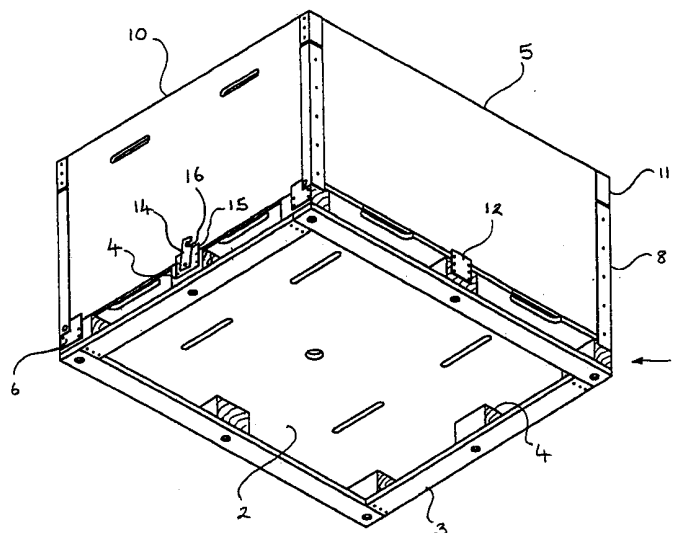




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(21) International Application Number: PCT/GB99/00113 (22) International Filing Date: 13 January 1999 (13.01.99) (30) Priority Data: 9800709.9 15 January 1998 (15.01.98) GB (71) Applicant (for all designated States except US): BOYCE, Anona, Marie [GB/GB]; Uplands Orchard, Wellington Heath, Ledbury, Herefordshire HR8 1NF (GB). (71)(72) Applicant and Inventor: BOYCE, Graham, John [GB/GB]; Uplands Orchard, Wellington Heath, Ledbury, Herefordshire HR8 1NF (GB). (74) Agent: A.R. DAVIES & CO.; 27 Imperial Square, Cheltenham GL50 1RQ (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: COLLAPSIBLE STORAGE BIN



(57) Abstract

A collapsible storage bin comprises a wooden pallet (1) having an upper surface (2) defining the bottom floor of the bin and a lower surface (3) comprising or including a continuous outer frame (3) connecting each corner of the pallet (1) to thereby prevent or inhibit bending of the pallet when the storage bin is loaded. The upper surface (2) of the pallet (1) is shortened on opposing edges adjacent to which detachable side walls (10) are guidingly receivable in or on releasable locking formations (8, 14, 15) on the side edges of pivotable side walls (5) by an amount corresponding to the thickness of each such detachable side wall, thereby to permit the lower edge of each such detachable side wall (10) to extend past the upper surface (2) of the pallet (1).

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COLLAPSIBLE STORAGE BIN

This invention relates to collapsible bins and storage systems therefor particularly, but not exclusively, designed for the transport of loose solid objects such as grain, apples etc. These objects tend to "flow" when store in quantity to form a conical structure unless prevented from doing so by a mechanical restraint such as a sack, bin or other such container.

Collapsible bins are well known as a means of storing products for transport whereafter they can be stored away in a disassembled state and/or returned in bulk to the original point of origin, thus saving considerable space and expense in the process. Where the collapsible storage bin is made of a foldable material, such as cardboard, assembly and disassembly is very easy but where considerable strength and rigidity is required of the bin, such as for the storage and transport of apples etc., assembly and disassembly of such storage bins has generally tended to be difficult and time consuming, requiring hand tools for the purposes of inserting or removing screws, nuts and other types of fasteners into, typically, plywood panels making up all or part of the bin structure.

It is an object of the present invention to provide a novel collapsible bin and storage system therefor which is suitable for heavy duty applications such as the transport and storage of apples, etc. but which can be easily assembled and disassembled without the use of any tools.

According to the invention there is provided a collapsible storage bin comprising a rectilinear pallet including upper and lower surfaces defining a space therebetween for access by forks of a forklift, the upper surface of the pallet defining the floor of a bin for storage purposes when the bin is in its assembled condition, four side wall for the bin, one for each side of the pallet, one opposing pair of said side walls being secured to opposite sides of the floor and being pivotable only between a collapsed position wherein they each lie substantially flat against or adjacent the floor of the pallet and an upright position defining opposing side walls of the bin, the other opposing pair of side walls being detachable for storage and being guidingly receivable in or on releasable locking formations in or on side edges of the pivotable side walls, in which position the detachable side walls collectively support the pivotable side walls from inward collapse and the pivotable side walls collectively support the detachable side walls from at least outward collapse, characterised in that the lower surfaces of the pallet comprise or include a continuous outer frame connecting each of the corners of the pallet to thereby prevent or inhibit bending of the pallet when the storage bin is loaded.

