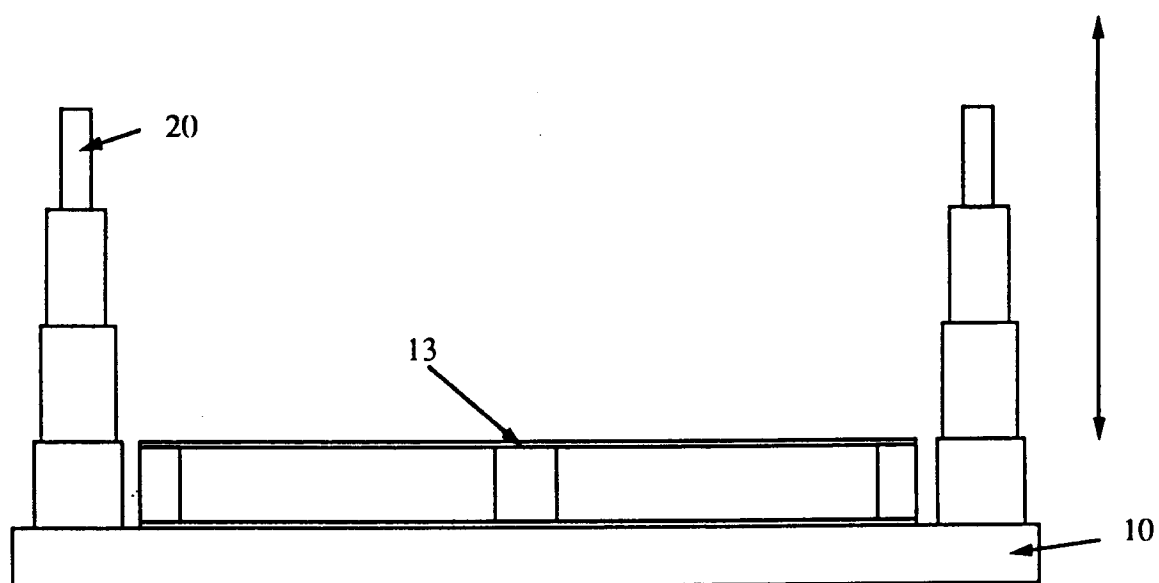


Fig. 5



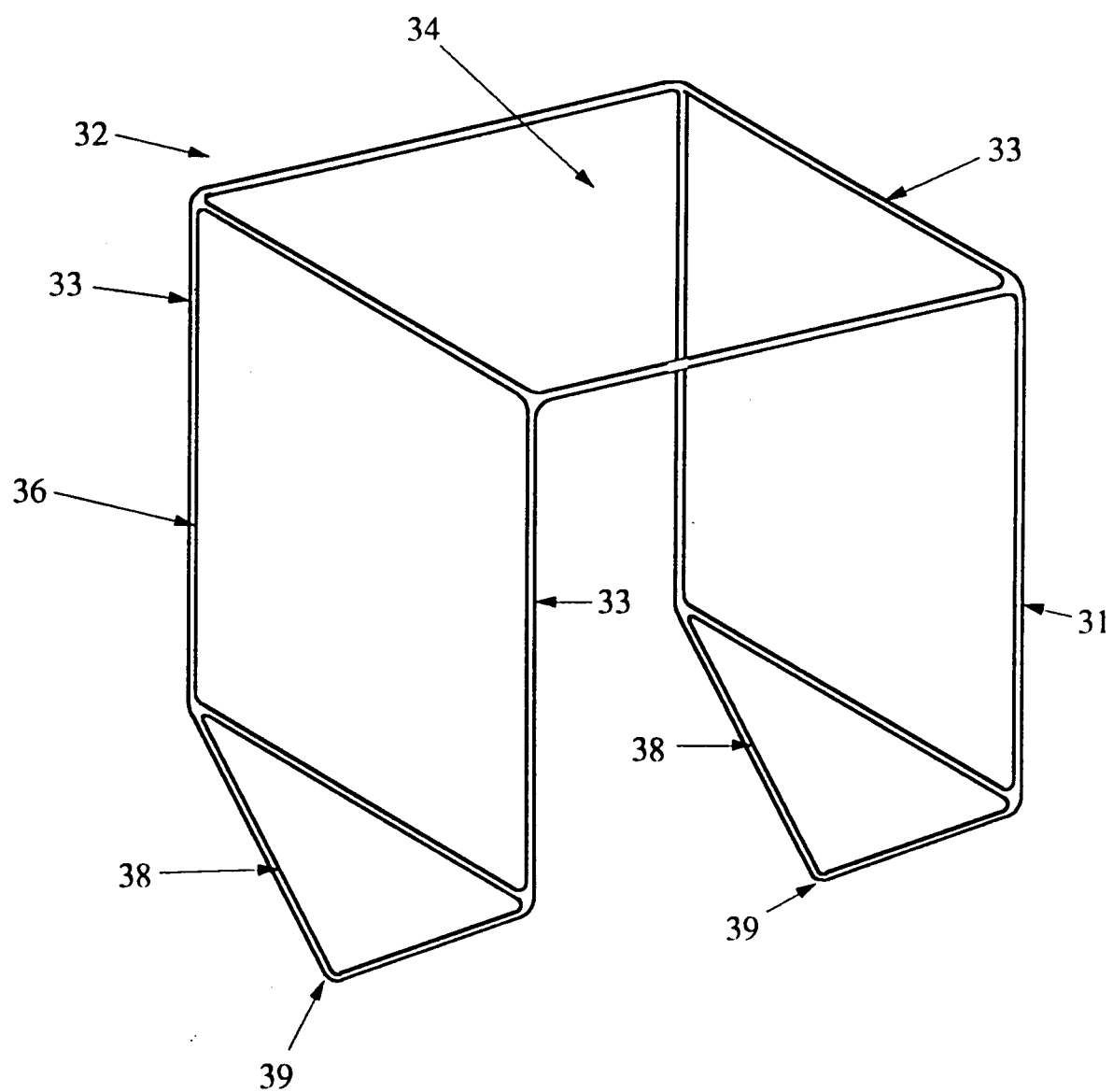


