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(54) **Expanding retractable luggage**

(57) A carry on cabin trolley with a hard shell and four wheels (14) expands to become a trolley suitcase with the push of two buttons situated on the top part of the suitcase, accommodating trips of longer duration. Using the same buttons the suitcase is contracted into the carry on cabin trolley with the standard dimensions accepted in the cabin compartment of any aircraft. The expansion is achieved with a spring piston (16) or any other automatic/manual lifting mechanism.

Honeycomb structured aluminium core composite panels sandwiched in PVC are used for the construction of the shell of the suitcase, which makes the suitcase lighter and more durable.

The suitcase has a single expandable handle (1) with triple usage to hand carry or push the suitcase in 2 different ways.

The suitcase provides a lid (5) compartment for the storage and easy access of small items of frequent use.

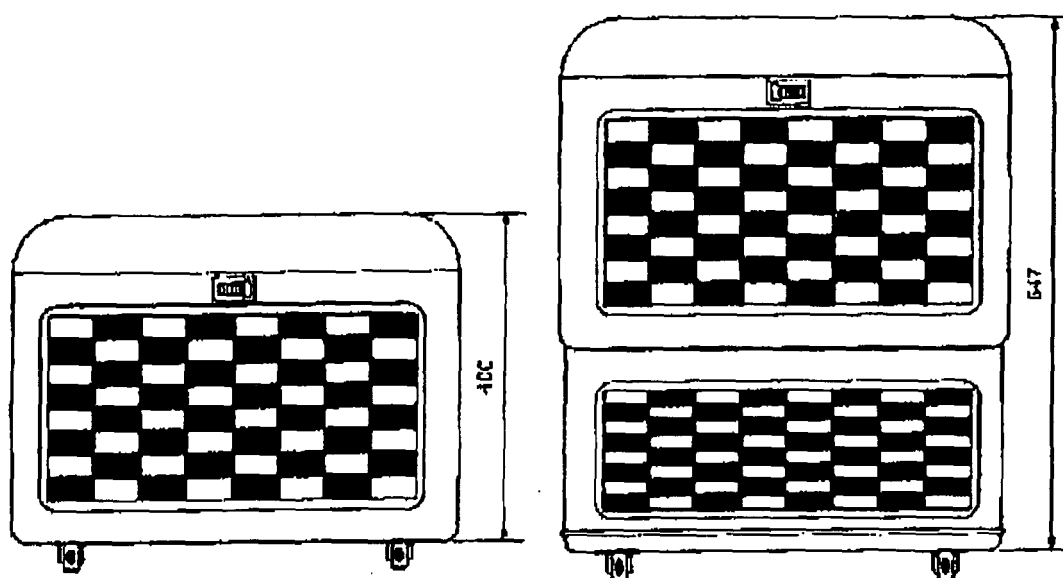


Figure 1

Description

[0001] As shown in fig. 2, the shell of the suitcase comprises of three main parts.

- 1 The lid.
- 2 The female part.
- 3 The male part.

The male part comprises of two parallel panels connected about their periphery and at the bottom.

The top of the male part adjoining to the female part remains open.

The female part comprises of two parallel panels connected about their periphery but the top and bottom are open.

The bottom of the female part adjoining to the male part remains open, whereas the top of the female part is adjoining to the lid.

The main storage space which is variable depends on the positioning of the female part with the male part.

The variation of space is made possible with the use of a spring piston and two guides.

The piston's chamber is connected by a joint ball to the female part and the rod of the piston is connected to the male part.

When the suitcase is resting on the bottom of the male part, expansion and contraction is achieved due to the upward or downward movement of the female part.

The piston and the two guides assist the vertical movement of the female part.

The retention and strength of the shell of the suitcase horizontally is assured by the piston, the two guides and the overlapping part of the male part with the female part.

[0002] As shown in Fig. 13 an internal compartment within the lid is achieved by the use of a flap. This creates a separate space from the internal space within the shell.

The lid compartment is for the storage of small items of immediate and frequent use.

Access to the lid compartment is easy as the lid unlocks and rises horizontally with the use of two pistons.

The positioning of the lid pistons in relation to the lid and the female part is such that they retain the lid in its open or closed position.

As shown in Fig. 4 the handle is placed at the centre and along the length of the lid.