Preferably, the upper surface of the pallet is shortened on the opposing edges adjacent to which the detachable side walls are guidingly receivable in or on releasable locking formations in or on the side edges of the pivotable side walls, relative to the corresponding lower surface of the pallet by an amount corresponding to the thickness of each such detachable side wall, thereby to permit the lower edge of each such detachable side wall to extend past the upper surface of the pallet. Preferably, such lower edge portions of the detachable side walls are received in slotted formations which prevent or inhibit at least the lower parts of the detachable side walls from bending outwards when

the storage bin is loaded with loose, flowable objects.

Preferably, the pivotable side walls are also foreshortened by an amount corresponding to the upper surface of the bottom pallet so that the detachable side walls
5 can be received within a slotted recess in the side edges of the pivotable side walls.

Conveniently, the pivotable side walls are pivoted on hinge pins, the major axes of which are raised above the upper surface of the bottom pallet by an amount sufficient to allow for each pivotable side wall to assume a slightly inclined position when
10 collapsed inwardly against or adjacent to the upper surface of the pallet, thereby to provide drainage and airflow between the inside walls of the pivotable side walls and the upper surface of the pallet.

The storage bin may include locking means for each detachable side wall
15 which may be in the form of a latch on the lower end thereof, the latch incorporating formations or recesses cooperable with complementary locking means on opposing sides of the pallet, thereby to prevent the side walls from being moved upwardly with respect to the pallet.

20 Conveniently, the locking means are provided by a swivellable latch on the lower end of each such detachable side wall, the latch incorporating a slot or other locking formation co-operable with a locking formation extending from the side of the pallet so that when so latched the side wall cannot be moved upwards with respect to the floor of the pallet. Alternatively, a pair of swivellable latches may be attached to respective sides

of the pallet, each cooperating with a locking formation, such as a peg, extending outwardly from the lower end of each detachable side wall.

In either configuration the locking formation may be vertically offset from
5 the pivot point of the swivellable latch when the latter is in its normal rest position so that when latched gravity prevents or inhibits the latch from becoming accidentally dislodged from the locking formation.

The invention will now be described, by way of example only, with
10 reference to the accompanying drawings in which:

Figure 1a is a perspective view of a collapsible bin according to the invention in its assembled condition with one of a pair of detachable side walls removed for clarity,
15

Figure 1b is an enlarged detailed view of a corner portion of the collapsible bin shown in Figure 1a,

Figure 2 is a perspective view from below of the collapsible bin of Figure
20 1a but showing the missing detachable side wall in position, and

Figure 3 is a perspective view of the collapsible bin of Figure 1 showing its component parts in a partly disassembled state.

Referring to the drawings a collapsible storage bin according to the invention comprises a wooden pallet shown generally at 1 having a planar upper surface 2 and a frame-like lower surface 3 inter connected at the four corners and the four median points of adjacent corners by eight wooden spacer blocks 4 which allow the forks of a forklift (not shown) to be received between the surfaces 2,3 for transporting the pallet 1 in a conventional manner. The collapsible bin includes a pair of opposing side walls 5 which are each pivotably mounted to respective sides of the pallet 1 so that they can be folded inwards and down towards the upper surface 2 of the pallet 1 in the manner as shown arrowed in Figure 3.

10

Each of the pivotable side walls 5 are mounted at respective ends on pivot plates 6 secured to opposing corners of the pallet 1 on respective pairs of blocks 4 in the manner as more clearly shown with reference to Figure 1b. The pivot plates 6 are secured to the blocks 4 and extend upwardly relative to the major plane of the upper surface 2 of the pallet 1 and each includes a hinge pin 7 which is received within a correspondingly shaped bore in an elongate "L" section metal channel bracket 8 secured along and spaced from opposing edges 9 of the pivotable side walls 5, the spacing being sufficient to define a slot for receiving corresponding edges of each of a pair of detachable side walls 10, only one of which is shown in Figure 1a for clarity.

