

[54] **LIGHTWEIGHT CONTAINER MEANS**[76] Inventor: **Winford Newton McLeod**, 116 15th Pl., Manhattan Beach, Calif. 90266[22] Filed: **Oct. 12, 1971**[21] Appl. No.: **188,353**[52] U.S. Cl. **206/16 R**, 206/46 FC, 224/45 S, 280/11.37 K[51] Int. Cl. **B65d 85/54**

[58] Field of Search 150/52 R, 52 F, 52 G; 190/28, 49; 206/16 R, 46 AM, 46 FR, 46 FC, DIG. 15; 220/4 B, 4 E, 9 F; 224/5 Z, 45 S; 280/11.37 A, 11.37 C, 11.37 K; 292/175, 302, DIG. 48

[56]

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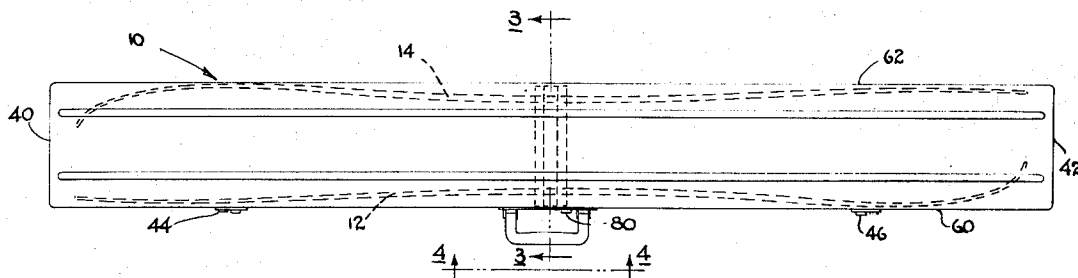
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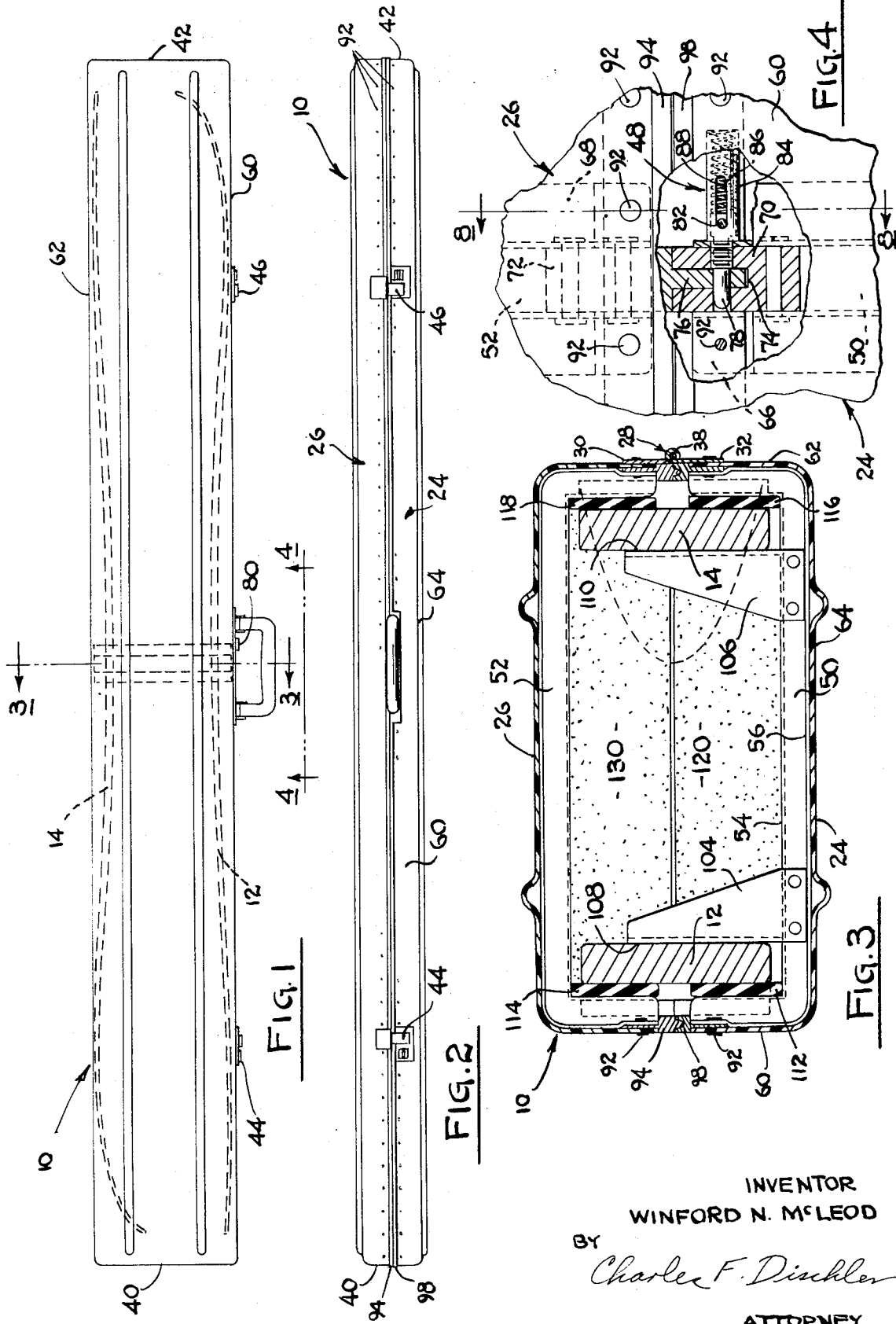
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[57]

