

592125

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

CONVENTION APPLICATION FOR A STANDARD PATENT

I, JOHN W. VON HOLDT, of 6864 Lexington Lane, Niles, Illinois 60648, United States of America hereby apply for the grant of a standard patent for an invention entitled:

"CONTAINER CONNECTOR SYSTEM"

which is described in the accompanying complete specification.

DETAILS OF BASIC APPLICATION

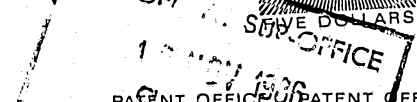
Number of Basic Application:-
831,527

Name of Convention Country in which Basic Application was filed:-
United States of America

Date of Basic application:-
21 February, 1986

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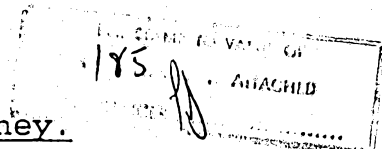


DATED this SEVENTH day of NOVEMBER 1986

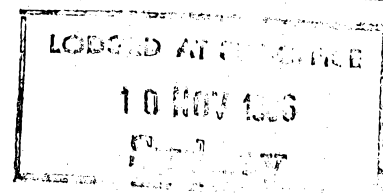
JOHN W. VON HOLDT

By:

M. J. Anderson
Registered Patent Attorney.



TO: THE COMMISSIONER OF PATENTS
AUSTRALIA



SBR/TGK/164 APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 27.10.89

DECLARATION IN SUPPORT OF A
CONVENTION APPLICATION FOR A PATENTIn support of the Convention Application made for a
patent for an invention entitled:

Title of Invention

" CONTAINER CONNECTOR SYSTEM "

Full name(s) and
address(es) of
Declarant(s)I/~~XX~~ JOHN W. VON HOLDT

of 6864 Lexington Lane, Niles, Illinois 60648 U.S.A.

do solemnly and sincerely declare as follows:--

Full name(s) of
Applicant(s)1. I am/~~XXXX~~ the applicant(s) for the patent .

(or, in the case of an application by a body corporate)

~~XX~~~~XX~~
~~XXXXXXXXXXXX~~2. The basic application(s) as defined by Section 141 of the
Act was/~~were~~ made

Basic Country(ies)

in the United States of America

Priority Date(s)

on February 21, 1986

Basic Applicant(s)

by John W. Von Holdt

Full name(s) and
address(es) of
inventor(s)3. I am/~~XXXX~~ the actual inventor(s) of the invention referred
to in the basic application(s)

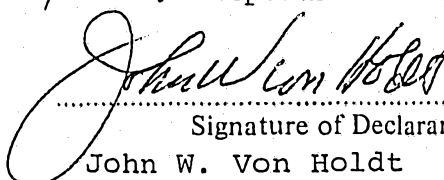
(or where a person other than the inventor is the applicant)

~~XX~~~~XX~~~~XX~~
~~XX~~
~~XX~~
~~XXXXXXXXXXXX~~Set out how Applicant(s)
derive title from actual
inventor(s) e.g. The
Applicant(s) is/are the
assignee(s) of the
invention from the
inventor(s)4. The basic application(s) referred to in paragraph 2 of this
Declaration was/~~were~~ the first application(s) made in a Convention
country in respect of the invention(s) the subject of the application.

Chicago,

Declared at IL. U.S.A. this

4 day of September 1986.



Signature of Declarant(s)

John W. Von Holdt

(12) PATENT ABRIDGMENT (11) Document No. **AU-B-64983/86**
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(54) Title
CONTAINER CONNECTOR SYSTEM

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(56) Prior Art Documents
US 3944074
US 400349
US 4416373

(57) Claim

1. An improved container having a bottom, an upright sidewall and an open top, a vertical axis being defined as passing through said bottom and said top, said container comprising, in combination, a peripheral skirt surrounding the sidewall of said container and having a radially outer skirt wall which is uniformly spaced radially outwardly from said container sidewall around the periphery thereof, a plurality of projections and corresponding recesses formed in alternating arrangement on the outer surface of said skirt wall around the periphery thereof, each said recess having a transverse surface at the top and/or bottom thereof to co-operate with the upper and/or lower end respectively of a corresponding projection of a container interlocked therewith, vertical movement between said containers being thereby restrained, said projections and recesses being sufficiently closely spaced so that said container may be nestled against a like container with their respective projections and recesses interlocked such that said containers are temporarily retained together without relative motion transverse to their vertical axes except for possible rotational motion about their vertical axes.