The push buttons which activate the piston are located on either sides of the lid.

A combination locking device is located at the centre of the lid, at the point where the lid is adjoining to the female part.

[0003] The four castor wheels are positioned on the bottom (closed) side of the male part thus enabling easy gliding manoeuvre of the suitcase in any direction. The two pairs of wheels differ in size.

The larger pair is placed along the side for towing/pushing the suitcase along its width.

[0004] The suitcase is completely waterproof in any position

(expanded/contracted).

This is achieved by the use of sealing rubbers at the point of contact the male part has together with the female part, at the point of contact the female part has together with the lid and at the two push buttons which activate the piston.

The locking device is situated outside the sealing rubber between the female part and the lid.

[0005] Please refer to Fig. 3 for the construction of the spring piston.

In the extended or contracted state, the piston automatically locks in position.

It has a dual locking device to prevent size adjustment in error.

The piston system provides for the existence of a security mechanism which consists of two pairs of locking actuators situated on either side of the piston, each pair corresponding to an action (expansion/contraction). Each push button on the lid activates two locking actuators, a single locking actuator from each pair.

Hence the two push buttons must be pressed simultaneously to engage the piston for expansion and contraction.

This prevents expansion/contraction in error.

The locking actuators are bolts with a wide thread suitable for their purpose.

[0006] The handle has a unique construction.

It is expandable and has triple usage.

- 1 Carnage of the suitcase by hand shown in Fig. 5.

The handle is secured by pushing it into the slot situated along the length on the top part of the lid.

The handle locks automatically with the use of four pins in four corresponding positions.

- 2 Push/tow the suitcase on wheels along its depth shown in Fig 5.

With the push of a button situated in the middle of the handle, the handle releases and with the use of springs rises by a few centimetres on the one end while the other end remains permanently connected to the lid via an appropriate mechanism.

If the handle is lifted to stand vertically on the side adjoining the lid, it can rotate 360 degrees and the suitcase can

thus be towed/pushed along its depth.

3 Push/tow the suitcase on wheels along its width shown in Fig 6.

With the push of a button situated in the middle of the handle, the handle releases and with the use of springs rises by a few centimetres on the one end while the other end remains permanently connected to the lid via an appropriate mechanism.

By pulling the handle along the length of the lid, with the help of the mechanism and appropriate rail guides, the point where the handle is connected to the lid slides up until the centre of the lid.

The handle, once at the centre and perpendicular to the lid, can rotate around its axes by 90 degrees anticlockwise where it will lock and the suitcase can thus be towed/pushed along its width.

By pushing the button on the handle a second time, when the handle is in positions 2 and 3, the handle will extend by fifteen centimetres which assists the towing/pushing of the suitcase, when the suitcase is fully contracted. Extension of the handle is shown by Fig. 7

[0007] A common mechanism is used for dislocating, expanding and contracting the handle as shown in Fig. 8. The pins (2) retain the handle with the suitcase at four points. The handle thus fits and binds entirely with the suitcase. With the push of a button (1) the four pins close inwards releasing the lever and with the use of two springs located at both ends raise the lever up by 10 cm.

[0008] The handle Shown in Fig 9 consists of three parts.

Element (1) is which is permanently bound to the suitcase is also the casing for the telescopic antenna (4) used for extending the handle.

Element (2) is the suitcase's handle and is connected to element (1) through the antenna and at the same time is the space where the handle's dislocating mechanism is placed.

Element (3) is directly connected to element (2) and becomes the handle used to wheel the suitcase when the handle is extended.

[0009] Of the activating mechanism of the handle shown in Fig 10, element (1) is made of metal.

Elements (2), (3) & (4) and elements (11), (12), (13) & (14) are made of rigid plastic. Elements (5), (6), (7), (8), (9) & (10) are made of self lubricating plastic.

[0010] The activating push button (2) Fig 11 is assembled with the handle and is placed as a group in position (1) seen on element (2) of Fig 8.

[0011] The design of the handle is such that it is easily assembled and at the same time It is easy to disassemble it, in the case that repairs of the handle may be required as shown on Fig 12.

[0012] The frame of the suitcase shall be made of rigid PVC.

The front, back and side panels of the suitcase's shell are made of composite panels.

The type of composite panels used is honeycomb aluminium core sandwiched in pvc.