ABSTRACT

A rigid elongate container for shipping and transporting equipment of such expensive and specialized nature as skis, together with articles and apparel typically associated with skiing, including ski boots, goggles, gloves, heavy jacket, and the like. Maximum efficiency in use of space and in strength-to-weight ratio are achieved by using the contained skis as part of the rigidizing system for the container.

8 Claims, 8 Drawing Figures



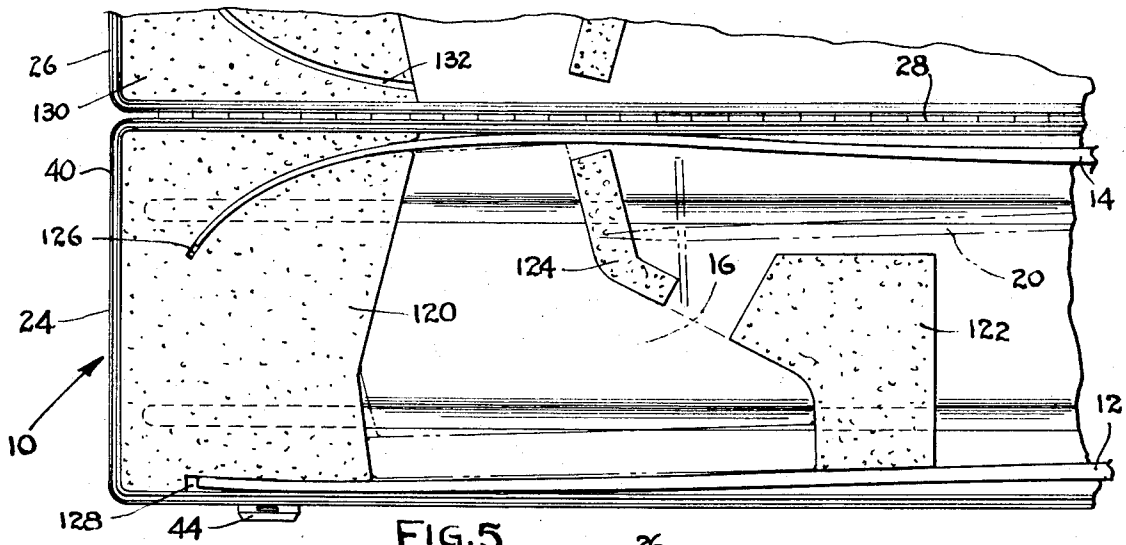


FIG. 5

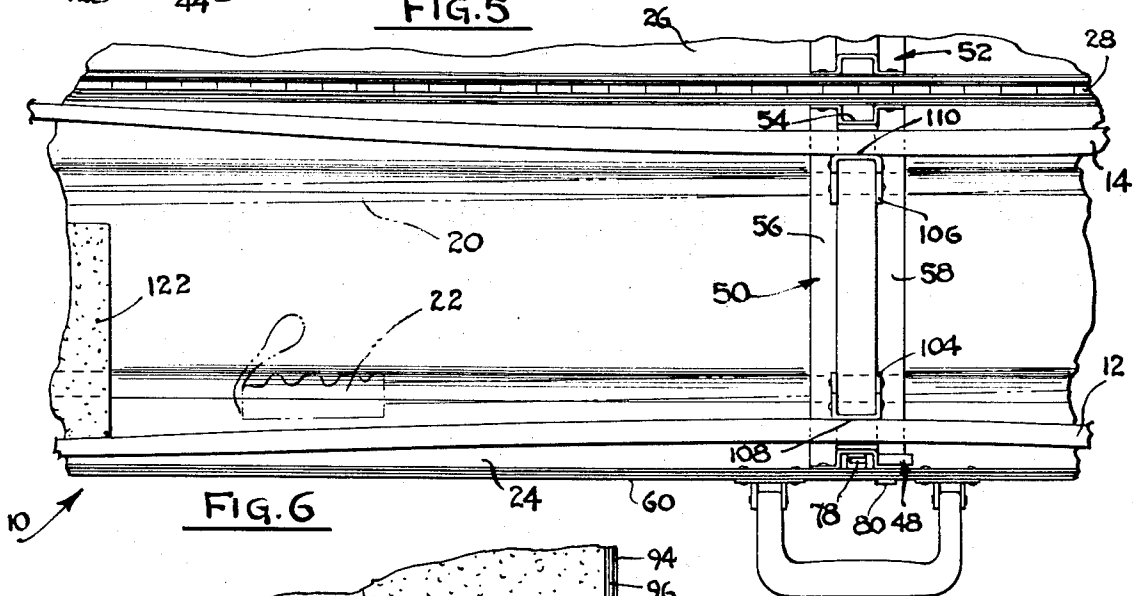


FIG. 6

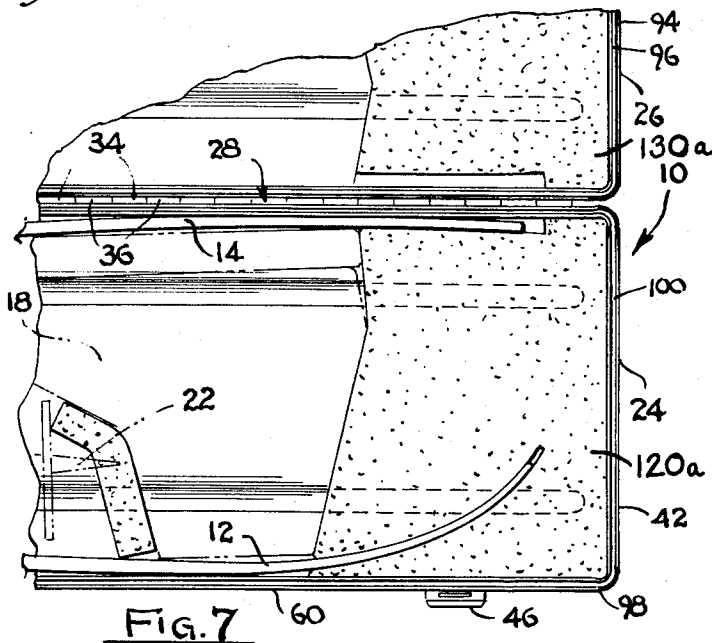


FIG. 7

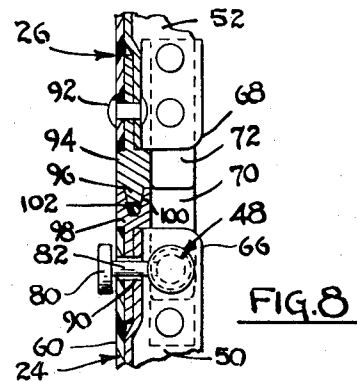


FIG. 8

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LIGHTWEIGHT CONTAINER MEANS

BACKGROUND OF THE INVENTION

Skiers, especially those involved in international competition, are familiar with certain transoceanic travel problems unique to this sport, the greatest of which is the safe and reliable shipment of their skis at a reasonable cost to the individual owner. It is usual for the skis to accompany the traveler on the same commercial airplane, such articles being checked through the counter in the same manner as luggage and carried in the luggage compartment of the airplane.

Due to their great length relative to their small cross-sectional profile, skis are particularly vulnerable to damage if loaded in directions or places thereon other than the loading associated with actual use of the same in skiing. Thus, for