Fig. 6

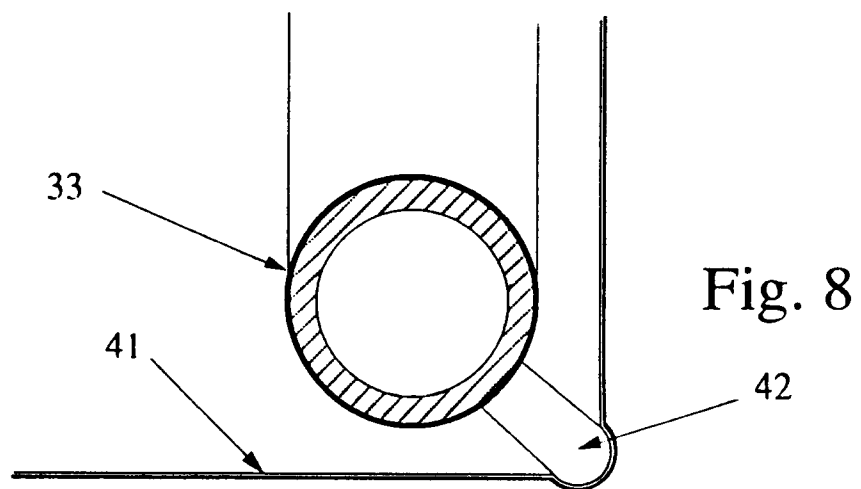