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FORM 10

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COMPLETE SPECIFICATION

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Complete Specification Lodged:

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Related Art:

This document contains the
amendments made under
Section 49 and is correct for
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Complete Specification for the invention entitled:

"CONTAINER CONNECTOR SYSTEM"

The following statement is a full description of this invention,
including the best method of performing it known to us/me

SBR/TGK/164F

CONTAINER CONNECTOR SYSTEM

Inventor: John W. Von Holdt

ABSTRACT OF THE DISCLOSURE

Containers are provided with externally positioned
5 interlock means to engage the corresponding interlock means
of other identical containers. This causes the containers to
be temporarily retained together without relative motion
transverse to their axes except for possible rotational motion
about their axes. Additionally, relative motion parallel to
10 their axes can be prevented. Significant advantages are
achieved by this when the containers are being processed along
a conveyor system, and when they are stacked in large stacks.

BACKGROUND OF THE INVENTION

Containers such as paint buckets, and many other containers of various types, are processed by automated means, being placed on a conveyor belt, and automatically filled and capped. Such a conveyor operation is relatively critical, requiring very fine adjustment of the various parameters of operation for efficient processing. For example, plastic containers such as paint buckets, when empty, can be easily thrown out of position as they move along a conveyor belt around curves and the like. Some of the paint buckets can ride up on a paint bucket next to it, assuming a tilted configuration which may prevent effective, automated filling of the container, with paint spilling over the edge of the tilted container.

Similarly, filled plastic or metal containers may be stored in warehouses in large stacks. Theoretically there should be no problem with this, even though the containers may be heavy. However, in actual fact, a container may tilt here as well, or the central portion of the stack of containers may sag slightly out of the plane of each level of containers in the stack, resulting in a focusing of the weight of the stack on one or more of the containers found therein. The result of this may be that such a container may rupture, ruining a substantial amount of the inventory and requiring disassembly of the stack of containers and a clean up operation.

In accordance with this invention, a container interlock system is provided to reduce or eliminate the problems described above. The containers of this invention may be carried in connected relation to each other on a conveyor belt, with their

interlocking relationship preventing containers from tilting upwardly or downwardly, or slipping to the side as the conveyor belt proceeds around curves preventing effective processing by automated machinery in the conveyor lines.

5 Similarly, when filled containers of this invention are stacked, their interlocking relationship can maintain them in a precise location without shifting of position, so that the stresses of the load imparted by the stack of containers will not be focused on a single, individual container, resulting in its damage.

10 DESCRIPTION OF THE INVENTION

An improved container having a bottom, an upright sidewall and open top, a vertical axis being defined as passing through said bottom and said top, said container comprising, in combination, a peripheral skirt surrounding the sidewall of said container and having a radially outer skirt wall which is uniformly spaced radially outwardly from said container sidewall around the periphery thereof, a plurality of projections and corresponding recesses formed in alternating arrangement on the outer surface of said skirt wall around the periphery thereof, each said recess having a transverse surface at the top and/or bottom thereof to co-operate with the upper and/or lower end respectively of a corresponding projection of a container interlocked therewith, vertical movement between said containers being thereby restrained, said projections and recesses being sufficiently closely spaced so that said container may be nestled against a like container with their respective projections and recesses interlocked such that said containers are temporarily retained together without relative motion transverse to their vertical axes except for possible rotational motion about their vertical axes.

The effect of this is to cause the containers to be temporarily retained together without relative motion transverse to their vertical axes, except for possible rotational motion about their vertical axes. In other words, when the containers are brought together into side-by-side contact, their respective interlock means can engage. When the interlock means are engaged, the containers cannot move horizontally (i.e., transverse to the container vertical axes) except that it may be possible for the containers to rotate relative to each other. Thus, while moving along a conveyor line, the respective containers, if in engaged, interlocking relation, are held together. Individual containers cannot be jostled out of line or the like.