example, a ski typically has its greatest thickness at the location of the boot attachment device approximately midway between the opposite ends thereof. From this localized area of maximum thickness, the ski tapers in thickness both forward to the curved tip and aft to the terminal transverse edge. In use, half the weight of the skier, as well as any other loading effect, is transferred into each ski at the location where the heavy ski boot attaches to the area of maximum thickness. This centralized load is distributed partly through the remaining length of the ski both forwardly and aft of the boot location. The vertical unit stress is naturally highest where the boot attaches, and diminishes incrementally fore and aft, following a distribution pattern generally coinciding with the thickness variation of the ski. Relatively little vertical stress is associated with the curved portion proximate the forward tip of the ski, this portion functioning mainly to guide the movement direction and longitudinal attitude of the ski relative to the snow covered surface over which it moves.

If subjected to high localized stress such as a concentrated beam load applied anywhere along the thin fore or aft portions of a ski, such as by the cumulative weight of other luggage pieces in the crowded compartment of an aircraft luggage hold, the ski will suffer irreparable damage through cracking or complete breakage. This costly occurrence accounts for many of the numerous advertisements involving offers to buy or sell one ski in sporting publications or newspapers.

When a skier checks into a commercial airline ticket counter to embark on a trip accompanied by his skis, it is not uncommon for the skier to be informed of the risk of breakage discussed above, and an express disclaimer of liability by the airline may even result. In some cases, the airline may furnish a cardboard box of long narrow shape sufficient to hold skis only but not to resist any substantial force such as compression by other luggage or shock loads when baggage handlers or conveyor mechanisms toss luggage items or move them about in loading and unloading commercial aircraft. Due to their characteristic of long length relative to small cross-section, skis require very substantial protection from shock, bending and concentrated beam loads during handling, stacking and transit.

The strength, rigidity, and other protective features of a container suitable for skis in the foregoing context is especially difficult to achieve for air travel use. The container strength must be balanced against the necessity for avoiding severe cost penalties identified with excess passenger luggage weight beyond the allowable

limits set by airlines and by Federal regulations. Thus, the design of a container such as discussed above is not a simple matter, and it is significant that no such containers are commercially available from any source including manufacturers of ordinary luggage.