This contributes to making the shell of the suitcase lighter and at the same time tougher and more durable.

On the outer surface of the shell, the pvc will be countersunk in leather of a different colour to the pvc thus giving the chequered effect.

[0013] The internal space of the male part may house a briefcase shown in Fig. 14.

The briefcase compartment is made of canvas and is divided into three sections.

Section (5) is to accommodate a laptop computer up to 17 inches together with its accessories.

On the sides and at the bottom the cloth is two fold and in between is padded with sponge.

Sections (3) and (4) are for carrying documents and other necessities.

The lid (1) is made of plastic and is lined with cloth. Its purpose is to divide the space within the suitcase into two sections but also to protect the laptop computer. The briefcase compartment can slide internally on guides along the length of the suitcase due to the two rings (2) Fig. 14.

The briefcase compartment is completely removable from the suitcase and may be used as a separate entity if the user may wish to take the briefcase on the plane while check in the suitcase.

[0014] The internal space of the male part may accommodate an adjustable and extendable drawer for packing clothes.

[0015] The internal space of the female part, under the lid, may provide for a hook and a hanger for the transport of suits and shirts thus avoiding wrinkling of the above mentioned garments.

[0016] Table 1 below describes all the components in Fig 15.

Table 1

A/A	QTY	PART NUMBER	DESCRIPTION
1	1		HANDLE UNIT
2	1		BUSH FOR HANDLE DIVERSION

(continued)

A/A	QTY	PART NUMBER	DESCRIPTION
3	2		PISTON RELEASE KNOB
4	2		SPRINGS
5	1		SUITCASE LID
6	2		LID SPRING PISTONS
7	1		BRIEFCASE
8	2		GUIDE
9	2		UPPER RUBBER SEAL
10	1		FEMALE CASE
11	1		HYBRID LOCK WITH KEY COMBINATION
12	1		MALE CASE
13	1		LOWER RUBBER SEAL
14	4		CASTOR WHEELS
15	16		SCREW 5 x 10
16	1		PISTON UNIT
17	1		UPPER PISTON COVER
18	1		LOWER PISTON COVER
19	1		LEVER PISTON
20	1		STUD

Brief Description of Figures in the Drawings

[0017] Fig. 1 Shows the suitcase in a fully expanded and fully contracted mode.

[0018] Fig. 2 Shows the main parts which make up the body of the suitcase

[0019] Fig. 3 Shows the spring piston system which is used for expanding or contracting the shell of the suitcase.

[0020] Fig. 4 Shows the top view of the lid. The handle. The 2 push buttons which activate the spring piston. The combination locking device.

[0021] Fig. 5 Shows two different positions of the handle.

1 to hand carry the suitcase.

2 handle to tow/push the suitcase along its depth.

[0022] Fig. 6 shows a position of the handle to tow/push the suitcase along its depth.

[0023] Fig. 7 Shows the handle in contracted and extended mode.

[0024] Fig. 8 Shows cross section of the handle.

1 The push button which releases (unlocks) the handle.

2 Four pins.

3 Antennae for extending the handle.

[0025] Fig. 9 Shows the handle sideways.

Points are further explained in the description.

[0026] Fig. 10 Shows assembly of the handle.

Points are further explained in the description.

[0027] Fig. 11 Shows the push button which releases (unlocks) the handle.

Points are further explained in the description.

[0028] Fig. 12 Shows assembly procedure of the handle.

[0029] Fig. 13 Shows the lid.

- 1 The lid cover.
- 2 Flap.
- 3 Piston for opening/closing the lid.

[0030] Fig. 14 Shows the removable briefcase which fits in the suitcase.

- 1 Is the lid of the removable briefcase.
- 2 Are the 2 rings for the briefcase to slide within the suitcase.
- 3 and 4 are compartment for documents.
- 5 is a compartment for a laptop computer.

[0031] Fig. 15 is the complete breakdown of components for the construction and assembly of the expandable retractable suitcase explained in table 1 in the description.