The interlock means also prevents the temporarily



retained containers from relative motion parallel to their axes, as well as preventing relative motion transverse to their axes. Thus, containers on a conveyor line cannot tilt upwardly one with respect to the other.

5 Also, when a plurality of such identical containers are horizontally grouped together in physical contact at the interlock means to define rows of containers along two different axes transverse to each other (for example, a layer of containers in a large stack thereof) the containers
10 in the center of the array are prevented from sagging due to the weight of containers on top of them in the stack, by the retaining action of their interlock means. Hence, the focusing of compressive force due to the weight of the stack is suppressed. As a result of this, larger and higher stacks of the containers
15 of this invention may be used in warehouses, for more efficient storage of the containers of this invention without crushing damage to the containers in the lower portions of the stacks.

 Strap means may be provided to surround each layer of containers, to hold them together in physical contact to
20 assure continued engagement of their interlock means.

 Specifically, the interlock means may comprise a series of projections and recesses, alternately and circumferentially spaced about the container. The projections and recesses are proportioned and shaped to respectively fit with
25 recesses and projections of typically identical containers positioned in side-by-side relation therewith, to achieve the benefits of this invention as described above.

 The series of projections and recesses may comprise a toothed rack with alternating teeth and spaces, positioned

about the periphery of said container, said spaces being bracketed by walls to prevent teeth positioned in said spaces from moving in a direction generally parallel to the container axis.

Alternatively, the teeth and spaces may be of generally
5 matching, conical shape so that one or more conical teeth of one container fit into conical spaces of the neighbor container for interlocking action.

As a further alternative, the externally positioned interlock means on each container may resemble a ring gear or
10 the like, with teeth of one gear interlock means residing within the spaces between the teeth of another interlock means of another container. However, in this situation there may be no restriction against relative motion of the container in a direction generally parallel to the container axis, but only
15 restriction of sideways motion, transverse to the container axis.

As yet another embodiment, the container of this invention may define a portion of rectangular cross-section with rounded corners. The corners may, in turn, define a
20 circumferentially extending series of projections and recesses for engaging corresponding projections and recesses of another, typically identical container. Such a container may also define on its flat, rectangular sides a plurality of ridges and slots proportioned to fit with corresponding slots and ridges of a
25 typically identical container.

The containers of this invention are generally rigid. However, the term "rigid" does not necessarily mean absolutely inflexible as with a ceramic. Self-supporting plastic containers or thin sheet metal containers which are substantially rigid

are capable for use in accordance with this invention, even though they may have a certain degree of flexibility.

DESCRIPTION OF THE DRAWINGS

5 In the drawings, Fig. 1 is a fragmentary, longitudinal sectional view of a series of plastic buckets made in accordance with this invention, positioned on a conveyor belt, showing how adjacent buckets can be held in interlocking relation for stabilization of the individual buckets as they move along the conveyor line;

10 Fig. 2 is a fragmentary, enlarged vertical sectional view of the bucket of Fig. 1;

Fig. 3 is a fragmentary, enlarged elevational view of a portion of the bucket of Fig. 1 similar to that shown in Fig. 2;

15 Fig. 4 is an enlarged, transverse sectional view taken along line 4-4 of Fig. 3, but also showing the interlocking relation with a corresponding fragment of another similar bucket;

Fig. 5 is a fragmentary, enlarged elevational view similar to Fig. 3 but showing a different embodiment of interlock means;



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Fig. 6 is an enlarged, transverse sectional view taken along line 6-6 of Fig. 5, but also showing the interlocking relation with a corresponding fragment of another, similar bucket;

Fig. 7 is a fragmentary perspective view of a portion of another container or bucket manufactured in accordance with this invention;

Fig. 8 is a sectional view taken along line 8-8 of Fig. 7;

Fig. 9 is a sectional view taken along line 9-9 of Fig. 7;

Fig. 10 is an elevational view of a stack of filled buckets made in accordance with this invention; and

Fig. 11 is a plan view of the stack of Fig. 10.