SUMMARY OF THE INVENTION

The invention comprises a container generally designated by reference numeral 10 adapted to hold two skis 12 and 14 in the relationship shown by FIG. 1, along with two ski boots 16 and 18 seen in FIGS. 5 and 7, respectively, a pair of ski poles 20 and 22, and other items of equipment or apparel. Container 10 consists generally of two halves 24 and 26, hinged together along one edge and provided with latch elements spaced along the edge thereof opposite from the hinge. Container 10 has lightweight but essentially rigid masses sized and situated securely at each end of both portions 24 and 26 as suggested by masses 120, 120a, 130, 130a in FIGS. 5 and 7, the mentioned masses being slotted and adapted to receive and restrain the opposite ends of skis 12 and 14 in nesting and load-transferring relationship. Each of the skis is deformed by manual force in order to place them into the slotted masses, which thereafter hold the skis in the stressed condition and in a manner whereby the skis impart considerable rigidity to the container. Interlocking flanges and grooves about the entire periphery of both portions 24 and 26 also comprise an efficient load-transfer path between the halves and further prevent misalignment or displacement of the two halves while they are fully closed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the container in the closed state,

FIG. 2 is a front elevational view of the structure of FIG. 1,

FIG. 3 is a cross-sectional view through the container taken along line 3—3 in FIG. 1,

FIG. 4 is an isolated fragmentary view, partly in cross-section, of a detail from the structure shown in FIGS. 1 and 2,

FIG. 5 is a top plan fragmentary view of a portion of the container shown in FIG. 1 but in the opened condition,

FIG. 6 is a view corresponding to FIG. 5 but showing another portion of the container,

FIG. 7 is another view corresponding to FIG. 5 but showing the opposite end of the container in the open condition, and

FIG. 8 is an isolated fragmentary view in cross-section taken along line 8—8 in FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, it may be seen that the invention comprises a container generally designated by reference numeral 10 having considerable length relative to its cross-sectional profile, as seen from a comparison between the several figures of the drawings. Container 10 is adapted to hold two skis 12 and 14 in the oppositely directed and nested relationship shown by FIG. 1, along with two large ski boots suggested by items 16 and 18 in FIGS. 5 and 7, respectively, a pair of ski poles 20 and 22, and other items of equipment or apparel (not shown).

Container 10 consists generally of two substantially identical halves 24 and 26, the lower half 24 being adapted to receive the mentioned items while the upper half 26 functions primarily as a lid and securely holds the contents of portion 24 immovably therewithin. Portion 26 is pivotally secured to portion 24 by a hinge assembly 28 comprising two oppositely corresponding and otherwise identical elongate elements 30 and 32 each having spaced apart loops 34 and 36, respectively, which nest between each other to form a continuous cylindrical shape adapted to receive a single rod or hinge pin 38 therewithin. Hinge assembly 28 extends continuously along one side only of container 10 to permit pivotal opening of portion 24 relative to portion 26 about a pivot axis through the center of pin 38.

Along the front wall 60 of container 10 opposite from hinge assembly 28 and situated in spaced-apart relationship between the extreme ends 40 and 42 of container 10 are latch assemblies 44, 46 and 48. Latches 44 and 46 may be of any suitable type known to the prior art as used in luggage generally, the details of which are not significant to the essential novelty of the structure set forth in the appended claims and need no further discussion herein. Latch assembly 48, however, is significant in this case and is therefore discussed in detail subsequently below.

Referring to FIG. 6, it may be seen that load-transferring and reinforcing means are included in container 10 comprising two internal bracing elements 50 and 52 secured within portions 24 and 26, respectively. Both elements 50 and 52 are substantially U-shaped in cross section and may comprise deformed sheet metal stampings or extrusions of the type sometimes known as hat sections. Element 50 in the view shown by FIG. 6 may be seen to have a hollow open-rectangular center portion 54 to which a flange 56 and 58 adjoins on either side thereof.

As seen from FIG. 3, hat section element 50 extends between front and back wall portions 60 and 62 of portion 24 and contiguous with lower wall portion 64 thereof. Elements 50 and 52 are situated substantially midway between ends 40 and 42 of container 10 as seen from FIG. 1, for a purpose discussed further below. Element 52 in portion 26 of container 10 is shaped similar to element 50 and is situated so that the terminal end portions of both elements are aligned in close juxtaposition when container 10 is completely closed, as suggested by end portions 66 and 68 of elements 50 and 52, respectively, shown in FIG. 8. Within the stated end portions are situated a pair of latch elements 70 and 72 forming part of latch assembly 48.