Claims

1. A suitcase having space generally parallel to front and back sides, connected about their periphery to peripheral wall member extending between the front and back sides, thereby defining a volume; a spine affixed to the wall member around the periphery thereof; the spine providing support to the wall member; a spring piston (or any automatic/manual lifting mechanism) adjustable lockage with the push of two buttons. While conventional luggage has no adjustment vertically, one must buy two or three pieces of luggage for their purposes. The user of this invention will not be faced with this problem. The one piece of luggage will expand or retract according to the needs of the user.
This invention works with a spring piston or any other automatic/manual lifting mechanism (air piston or scissor hoist or steering worm in case of manual lifting) and has adjustment points to fit the user's needs for luggage space. This invention is equipped with a releasable push button for the adjustment of the volume space. The luggage has a male and female part and the variable volume space is defined by the position of the female part in relation to the male part
2. The suitcase of claim 1 provides for a lid for easy access of small items of immediate and frequent use.
3. The suitcase of claim 1 whereby a single handle uniquely designed adapts into three different positions for the carriage of the suitcase in three different ways in expanded or contracted positions.
 - (i) To hand carry the luggage.
 - (ii) To wheel the luggage along its depth.
 - (iii) To wheel the luggage along its width.
 The handle elongates by antennae method.
4. The suitcase of claim 1 has four castor wheels for easy gliding manoeuvre of the suitcase in any direction.
5. The suitcase of claim 1 whereby the piston is a specially designed spring piston which is activated by engaging two push buttons simultaneously to offset expansion/contraction in error.
6. The suitcase of claim 1 is **characterised in that** the lock takes the form of a key operated lock and/or combination lock.
7. The suitcase of claim 1 whereby the front, back and sides are made of composite panels (honeycomb aluminium core sandwiched in PVC).
8. The suitcase of claim 1 has a completely waterproof outer shell.
9. The suitcase of claim 1 may house a removable briefcase for carrying a laptop computer with its accessories and documents.
10. The suitcase of claim 1 may have an internal sliding and extending drawer for packing clothes.

EP 2 077 080 A1

11. The suitcase of claim I may have a hook and hanger for hanging suits.

12. The suitcase of claim I may be used as a chess board when contracted.

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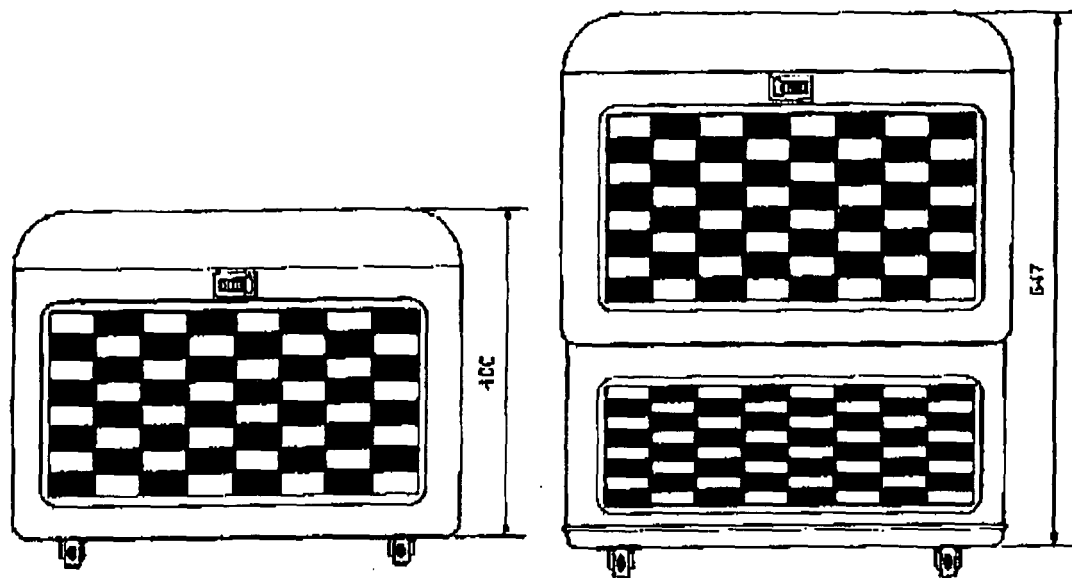


Figure 1

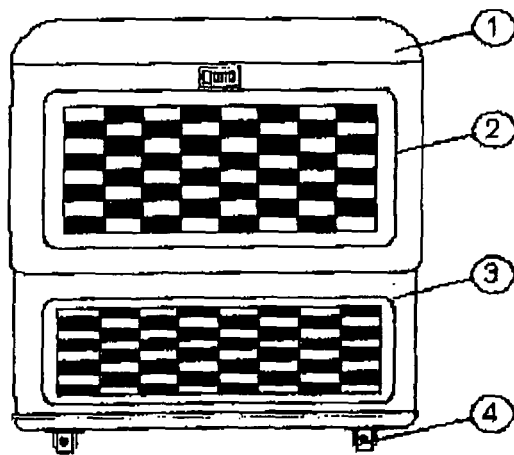


Figure 2

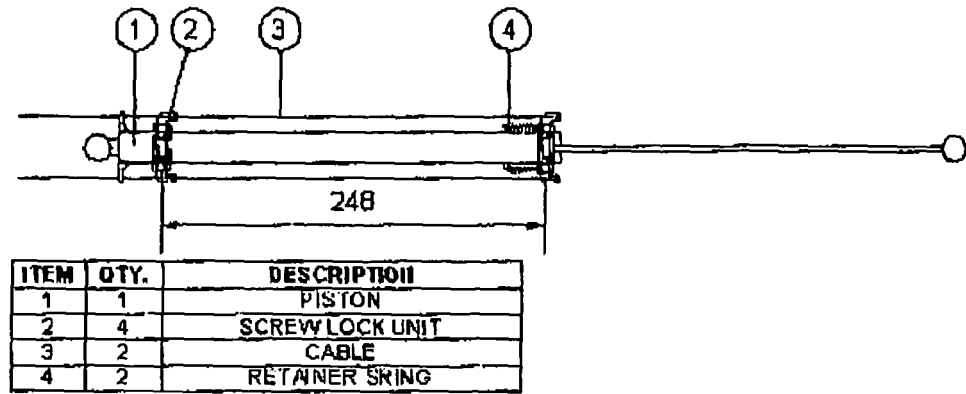


Figure 3

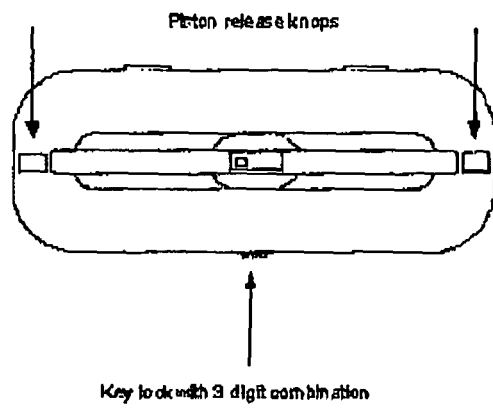


Figure 4

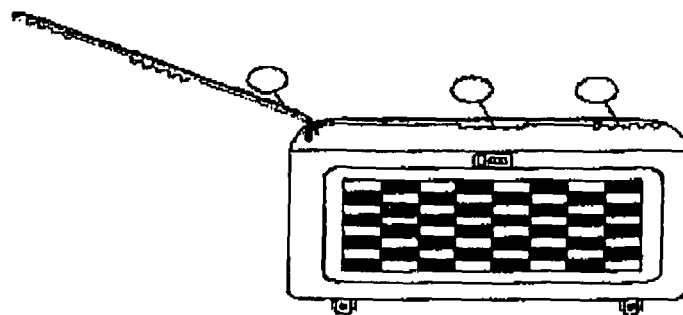


Figure 5

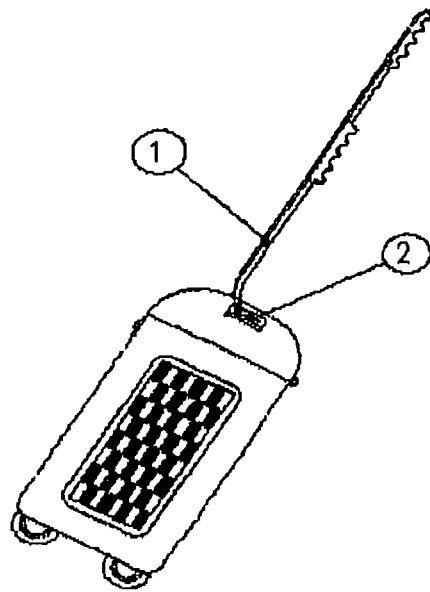


Figure 6

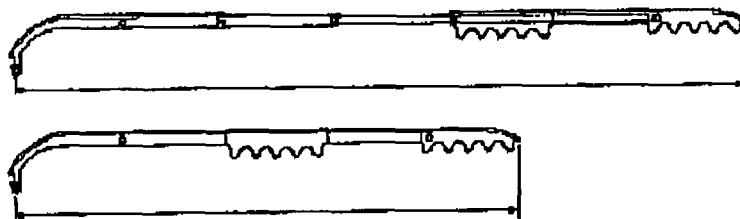


Figure 7

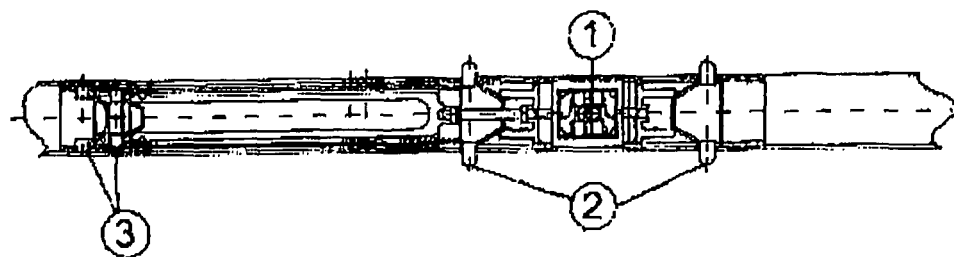