20

Each detachable side wall 10 includes at opposing upper ends thereof a pair of corresponding shaped "L" section bracket members 11 which also define a slot corresponding the thickness to each of the pivotable side walls 5 so that, as can be shown more clearly with reference to Figure 1a, the brackets 8,11 cooperate to prevent outward

collapse of all four side walls 5,10.

Because the pivotable side walls 5 are generally longer than the detachable side walls 10 and could therefore bend more easily in their mid sections, support plates 12 are fixed to opposing blocks 4 at the mid portion and extend upwardly therefrom to prevent or inhibit outward bending of the lower portion of each pivotable side wall 5 when the inside of the bin is filled with loose "flowable" objects.

As can be seen more clearly with reference to Figure 1b, the upper surface 2 of the pallet 1 is shortened on those opposing edges which point towards the hinge plates 6 so as to define a slot therebetween into which the lower edge of a respective detachable side wall 10 can be received until it is prevented from further downward movement by the presence of the blocks 4. Also from Figure 1b it will be apparent that the major axes of the hinge pin 7 is slightly raised above the major plane of the upper surface 2 so that when each pivotable side wall 5 is folded downwards towards the upper surface 2 in the manner as shown in Figure 3 only the free ends of each side wall will touch the upper surface 2, thereby leaving a gap from which water may escape and into which air may flow in order to prevent or inhibit rotting of the component parts and increase the speed at which they may dry after, for example, being washed with water.

20

As stated above, the elongate brackets 8,11 on respective ends of the pivotable side walls 5 and detachable side walls 10 each cooperate with the other to prevent outward collapse of the side walls 5,10. To prevent inward collapse of the pivotable side walls 5 relative to the detachable side walls 10, the latter are provided with

elongate wooden support plates 13 secured to adjacent opposing inner side edges but spaced therefrom by the thickness of each of the pivotable side walls 5.

In order to prevent or inhibit the detachable side walls 10 from becoming accidentally dislodged in the upward direction relative to the pallet 1, locking means in the form of a swivellable latch 14 is pivotably mounted on a raised latch plate 15 centrally secured to respective sides of the pallet 1 on respective middle blocks 4 in the manner as shown in Figures 2 and 3 and include slotted locking formations which cooperate with an outwardly projecting peg 16 fixed centrally to the lower part of each detachable side wall 10 but vertically offset from the pivot of the latch in an over-centre manner so that gravity prevents or inhibits accidental unlatching. Because the upper edge of the latch plate 15 is raised above the block 4 it will be appreciated that it also forms part of the slot defined by the forward edges of the foreshortened upper surface 2 of the pallet and the hinge plate 6 and thereby prevents or inhibits the middle portion of each detachable side wall 10 from bulging outwards under load. The existence of this slot into which the lower edge of each detachable side wall 10 must be inserted to assemble the bin also ensures that any warping or distortion of a detachable side wall 10 is minimised and/or stabilised. Accordingly, when each is latched in place the entire structure of the bin is generally very rigid even though it can be easily disassembled by hand in a manner to be described.

20

The collapsible storage bin of the invention is assembled in the reverse manner to that shown in Figure 3 in that the two pivotable side walls 5 are each raised to the vertical position as shown in Figure 1a whereafter the detachable side walls 10 are slotted into their respective positions with the elongate brackets 8 on respective ends 9

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of each side wall 5 capturing respective side ends of each detachable side wall 10 and the corresponding elongate brackets 11 at respective upper ends of each detachable side wall 10 capturing respective upper ends of each pivotable side wall 5, thereby providing in cooperation with the elongate support plates 10 a rigid box-like structure into which
5 flowable objects such as apples etc. may be introduced for transport.

Because the lower surface 3 of the pallet 1 comprises or includes a continuous outer frame connecting all of the wooden blocks 4 the tendency of the storage bin to bend under load is significantly reduced, although it will be apparent that instead
10 of the lower surface 3 comprising a continuous outer frame, it could instead be a single rectilinear sheet. Additionally, because opposing edges of the upper surface 2 are foreshortened relative to the lower surface 3 to permit the lower edges of each of the detachable side walls 10 to bear against the upper portions of respective wooden blocks
4 they are each effectively captured on three of the four outer edges thereof, the upper
15 edge being the exception, so that in cooperation with the locking means 14,15 the entire structure is generally very rigid and suitable for storing filled bins one on top of the other without significant risk of various parts of each such bin sagging or bending during storage and transport. This is so even though no hand tools are required for assembly or
disassembly.