Referring to FIG. 4, it may be seen that element 70 in end portion 66 of brace 50 has an elongate slot 74 adapted to receive a flat tongue 76 in snugly interfitting and load-transferring relationship. Secure holding means to maintain tongue 76 within slot 74 are provided in the form of pin 78 adapted to penetrate laterally through both the tongue and the slot in the manner shown in FIG. 4. Pin 78 is slidably movable into and out of holding engagement by force applied to the pin manually through knob 80 connected therewith by shank 82 integrally joining knob 80 and pin 78. Pin 78 is laterally slidable within a cylindrical housing 84 and biased toward the engaged position of FIG. 4 by compression coil spring 86 also contained within housing 84. Housing 84 is provided with an elongate slot 88 through which shank 82 protrudes, the opposite ends of slot 88

constituting limit stops which restrict the permissible movement of pin 78 within housing 84. Shank 82 also projects through a slot 90 in front wall portion 60 of container 10, shown particularly in FIG. 8.

Although many different materials of construction might be suitable in the manufacture of container 10 and its various component parts, an especially useful material for the wall surfaces of portions 24 and 26 is molded plastic such as a relatively hard polyvinylchloride copolymer. Completely around the generally rectangular peripheral edge of each portion 24 and 26, a continuous metallic strip of greater hardness and strength than the mentioned plastic is preferably secured by suitable means such as rivets 92 seen in FIGS. 2 and 4. The stated metal strip 94 on portion 26 is provided with a projecting ridge 96, preferably tapering in thickness toward a minimum at its distal edge as seen in FIG. 8. Metal strip 98 on portion 24 is provided with a groove 100 having the same width and tapered cross-sectional dimensions as ridge 96 whereby, when container 10 is in the closed condition, the ridge seats snugly within the groove continuously about the entire periphery of the portions 24 and 26. Although not essential for most environmental conditions, flexible sealing means may optionally be incorporated into the foregoing structure as suggested by elongate rubber seal element 102 shown at the bottom of groove 100 in FIG. 8. An effective, fluid-tight seal is formed by metallic strips 94 and 98 due to their substantial surface area contact and snug fit, but when substantial differential pressure conditions exist across the wall surfaces of container 10, element 102 is helpful in maintaining the existing seal fluid tight.

Referring particularly to FIGS. 3 and 6, it may be seen that a pair of brackets 104 and 106 are secured to element 50 and are situated within portion 24 of container 10 so as to present oppositely directed bearing surfaces 108 and 110 toward the front and back of the container, respectively. Also evident from FIG. 3 are felt or other flexible padding elements 112, 114, 116 and 118 against which the surfaces of skis 12 and 14 bear. Brackets 104 and 106 function to prevent displacement of the skis during shock, vibration and handling forces to which container 10 is normally subjected during transoceanic high-altitude flights. Moreover, any external forces which would tend to twist container 10 are resisted by the skis themselves, which are wedged forcibly between surfaces 108 and 110 and padding elements 112, 114, and 116, 118, respectively, as seen in FIG. 3.

Additional restraining means are included in container 10 as shown in FIG. 5, for example, wherein lightweight but substantially rigid masses 120, 122 and 124 are secured within portion 24 of the container and configured so as to receive skis 12, 14 and boot 16 nesting relationship. Thus, mass 120, which may illustratively be a foamed plastic of sufficient stiffness to resist bending or deflection, is provided with a curved slot 126 shaped and sized to receive the curved forward tip of ski 14 in nesting relationship, and slot 128 in the same mass receives the aft terminal end of ski 12. Masses 120, 122 and 124 are secured within portion 24 by suitable means to prevent their movement, such as a strong adhesive, to permit the transfer of loads between the walls of portion 24, the skis, the boots and the masses. Other masses similar to masses 120, 122 and 124 are also affixed within portion 24 at the oppo-