Figure 8

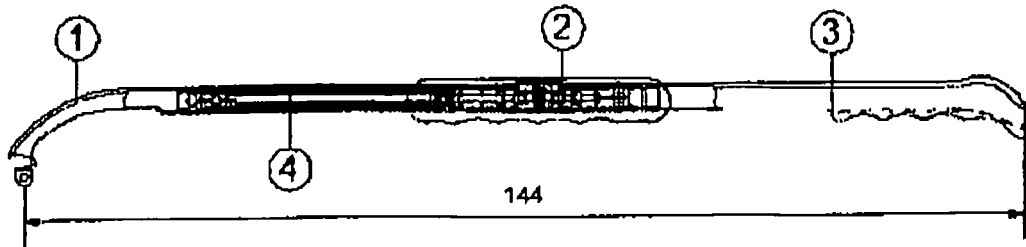


Figure 9

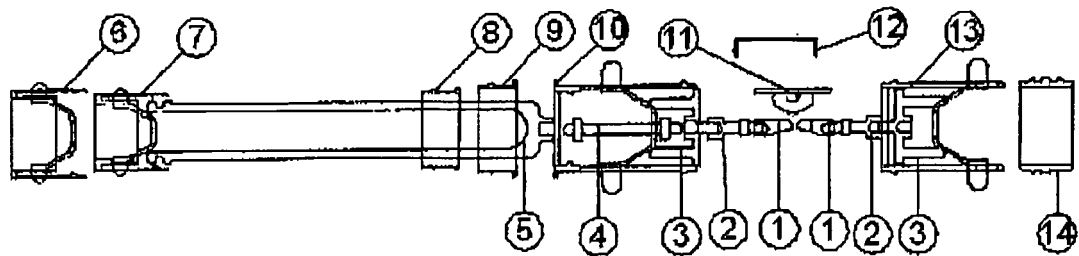


Figure 10

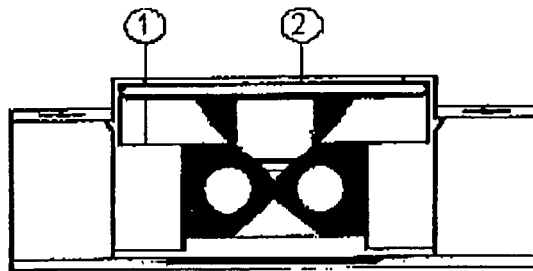


Figure 11

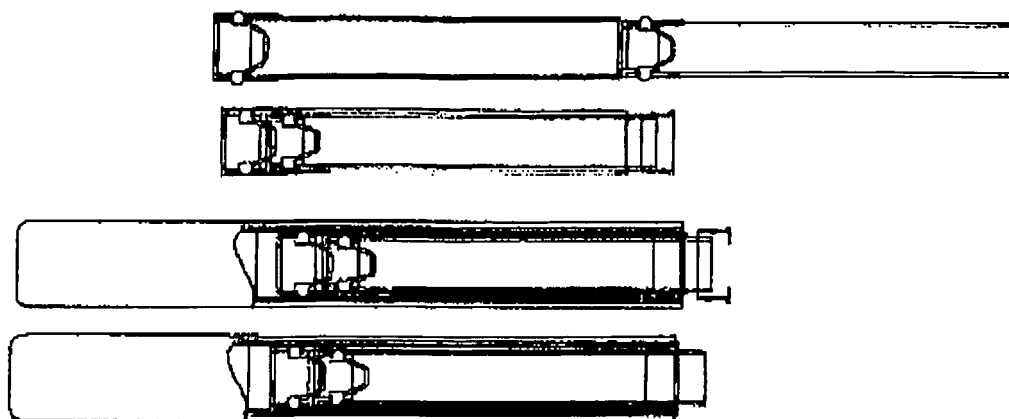


Figure 12

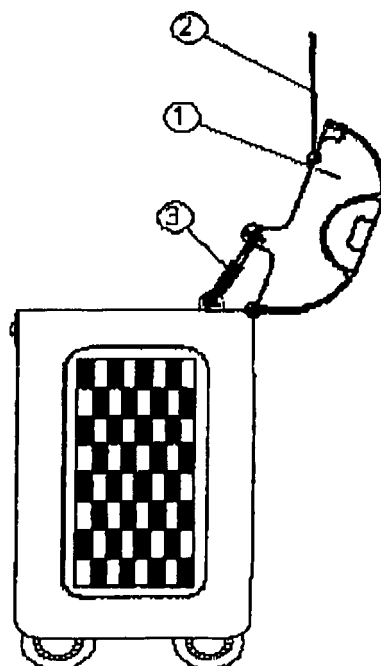


Figure 13

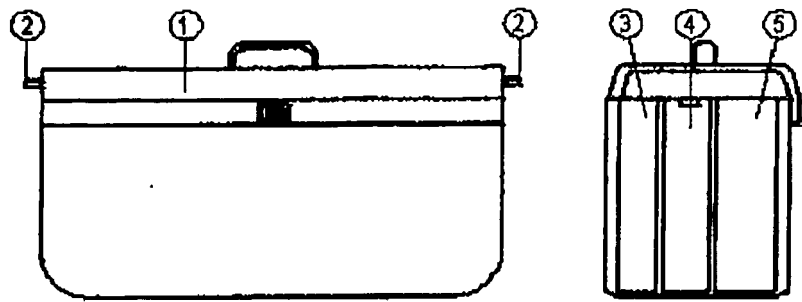


Figure 14

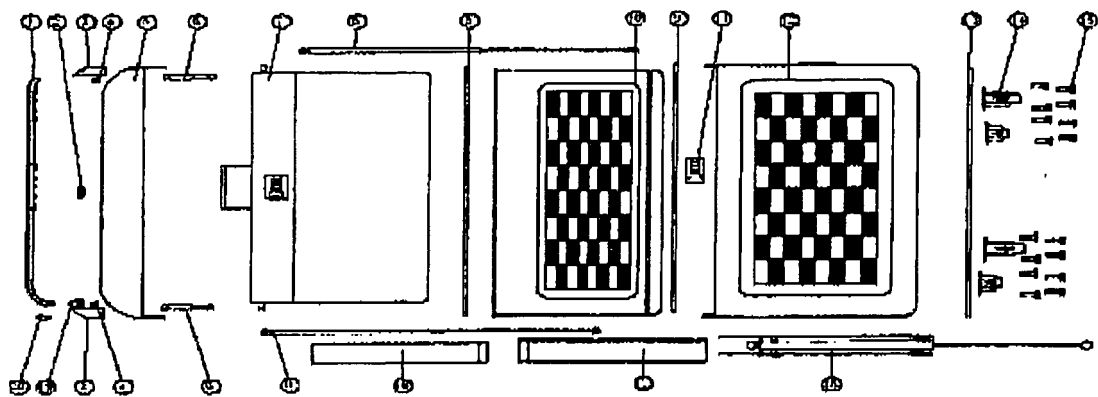


Figure 15



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 00 0142

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 June 2008	Examiner Lang, Denis
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 00 0142

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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