DESCRIPTION OF SPECIFIC EMBODIMENTS

Referring to Figs. 1 through 3, a plastic container, specifically a bucket, is shown, being made in accordance with this invention. Molded plastic bucket 10 is shown to be of generally conventional design except for the structure of annular skirt 12 which is positioned about the periphery of bucket 10 adjacent its rim 14. As shown, annular skirt 12 carries interlock means 15 for interlocking engagement with one or more adjacent buckets 10a, which may carry skirt 12a and corresponding

interlock means. Fig. 1 typifies a row of buckets in which bucket 10 may be bracketed on both sides by buckets 10a, having skirts 12a, the row of buckets being carries on a conveyor belt 16 of conventional design, for example for a paint bucket filling operation. A continuous technical problem of automated filling of paint buckets is that the empty, large plastic buckets 10, 10a are of light weight, and thus are easily moved by jostling or other small forces. For example, when conveyor belt 16 goes around a curve, the empty bucket 10 can be easily dislodged, or one bucket may tilt up against the other bucket so as to be pushed out of position for proper processing in the paint filling line.

In accordance with this invention, the interlock means 15 is provided to permit temporary interlocking of buckets 10, 10a, to permit then to be retained together while temporarily interlocked, without relative motion transverse to their axes (with the axis of bucket 10 being identified by line 18). However, as conveyor belt 16 rounds the curve, the respective buckets 10, 10a can rotate about their respective axes 18, while not losing their interlocking relationship.

Likewise, in the specific embodiment shown in Figs. 1 through 4, buckets 10, 10a are temporarily retained to prevent relative motion parallel to their axes 18, i.e., vertical motion from the viewpoint of Figs. 1 through 3. Thus, buckets 10, 10a may be retained together on conveyor belt 16 so that they cannot fall out of their desired position for processing through various stations along conveyor belt 16. This is illustrated by the fact that a slight space 20 exists between bucket 10 and conveyor belt 16. The interlocking relationship between bucket 10 and

its adjacent buckets 10a can actually hold bucket 10 away from conveyor belt 16 in a fixed, retained position between buckets 10a, should conveyor belt 16 drop slightly at a point along its path.

Turning to the specific structure of interlock means 15 annular skirt 12 carries about its outer surface an encircling pair of annular serrated bands 22, 24 comprising a series of projections 26 and recesses 28 which are proportioned to fit together in mating relation with corresponding projections and recesses 26, 28 of bucket 10a as shown in Fig. 1.

10 Circumferential walls 30 bracket each recess 28 while each projection 26 of each serrated band or ring 22, 24 projects outwardly from annular circumferential walls 30. The effect of this is for walls 30 to capture the projections 26 of another bucket as they project into recesses 28, to restrict relative motion between buckets, 10, 10a in a direction longitudinal or parallel with respect to axis 18.

Accordingly, buckets 10, 10a can move along conveyor belt 16 with the interlock means 15 in engagement with each other, to hold the respective buckets in a predetermined position of side-by-side contact, so that jostling, bouncing, or the like along conveyor belt 16 will not tend to throw the buckets out of position. At the same time, buckets 10, 10a can
20 rotate about their axes 18 as conveyor belt 16 goes around a curve, without the buckets losing their interlocking relationship.

Referring now to Figs. 5 and 6, an enlarged fragment of a bucket is disclosed which is similar in structure to bucket 10, except for the differences shown therein, and which has advantages of use similar to bucket 10.

In Fig. 5, a portion of bucket 10b adjacent lip 14b is shown in this embodiment. Interlock means 32 are shown which comprises two annular rows of alternating pyramids 34 and recesses 36, in which recesses 36 are proportioned to receive structures of similar shape to pyramids 34. For

clarity of disclosure, each pyramid 34 is shown to be casting a shadow, as if the light were coming from the upper left of the drawing.

Once again, as before, two rows 38, 40 of alternating pyramids and recesses are provided. However, if desired, a single row of projections and recesses either of the type shown in Figs. 1 through 4, or the type shown in Figs. 5 through 6, may be used without a second row. Also, while rows 22, 24, 38 and 40 are typically annular, extending around the entire circumference of their bucket, that is not necessarily a mandatory feature in all embodiments of the buckets of this invention. Instead, short sections of projections and recesses may be used, if desired.

Fig. 6 shows how the projections 34 can project into recesses 42 of an adjacent bucket 10c when the buckets 10b, 10c are, for example, engaging each other while riding on a conveyor belt. Correspondingly, projections 46 of bucket 10c may project into recesses 36 of bucket 10b, to provide the temporary interlocking relation of this invention. Buckets 10b and 10c may, but not necessarily, be of identical shape.

Figs. 7 through 9 disclose another embodiment of the bucket of this invention. Bucket 10d may be of rectangular cross-section, with one corner being shown. Below bucket rim 14d, bucket 10d may have rounded corners 48, with the corners

defining at least one projection 50 and recess 52 for engaging corresponding projections and recesses of another container. All four corners of bucket 10d may be as illustrated in Fig. 7, but the positions of members 50 and 52 should be reversed in the adjacent corners with that relation continuing around the bucket. Thus, the corner 49 opposite to corner 48 has members 50 and 52 in the position shown, while in the two adjacent corners 51 of the bucket the positions of members 50 and 52 are reversed.

In addition, the flat sides 54 of rectangular bucket 10d may carry ridges 56 and slots 58 which are proportioned to fit with corresponding slots and ridges of another container. It could be seen that on flat, rectangular side 60, around the corner from side 54, the positions of slots 58 and ridges 56 may be reversed. This relationship of alternating reversal of members 56 and 58 continues on around the other bucket sides.

Thus, the bucket of Fig. 7 can enter into engaged relation with another bucket of identical design, since the alternating positional relationship of projections 50 and recesses 52, and slots 58 and ridges 56, continues on around the other sides of bucket 10d. By this design, a row of buckets 10d can be placed in interlocking relation, and yet they can rotate on a conveyor belt without losing their interlocking relationship with the adjoining buckets.

Referring to Figs. 10 and 11, a stack of containers or buckets 10 is disclosed, with containers 10 being horizontally grouped together in physical contact at their respective interlock means 15 to define rows of containers along two different axes transverse to each other i.e., axes 62 and 63. Buckets 10 are

locked in their interlocking relationship through interlock means 15, the details of which are shown in Figs. 2 through 4, or alternatively in Figs. 5 through 7.

5 A strap 64 surrounds each group of containers in a single layer of stacked containers, completely surrounding the enclosed group and holding them together in said physical contact which results in the interlocked relation. Containers 10 of course carry lids 66 to permit the stacking as shown.

As the result of this, since each individual 10 horizontal layer 68, 70, 72 of containers is retained in interlocking relation relative to each other, to prevent horizontal motion and preferably also vertical motion relative one to the other, the stack of containers can be piled higher than would be otherwise safe and appropriate, since the individual 15 containers are locked together in their respective layers and cannot move relative one to another. Accordingly, chances are greatly reduced that a container may be inadvertantly moved so as to be subjected to an excess, focused, compressive force which might result in rupture. Since the containers are all 20 held together in relative positional fixation, the compressive force created by the upper stacked containers against the lower ones can be spread out to be borne equally by each individual container in a lower level of the stack.

The above has been offered for illustrative purposes 25 only, and is not intended to limit the scope of the invention of this application, which is as defined in the claims.

The claims defining the invention are as follows:

1. An improved container having a bottom, an upright sidewall and an open top, a vertical axis being defined as passing through said bottom and said top, said container comprising, in combination, a peripheral skirt surrounding the sidewall of said container and having a radially outer skirt wall which is uniformly spaced radially outwardly from said container sidewall around the periphery thereof, a plurality of projections and corresponding recesses formed in alternating arrangement on the outer surface of said skirt wall around the periphery thereof, each said recess having a transverse surface at the top and/or bottom thereof to co-operate with the upper and/or lower end respectively of a corresponding projection of a container interlocked therewith, vertical movement between said containers being thereby restrained, said projections and recesses being sufficiently closely spaced so that said container may be nestled against a like container with their respective projections and recesses interlocked such that said containers are temporarily retained together without relative motion transverse to their vertical axes except for possible rotational motion about their vertical axes.

2. A container as claimed in claim 1, wherein said projections and recesses are of generally matching conical shape.

3. A container as claimed in claim 1 or claim 2 in which the peripheral skirt is located adjacent the open top of the container.

4. A container as claimed in any one of the preceding claims wherein the container is of generally rectangular cross section with rounded corners, the peripheral skirt at each corner having at least one projection and recess for engaging corresponding projections and recesses of another container.

5. A container as claimed in claim 4 wherein the projections and recesses on the rectilinear sides of the skirt comprise a plurality of ridges and slots proportioned to fit with corresponding slots and ridges of another container.

6. A container as claimed in any one of the preceding claims in contact with a plurality of identical containers horizontally grouped together in physical contact by means of said corresponding projections and recesses and defining rows of containers along two different axes



transverse to each other, and strap means surrounding said group of containers and holding them together in physical contact.

7. The group of containers of claim 6 constituting a common layer containers in a stack of containers, whereby improved weight distribution is provided in the stack reducing the probability of excess focused weight collapsing a container.

8. A container as herein described with reference to figures 1-4; 5-6; or 7-9.

DATED this NINETEENTH day of OCTOBER 1989

John W Von Holdt

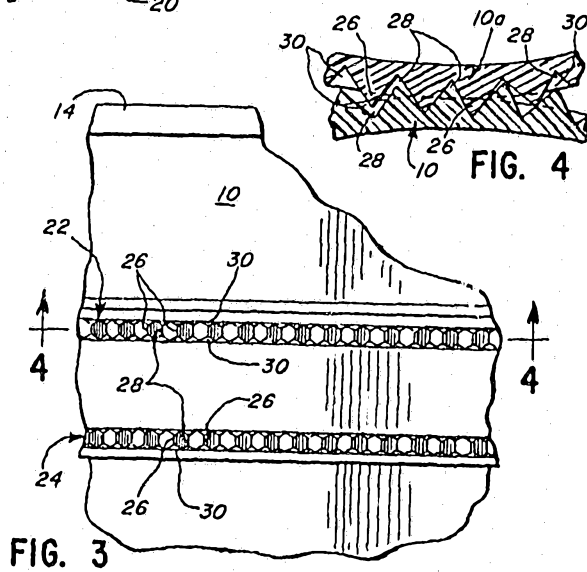
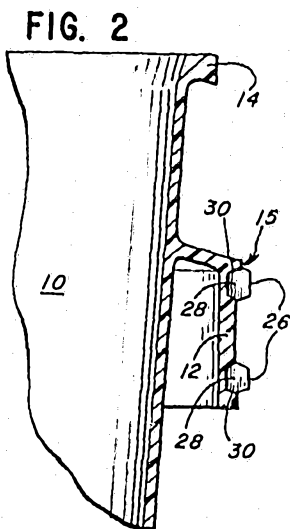
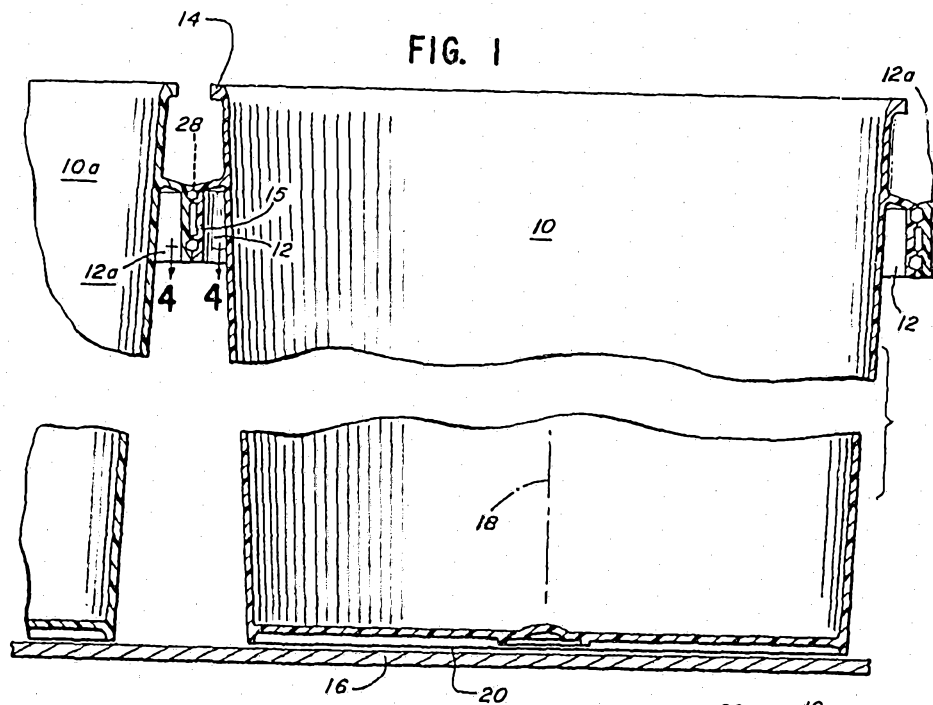
Patent Attorneys for the Applicant

SPRUSON & FERGUSON



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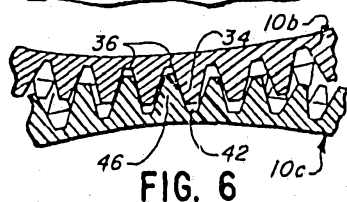
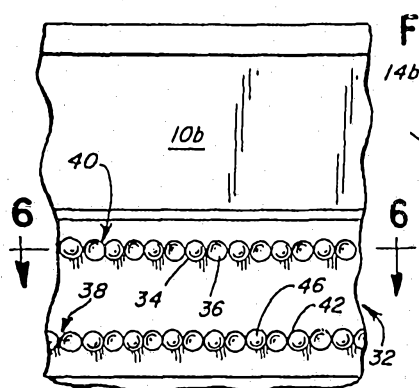


FIG. 5

FIG. 7

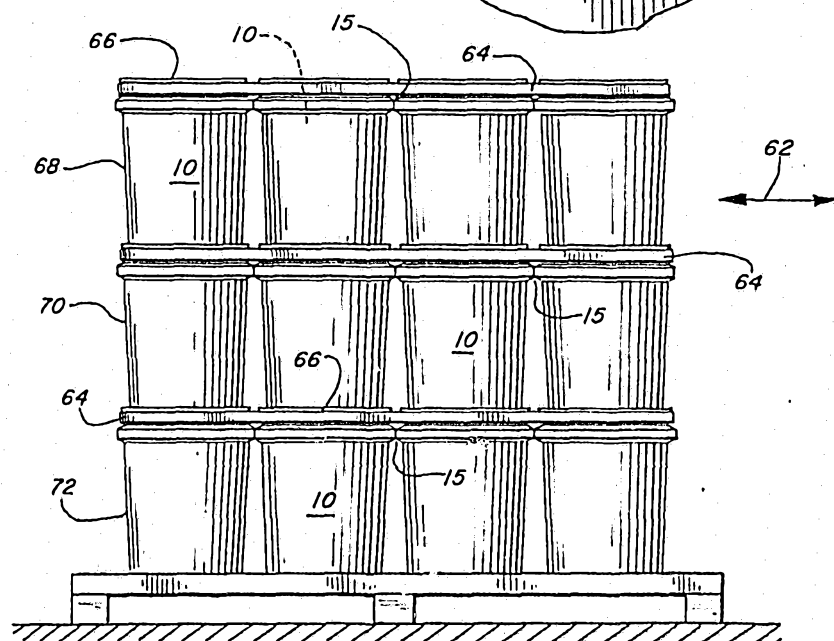
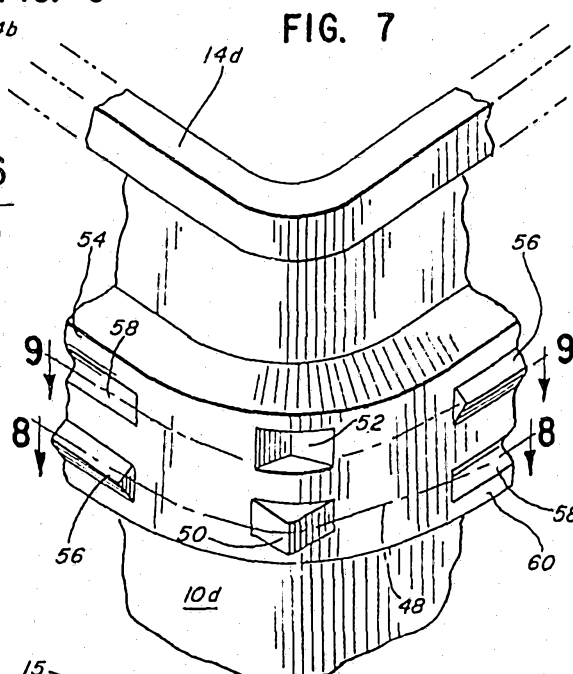


FIG. 10

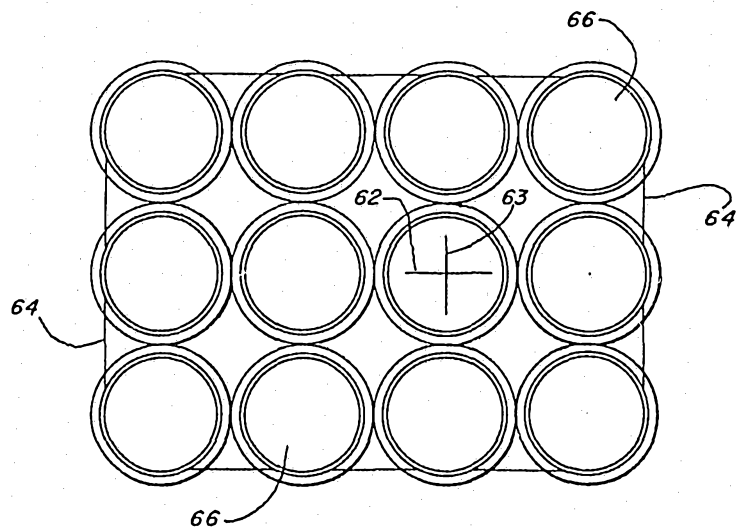
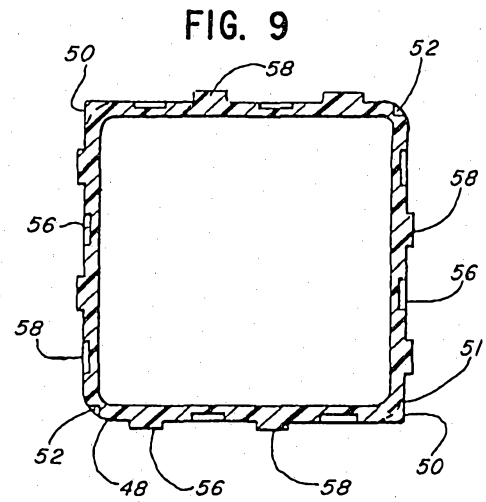
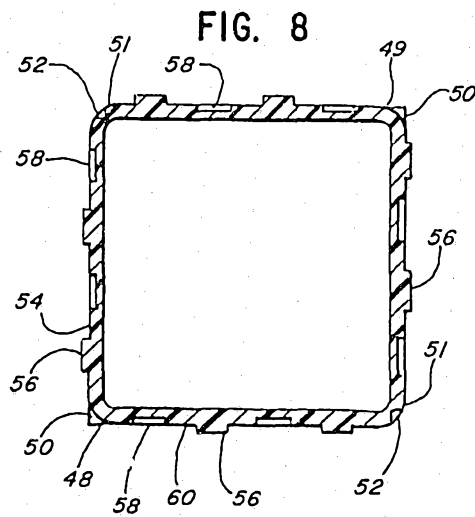


FIG. 11