site end from those shown in FIG. 5, as seen at 120a and 130a in FIG. 7. Since their construction is identical to those described above, no further mention need be made of these details. However, it is important to note that the slots in these masses such as slots 126 and 128 in mass 120, are oriented with respect to center brackets 104 and 106 so that skis 12 and 14 must be manually deformed in order to fit the skis into the restraints thus provided. This deforming action arches the skis slightly whereby ski 14 as seen in FIG. 6, for example, is biased against bearing surface 110 of bracket 106. From FIG. 5, it will also be understood that mass 130 is similar to mass 120 and has slot 132 formed therein to align with slot 126 whereby masses 120 and 130 cooperatively function to nest skis 12 and 14 therein.

From the description set forth above, it will become clear that container 10, although made of thin sheet plastic material comprising the walls of portions 24 and 26, is adapted to provide strongly load-resistant properties in a unique combination of interlocking and structurally interacting elements. Vertical loads applied through container 10 such as by stacking the same are resisted by internal brackets and frame elements 50, 52 and 104, 106 at the center of the container midway between ends 40 and 42, and by the skis themselves, since their greatest resistance to bending is vertically through the skis when positioned as shown in FIG. 3. Both lateral and endwise loads applied to container 10 are resisted by the strongly interlocking feature of metal strips 94 and 98 which prevent any relative movement between portions 24 and 26, whereby the container reacts to loads in the manner of a single unitary structural member such as an I-beam. Use of the contained materials, especially skis 12 and 14, to provide substantial load resistance by mounting the same in load-transferring relationship with the container inner elements such as masses 120, 120a, 130, 130a and brackets 104, 106 as well as the ski boots, etc. results in maximum strength and minimum weight in the container, particularly adapting the same for use in air travel by avoiding the risk of excess baggage weight. Location of latch assembly 48 so as to interlock not merely the thin sheet walls of portions 24 and 26, but internal frame members 50 and 52 results in greater holding strength and resistance to prying or the like, since the frame members are primary load-carrying structure and distribute stresses over a much wider area into the thin walls of items 24 and 26. Thus, separation of latch assembly 48 by overstressing the same would be much easier if the assembly were merely attached to thin plastic sheets instead of being secured and contained within rigid frame members 50 and 52. It may also be seen from FIG. 5, for example, that ski boot 16, which is normally very stiff and bend-resistant due to its heavy construction, is positioned so as to bear against both skis 12 and 14, thus constituting an effective load transfer path between the skis. The restraint thus provided at each end of the skis cooperate with that provided by brackets 104 and 106 at the center portion of the skis to prevent any possibility of movement between the skis, so that loads applied to one ski are effectively resisted by both. Also, it will be understood that the center area of container 10 on either side of brackets 104, 106 and between the foamed masses corresponding to masses 120, 122 and 124 at each end of the container, will normally be filled with ski clothing and other items associated with the sport, and that the more tightly

packed the contents of container 10, the more effective and efficient transfer of loads through such contents will be.

I claim:

1. In a light weight container for skis:

a pair of split rigid members each having a pair of slots therein, one slot of each pair of slots being contoured to receive and constrain a portion of a ski, and the other slot of each pair of slots being contoured to receive and constrain a portion of a second ski, said members being spaced apart to receive the heel of one ski and opposite ends of said skis, and said slots and members being positioned and contoured to hold skis in a bent, stressed condition;

structural members between said members to hold said masses in said positions;

a pair of rigid clamps, attached to said structural members, substantially midway between said rigid members to clamp the foot portion of said skis in said stressed condition.

2. Apparatus as recited in claim 1 and further comprising:

two thin-walled box-like portions surrounding and attached to said rigid members and said structural members, said portions each having a generally rectangular terminal edge, said terminal edges being reinforce, said reinforcing members being part of said structural members and fitting together in abutting relationship about their periphery; and securing means mounted upon said two box-like portions for securing them in said edge-abutting relationship.