20

After use, each such storage bin may be disassembled by hand in the manner as shown in Figure 3 for subsequent storage one on top of the other and return, if appropriate, to their original destination after transporting objects to a required destination. Where, for example, the height of each side wall 5,10 is equal to the length

of each side wall 5 it will be apparent that complementary pairs of detachable side walls 10 can be placed side-by-side on top of folded down opposing pairs of pivotable side walls 5 for storage or transport purposes as the case may be.

5 The invention therefore provides a sturdy and simple to erect and dismantle collapsible storage bin in which many of the disadvantages of known storage bins are obviated, requiring only a minimum of expertise on the part of a user thereof for assembly and disassembly and without the use of hand tools.

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CLAIMS

5 1. A collapsible storage bin comprising a rectilinear pallet including upper and lower surfaces defining a space therebetween for access by forks of a forklift, the upper surface of the pallet defining the floor of a bin for storage purposes when the bin is in its assembled condition, four side wall for the bin, one for each side of the pallet, one opposing pair of said side walls being secured to opposite sides of the floor and being
10 pivotal only between a collapsed position wherein they each lie substantially flat against or adjacent the floor of the pallet and an upright position defining opposing side walls of the bin, the other opposing pair of side walls being detachable for storage and being guidingly receivable in or on releasable locking formations in or on side edges of the pivotal side walls, in which position the detachable side walls collectively support the
15 pivotal side walls from inward collapse and the pivotal side walls collectively support the detachable side walls from at least outward collapse, CHARACTERISED IN THAT the lower surfaces of the pallet comprise or include a continuous outer frame connecting each of the corners of the pallet to thereby prevent or inhibit bending of the pallet when the storage bin is loaded.

20

2. A collapsible storage bin according to Claim 1 further characterised in that the upper surface of the pallet is shortened on the opposing edges adjacent to which the detachable side walls are guidingly receivable in or on the releasable locking formations in or on the side edges of the pivotal side walls, relative to the corresponding lower

-11-

surface of the pallet by an amount corresponding to the thickness of each such detachable side wall, thereby to permit the lower edge of each such detachable side wall to extend past the upper surface of the pallet.

- 5 3. A collapsible storage bin according to Claim 1 or Claim 2 further characterised in that the lower edge portions of the detachable side walls are received in slotted formations which prevent or inhibit at least the lower parts of the detachable side walls from at least bending outwards when the storage bin is loaded with loose, flowable objects.

10

4. A collapsible storage bin according to any preceding claim further characterised in that the pivotable side walls are also foreshortened by an amount corresponding to the upper surface of the bottom pallet so that the detachable side walls can be received within a slotted recess in the side edges of the pivotable side walls.

15

5. A collapsible storage bin according to any preceding claim further characterised in that the pivotable side walls are pivoted on hinge pins, the major axes of which are raised above the upper surface of the bottom pallet by an amount sufficient to allow for each pivotable side wall to assume a slightly inclined position when collapsed
- 20 inwardly against or adjacent to the upper surface of the pallet, thereby to provide drainage and airflow between the inside walls of the pivotable side walls and the upper surface of the pallet.

6. A collapsible storage bin according to any preceding claim further

characterised in that it includes locking means for each detachable side wall in the form of a latch on the lower end thereof, the latch incorporating formations or recesses cooperable with complementary locking means on opposing sides of the pallet, thereby to prevent the side walls from being moved upwardly with respect to the pallet.

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7. A collapsible storage bin according to Claim 6 further characterised in that the locking means comprises a swivellable latch on the lower end of each such detachable side wall, the latch incorporating a slot or other locking formation co-operable with a locking formation extending from the side of the pallet so that when so latched the side wall cannot be moved upwards with respect to the floor of the pallet.

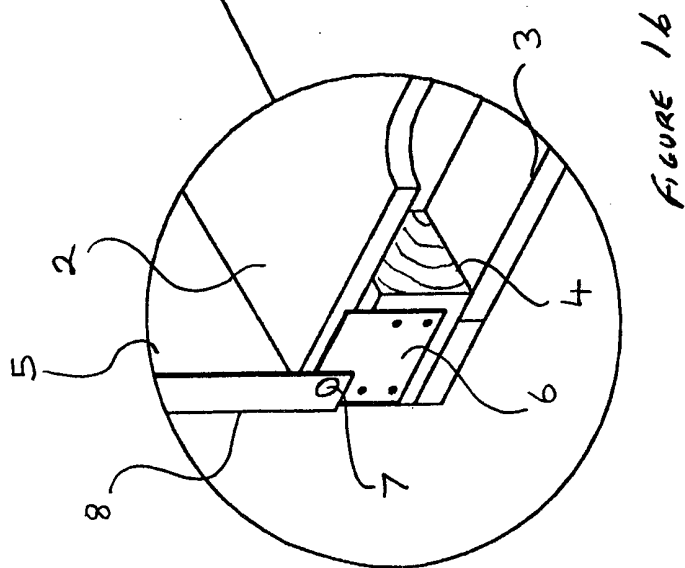
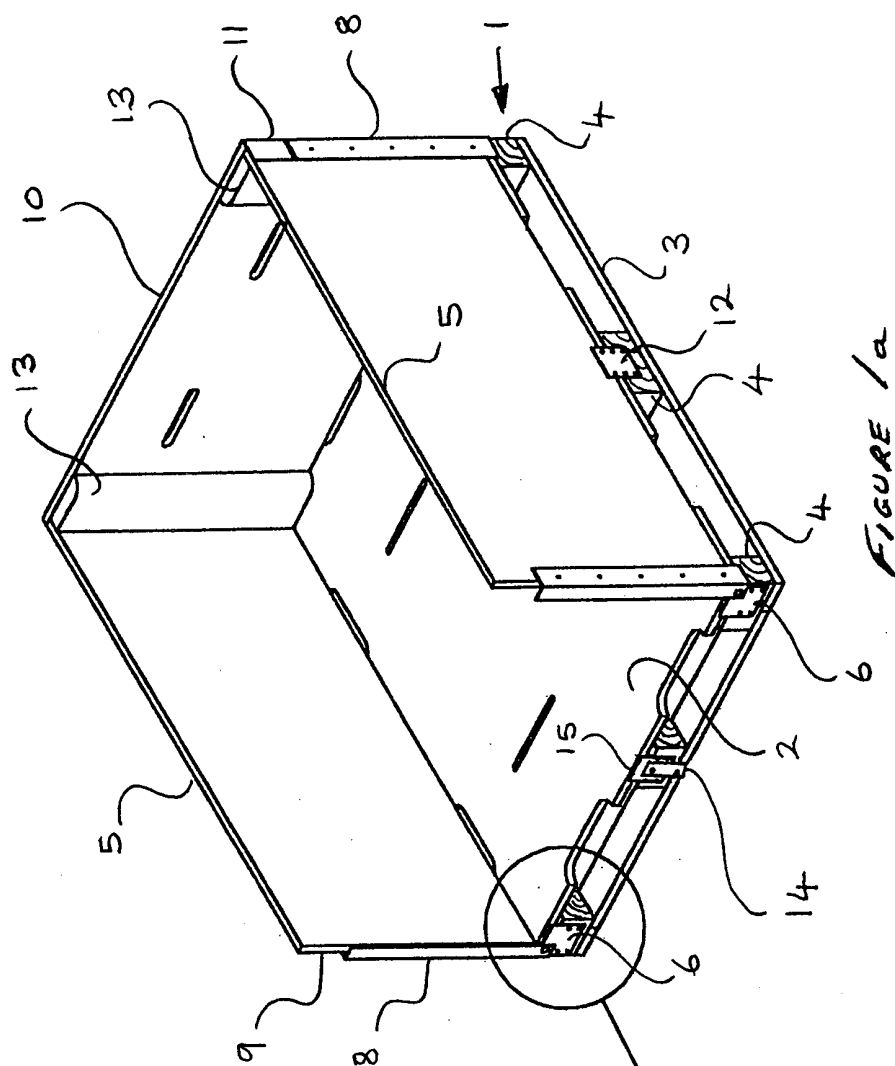
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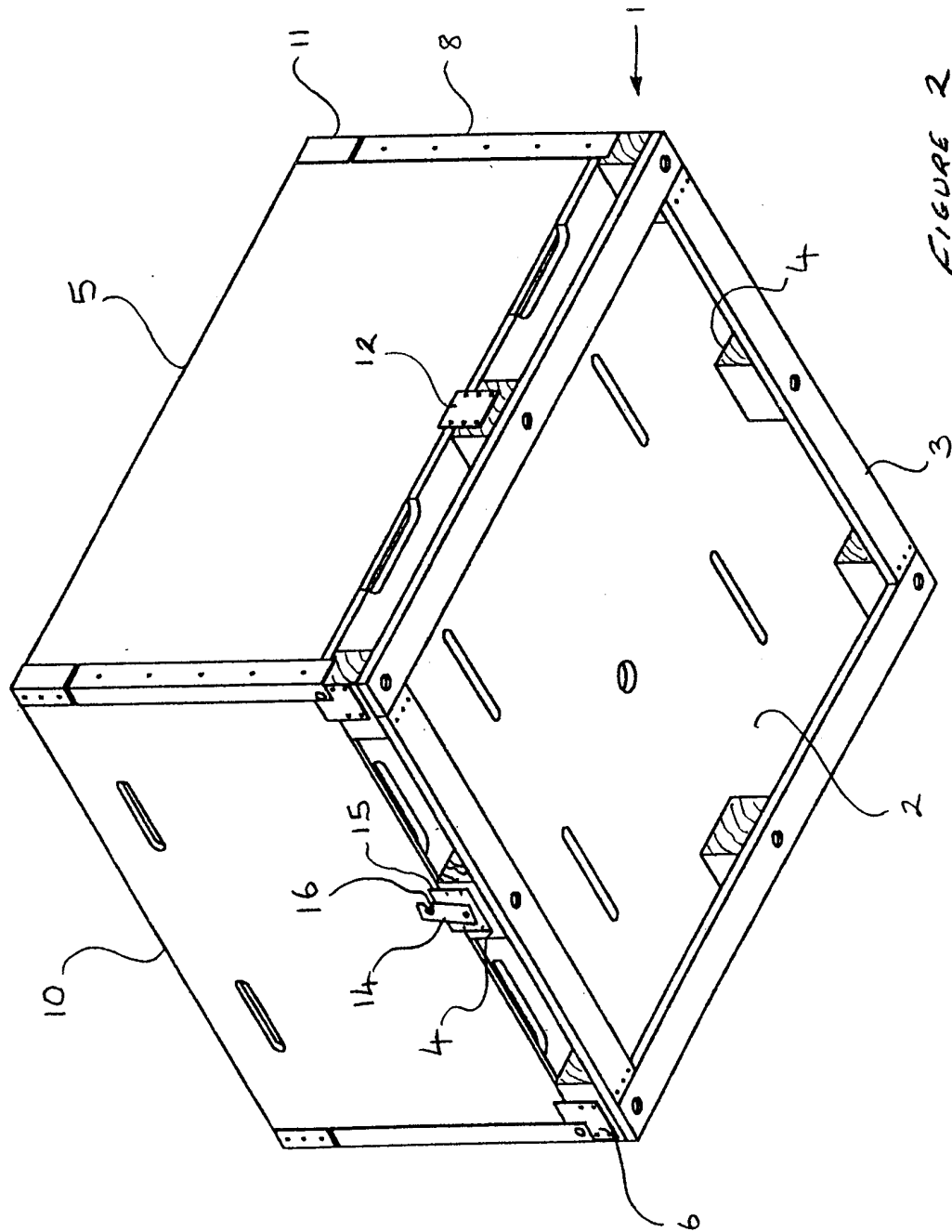
8. A collapsible storage bin according to Claim 7 further characterised in that the locking formation is vertically offset from the pivot point of the latch when the latter is in its normal rest position so that when latched gravity prevents or inhibits the latch from becoming accidentally dislodged from the locking formation.

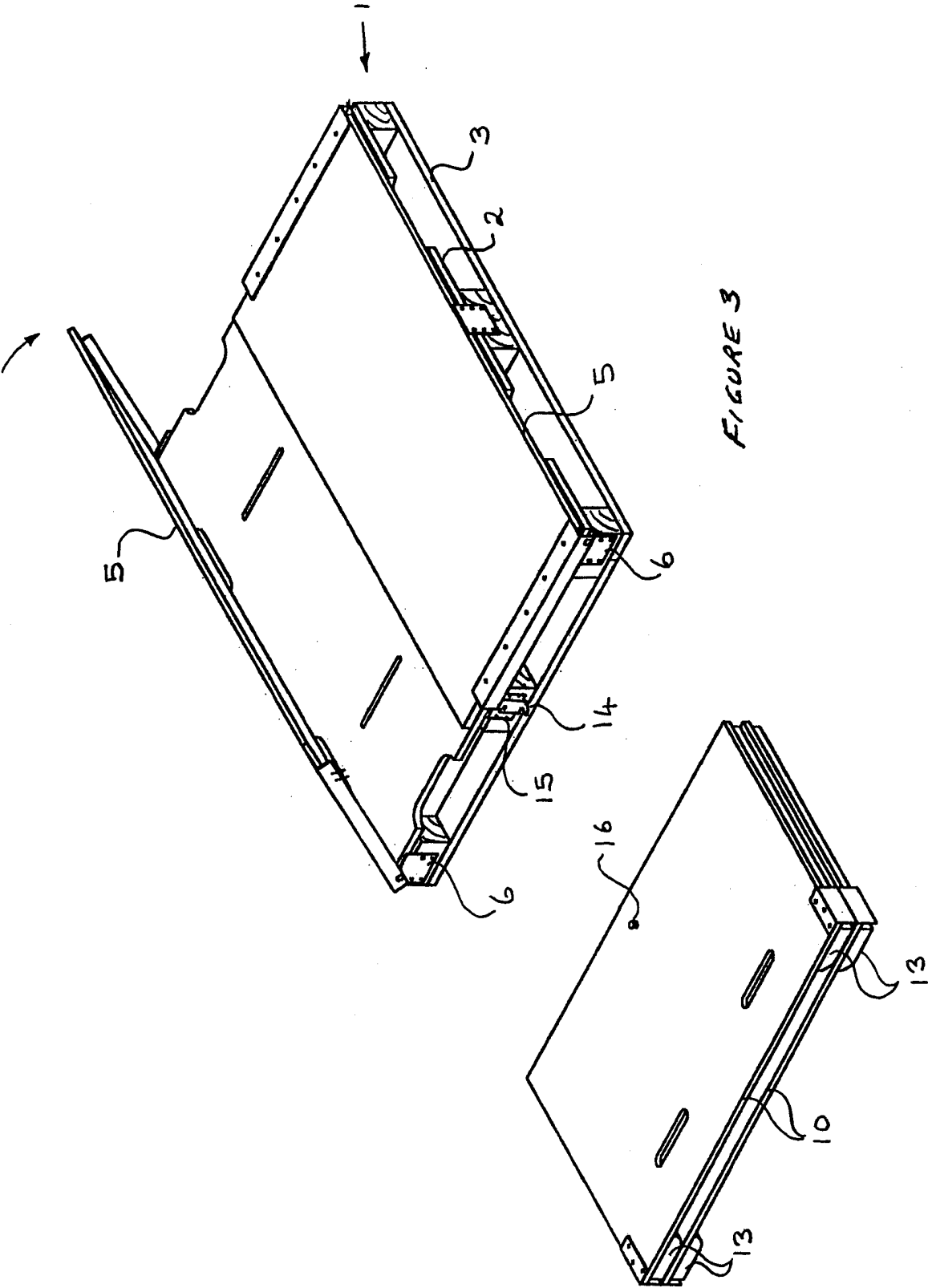
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9. A collapsible storage bin substantially as hereinbefore described with reference to and as shown in the drawings.

20







INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/00113

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65D19/16

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 1 257 532 A (BUSS) 22 December 1971 see page 2, line 25 - line 109; figures 1-4	1-8
Y	DE 78 27 925 U (INTENSIV VERPACKUNG GMBH) 25 January 1979 see page 6, line 14 - page 7, line 12; figures 1-3,9,10	1-8
Y	CH 339 114 A (STÖCKLIN) 15 June 1959 see the whole document	5-8
A	FR 2 673 913 A (LAURENCOT) 18 September 1992 see the whole document	1-4
A	BE 623 360 A (PIGET) 8 October 1962	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

26 April 1999

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 99/00113

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

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

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because they relate to subject matter not required to be searched by this Authority, namely:
Rule 6.2a. PCT
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

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

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

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2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/GB 99/00113

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1257532	A	22-12-1971	NONE
DE 7827925	U	25-01-1979	NONE
CH 339114	A		NONE
FR 2673913	A	18-09-1992	NONE
BE 623360	A		NONE