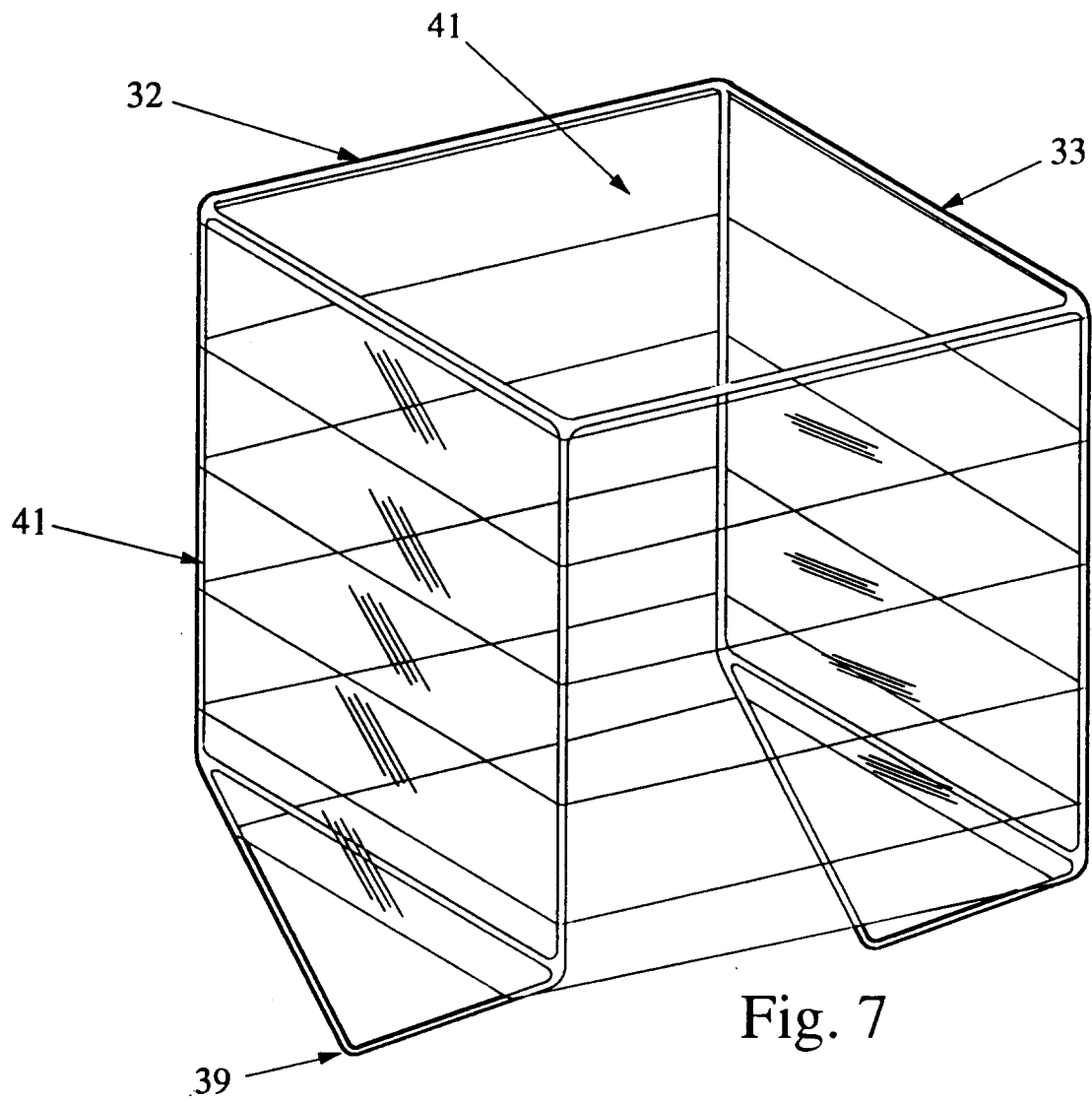
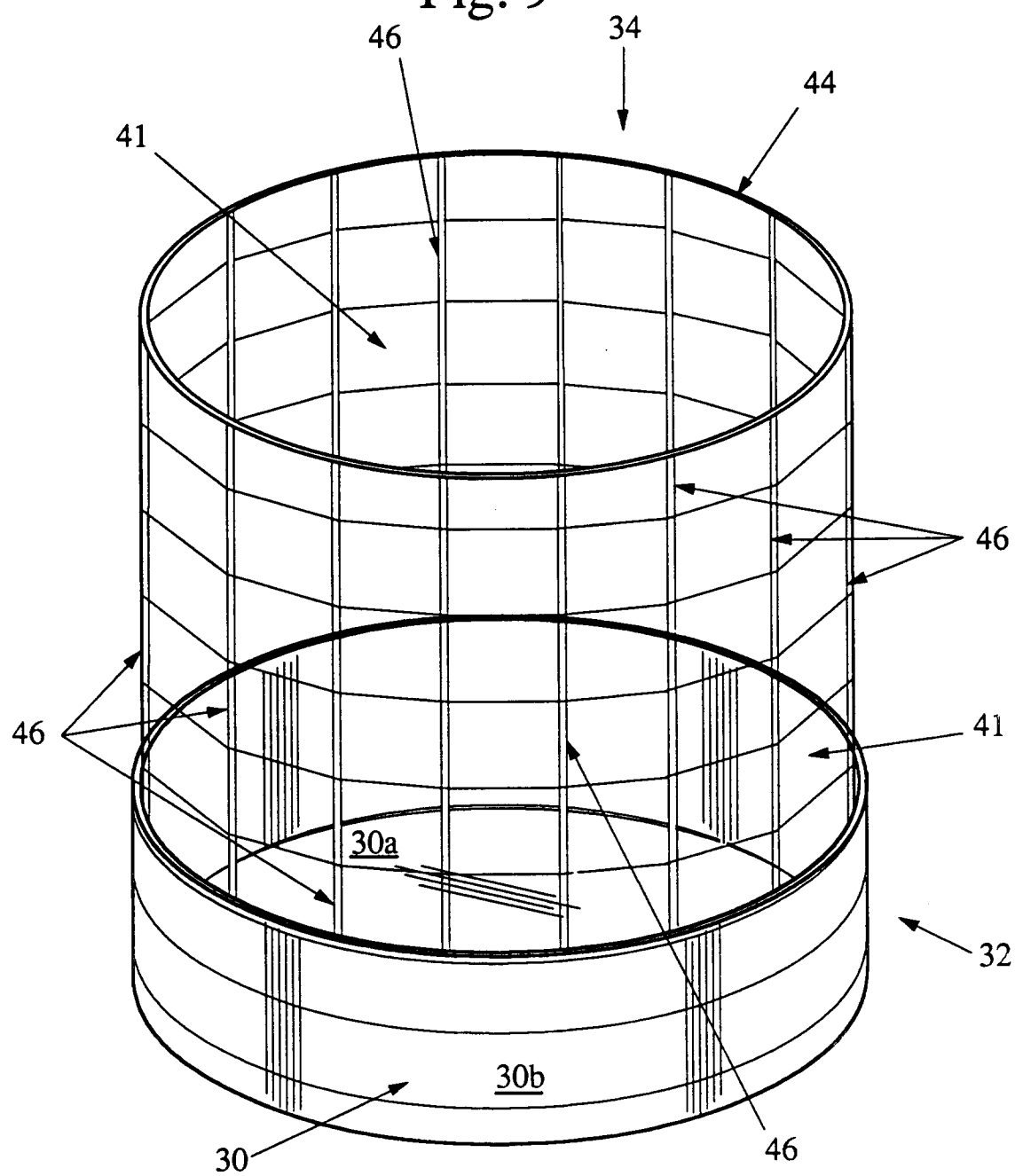


Fig. 9



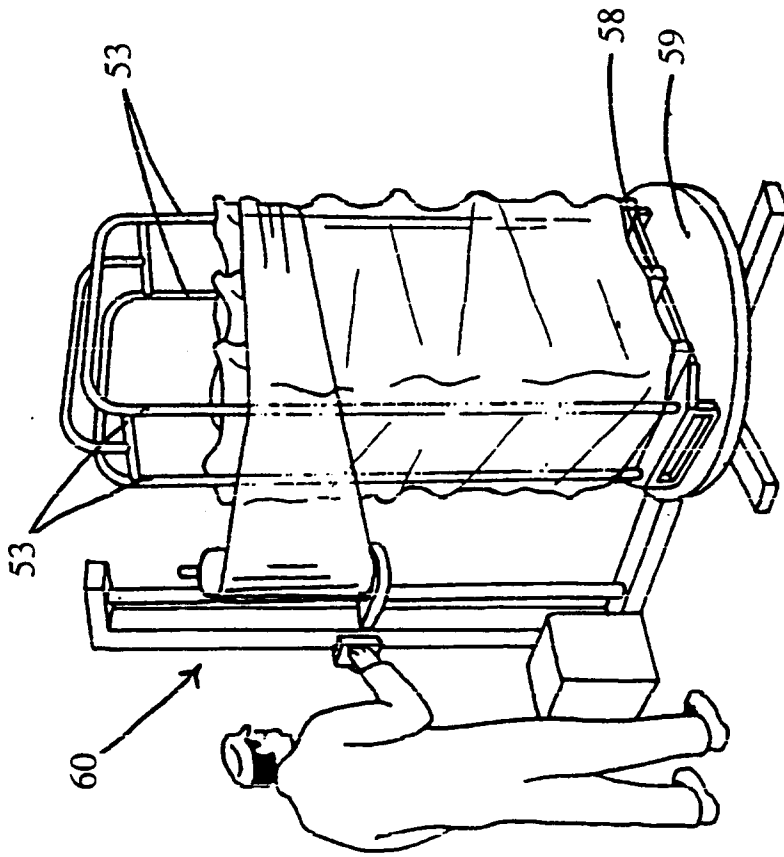


Fig. 11

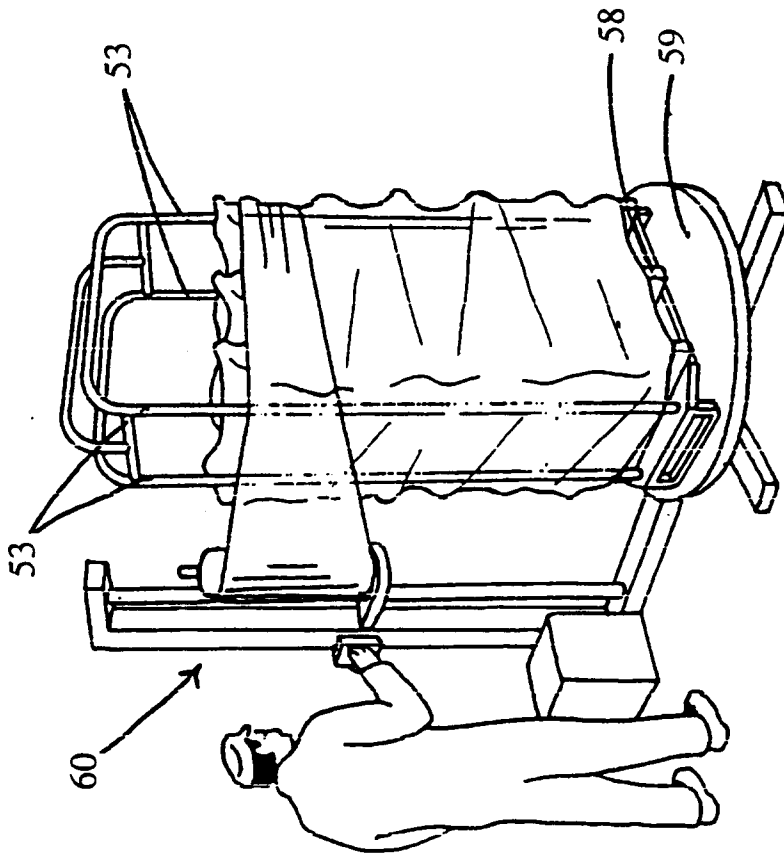
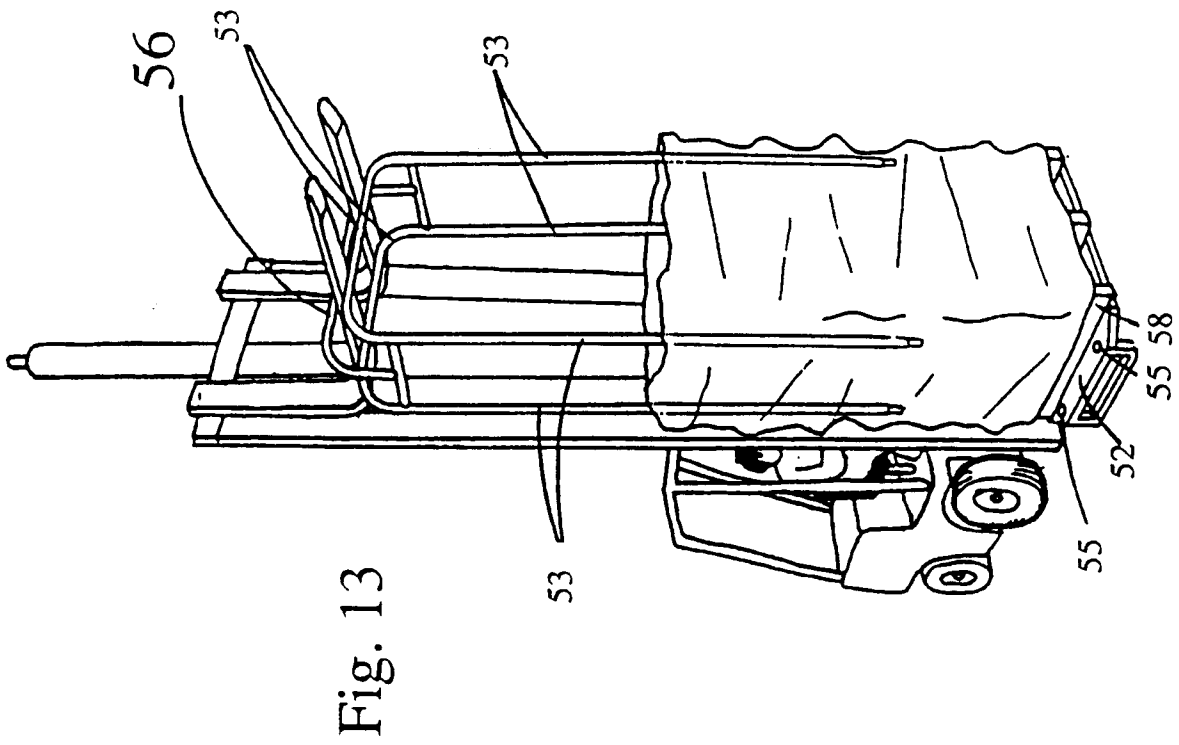
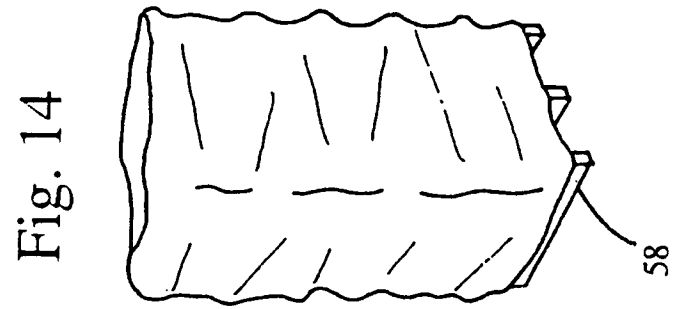
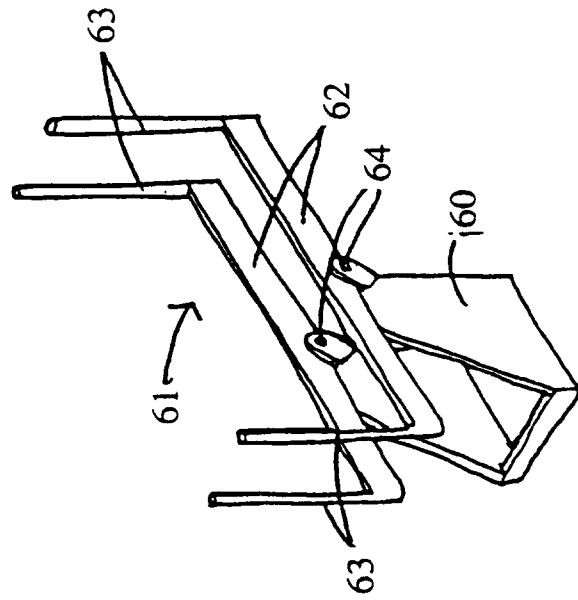
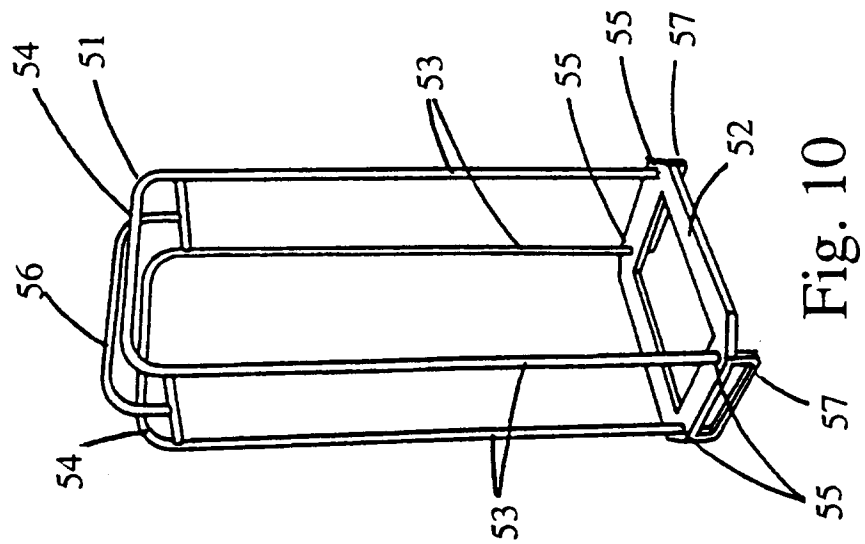


Fig. 12





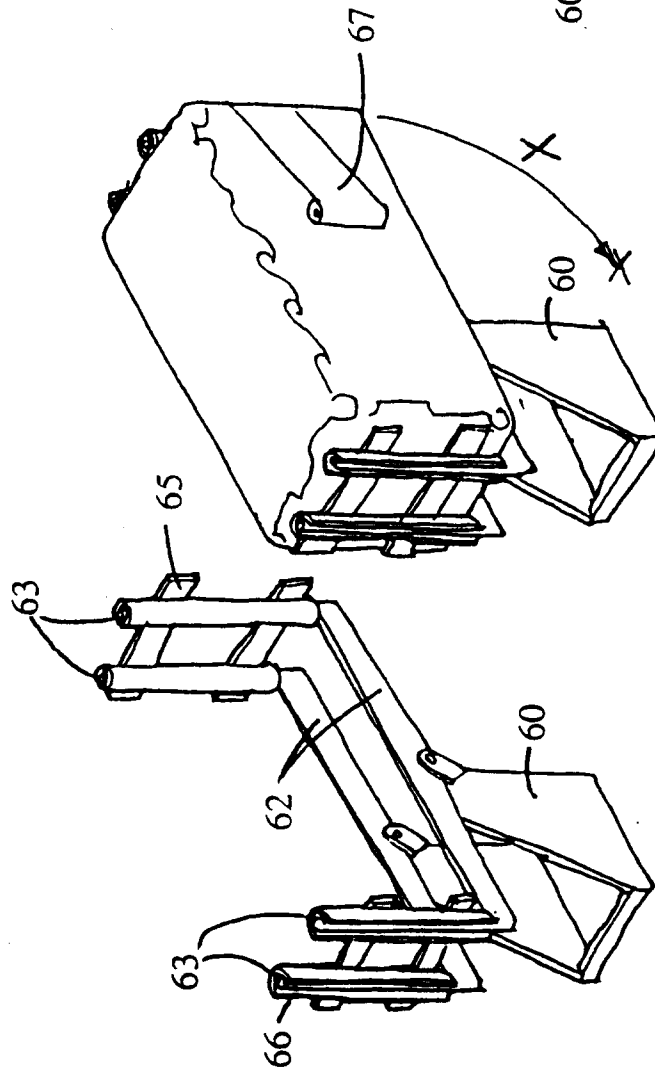


Fig. 16

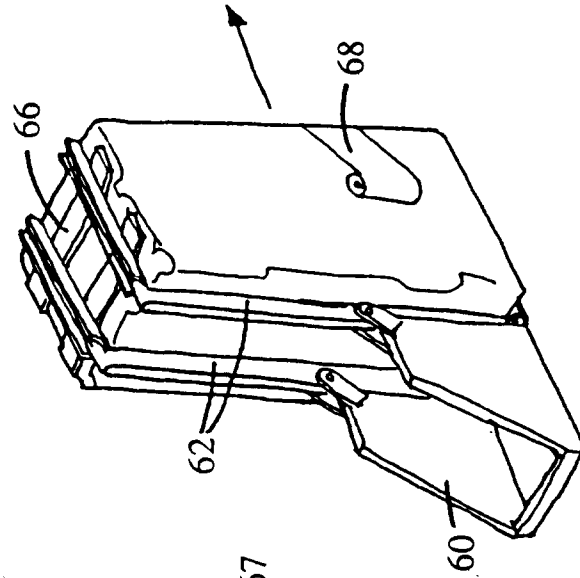


Fig. 17

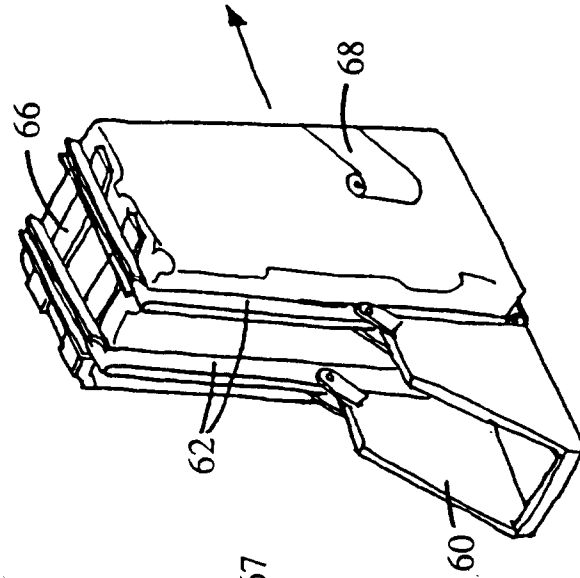


Fig. 18

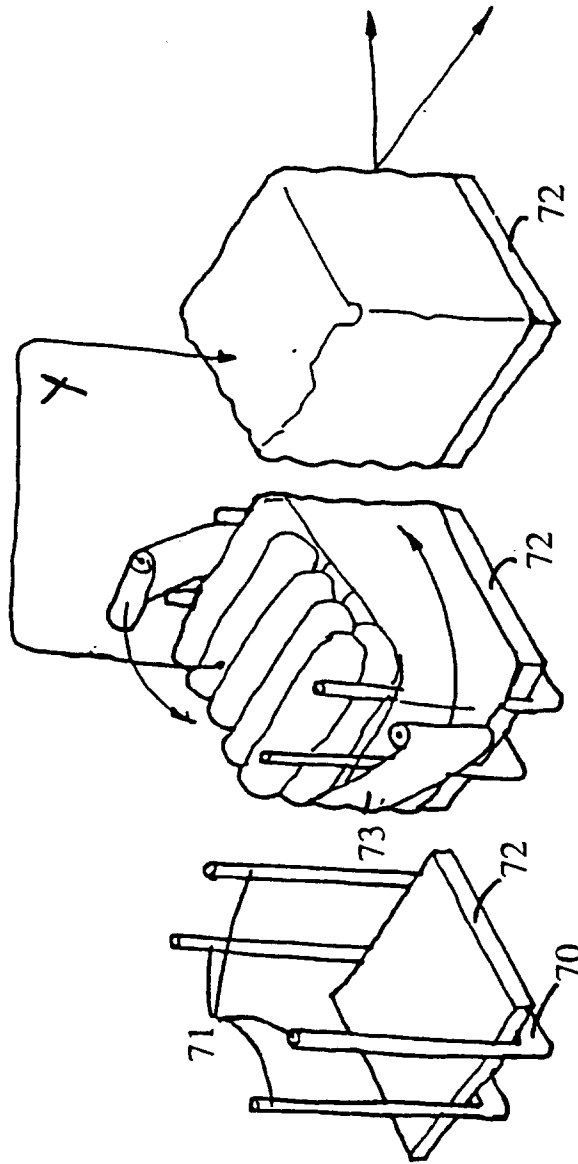


Fig. 19 Fig. 20 Fig. 21

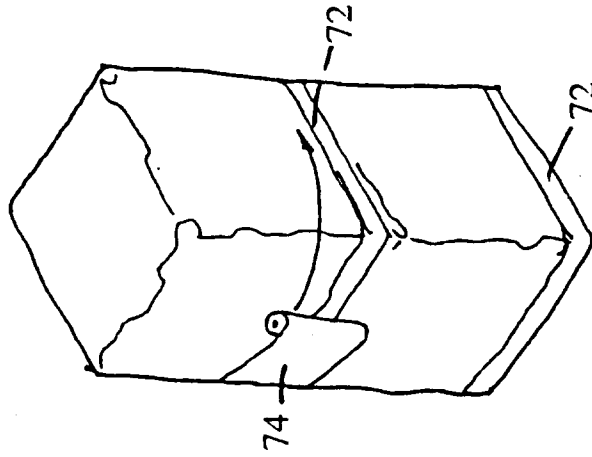


Fig. 22

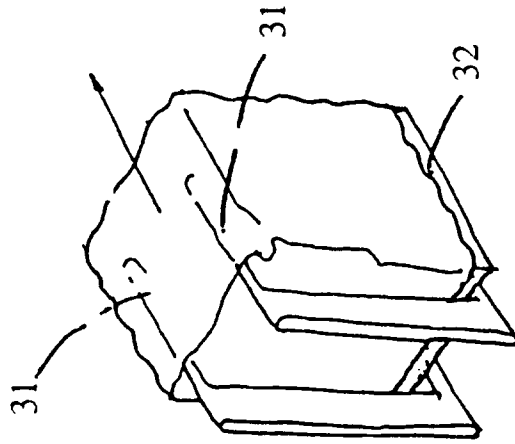


Fig. 23

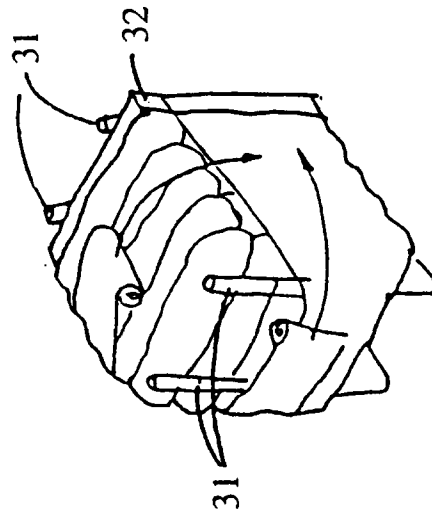


Fig. 24

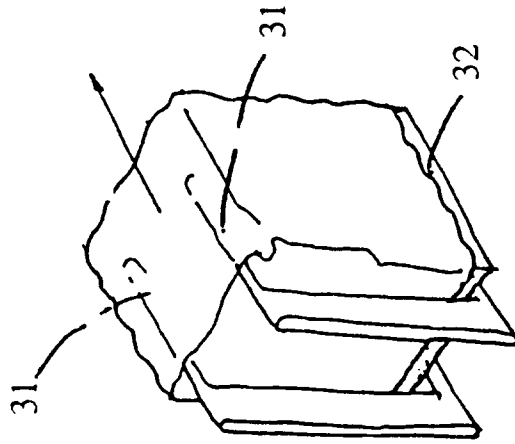


Fig. 25

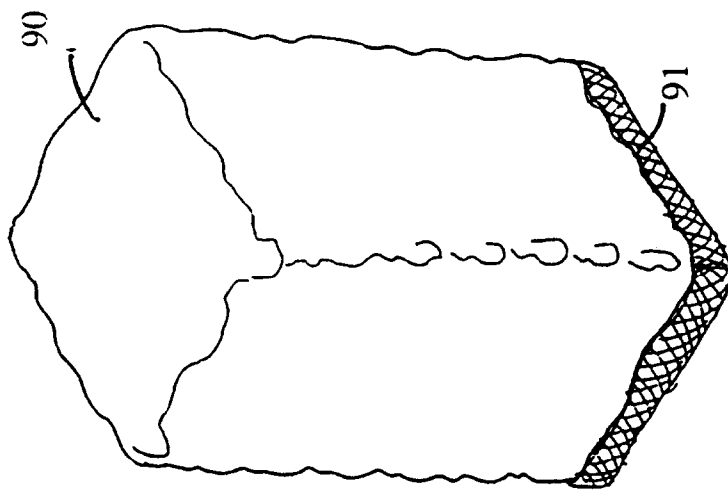


Fig. 26

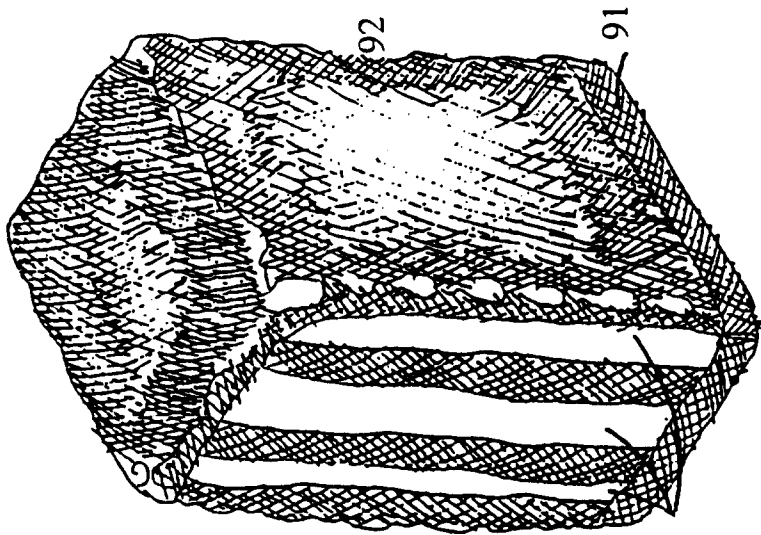


Fig. 27

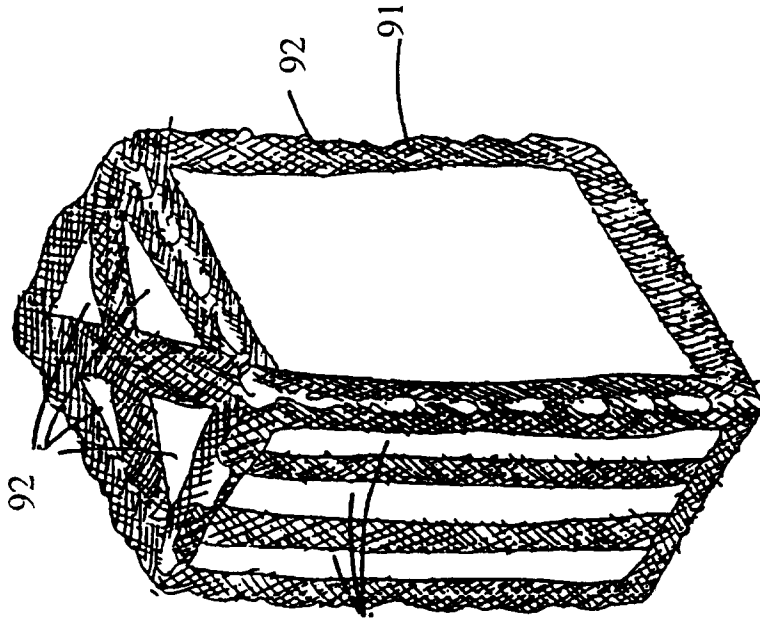


Fig. 28