3. Apparatus as recited in claim 2 in which said reinforcing members at said two peripheral edges each form a locking strip, one of said locking strips having a projecting ridge of tapered wedge cross-section shape, and the other of said locking strips having a groove of oppositely corresponding cross-sectional shape to receive said projecting ridge in firm continuous load-transferring relation throughout the length of both said locking strips.

4. Apparatus as recited in claim 3 and further comprising:

flexible sealing means between said locking strips for making a fluid-tight seal therebetween when said locking strips are in fully engaged relationship.

5. Apparatus as recited in claim 2 in which

said split rigid members comprise:

rigid masses sized and situated securely at each end of said box-like portions, said masses being slotted and adapted to receive and restrain the opposite ends of a pair of skis in nesting and load-transferring relationship.

6. Apparatus as recited in claim 5 in which said masses comprise:

masses of sufficient stiffness to resist bending force introduced by flexed skis, having a curved slot shaped and sized to receive the curved forward tip of a ski, and a second slot shaped and sized to receive the aft terminal end of a ski;

said masses being secured to said structural members to prevent movement of said masses relative to said structural members;

said slots being oriented relative to said rigid clamps to require deformation of skis for insertion into said slots.

7. Apparatus as recited in claim 2 and further comprising a handle attached to said structural members, and in which said rigid clamps comprise:

- a reinforcing member in the central section of said portions, substantially midway between said rigid members; 5
- a pair of brackets, upstanding from at least one of said box-like portions and said last-named reinforcing member; and
- flexible padding elements in opposition to said brackets to form clamps for clamping the foot pads of a pair of skis. 10

8. A lightweight container for skis, comprising: two thin-walled box-like portions each having a generally rectangular terminal edge, said terminal edges fitting together in abutting relationship about their periphery to completely enclose a pair of skis therewithin; 15

securing means mounted on said two box-like portions for securing the same in said edge-abutting relationship; 20

force application means secured within said container for transferring force continuously between said container and enclosed skis in an amount sufficient to deform the skis in a stressed condition to increase their bend resistance and the bend resistance of said container, a locking strip being positioned along each of said two peripheral edges, one of said locking strips having a projecting ridge of tapered wedge cross-sectional shape, and the other of said locking strips having a groove of oppositely corresponding cross-sectional shape adapted to receive said projecting ridge in firm continuous load-transferring relationship throughout the length of both said locking strips, 35

flexible sealing means being positioned between said

locking strips for making a fluid-tight seal therebetween when said locking strips are in fully engaged relationship,

latch means mounted on said two box-like portions for releasably holding said portions together with said peripheral edges in fully engaged relationship, hinge means connecting between said two box-like portions for securing said portions together in mutually pivotable relationship,

a first latch element having a projecting tongue and being affixed to one of said two box-like portions, a second latch element having a slot adapted to receive said projecting tongue,

a translationally slidable bolt adapted to penetrate through said tongue and said slot for preventing relative movement between said first and second latch elements when said tongue is positioned with said slot,

said force application means including clamping frame elements mounted within and substantially half way between the ends of each of said portions, said frame elements having terminal ends adapted to abut each other when said container is closed, positioned and adapted to clamp the foot pads of enclosed skis,

said first and second latch elements each being secured within said terminal ends of said frame elements, and

wherein said force application means further includes:

restraining masses, secured and positioned within said container, contoured and positioned relative to said frame elements to receive the ends of skis and to flex the skis into a stressed condition in nesting relationship.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,767,036

Dated October 23, 1973

Inventor(s) Winford Newton McLeod

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 53, "hole" should read -- hold --.
Column 2, line 5, "ordinarily" should read -- ordinary --;
line 13, "qpparel" should read -- apparel --. Column 4,
line 56, after "16" insert -- in --. Column 6, line 12,
cancel "the heel of one ski and"; line 28, "reinforce" should
read -- reinforced --.

Signed and sealed this 26th day of March 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents