(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 369 575 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **89307953.3**

(51) Int. Cl.[5]: **B65D 88/14, B65D 90/00**

(22) Date of filing: **04.08.89**

(30) Priority: **18.11.88 US 273730**

(43) Date of publication of application:
23.05.90 Bulletin 90/21

(84) Designated Contracting States:
CH DE FR GB LI

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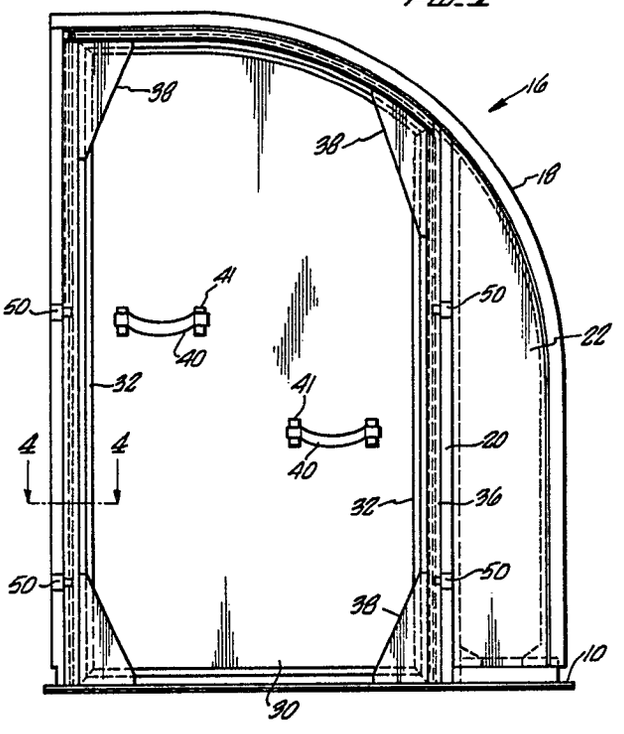
(54) Improved cargo container.

(57) A cargo container is designed and constructed to better utilize the available cargo space in the small and large commercial aircraft typically used for the commercial transportation of cargo. Used in tandem and arranged in mirror-image fashion, containers fill the available cargo space in a typical Boeing 727 cargo aircraft. Used singly, the containers allow for a sixteen (16%) increased utilization of the available cargo space in a Douglas DC10 cargo aircraft compared with prior art containers.

FIG. 1



EP 0 369 575 A1

Improved Cargo Container

BACKGROUND OF THE INVENTION

Field of Art

This invention pertains to aircraft cargo containers of the type which are intended to be first filled with cargo, then loaded into the fuselage of the aircraft.

Prior Art

In most instances, for reasons of speed and ease of loading and unloading, and for reasons of safety and security, cargo which is transported by air is first placed in cargo containers which are then sealed prior to being loaded onto the airplane. Typically, the loading of these containers is accomplished by means of a system of conveyor belts, tracks and ramps.

Because it is most often volume, not weight, which is the limiting factor in air cargo shipments, air cargo containers are preferably designed and constructed to occupy as much of the available cargo space within the airplane fuselage as possible. As the Boeing 727 aircraft is used by a great many cargo carriers, many cargo containers in use today are designed and constructed to fit the interior configuration of the cargo space of that aircraft's fuselage. Typical of that type aircraft cargo container is that shown in U.S. Patent No. 3,904,064. It is characterized by a box-like container with its upper exterior edges rounded to conform to the curved shape of interior cargo compartment of the airplane's fuselage. Further, the width of that cargo container is such that it spans the available cargo space from side-to-side within the airplane. This configuration and size of the cargo container are, of course, intended to provide for the maximum utilization of cargo space within the Boeing 727 aircraft.

While the Boeing 727 continues to be a very popular aircraft for transportation of cargo, other aircraft are being used for that purpose with increasing frequency. While it is, of course, possible to construct cargo containers of a size and configuration to conform to the cargo space of these other, typically larger, planes, many cargo carriers choose not to do so for several reasons, such as incompatability with current loading and unloading equipment, and the inability to transfer the containers from the larger plane to a smaller plane. Hence, the cargo containers built for the Boeing 727 aircraft are often used in aircraft such as the Douglas DC10, with the concomitant inefficient use of the available space.

For example, while the Boeing 727 uses a single row of containers like that shown in U.S. Patent No. 3,904,064, the Douglas DC10 can accommodate two rows, side-by-side, of the same container, and still have significant unutilized space along the sides of the aircraft. In other words, DC10 aircraft and other large aircraft could carry significantly greater cargo if a cargo container was available which utilized the additional space more efficiently.

SUMMARY OF INVENTION

This invention fills that need with a container sized and shaped such that two of them, positioned together in mirror- image fashion, are adapted for the Boeing 727 aircraft with no loss of cargo space utilization compared to the prior art containers. Used singly, however, the containers of this invention better utilize the space available in the larger aircraft. For example, the DC10 aircraft will accept two rows of eleven prior art containers, or twenty-two total. Utilizing the container of this invention, however, the same aircraft space will accommodate eight (8) double units and thirty-five (35) single units, which equates to substantially the same useable cargo volume as twenty-five and one-half of the prior art containers. This constitutes an increase of useable cargo space of three and one-half of the prior art cargo containers, or a sixteen percent (16%) increase in aircraft cargo space utilization. In addition, the container of this invention can be transported on the ground using the same equipment as for the prior art containers, and can be loaded directly from the smaller aircraft to the larger aircraft and vice versa.

The smaller containers also provide a secondary benefit in that many customers, who may not have sufficient cargo to fill the prior art container, nevertheless desire door-to-door delivery of the sealed container. Accordingly, on any given flight, several of the prior art containers could be less than half full. By utilizing the containers of this invention, those customers having less cargo, but still desiring door-to-door delivery of the sealed container, can be accommodated at a lesser charge, while providing greater profit to the carrier.

Further benefits of this invention include fully interchangeable sealable two-sided doors and a locking mechanism to hold the doors securely in

position, creating a water tight seal.

Further objectives and benefits of the invention will become apparent to those skilled in the art upon the reading of the remainder of this specification and the claims, and a review of the drawings.

DESCRIPTION OF THE FIGURES

Figure 1 is a side view of the container of this invention, showing the door in position, locked in place. The opposite side of the container is the mirror image of that shown here.

Figure 2 is a side view with the door in isolation.

Figure 3 is a plan view of the base portion of the invention.

Figure 4 is a top view in cross section taken along lines 4-4 in Figure 1, showing the construction of the door frame.

Figure 5 is a view in isolation of the locking device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Unless otherwise specified, all components of this invention are preferably manufactured of aluminum, as that provides the best combination of strength and light weight.

The container has a rectangular base 10 (best seen in Figure 3), which is preferably 88″ long and 62″ wide. The base 10 has a perimeter shoe 12 to which a flat piece of aluminum sheeting 14 is riveted by conventional rivets 15.

Attached to the base 10, and forming three sides of the container enclosure, is a hood assembly, generally designated 16 in Figure 1. The main support for hood assembly 16 comprises a pair of curved posts 18. Only one post is shown as the side opposite to that shown in Figure 1 is exactly the same, in mirror image as that shown in Figure 1. The ends of posts 18 are at ninety degrees (90°) from one another, and travel through an arc which closely approximates the interior configuration of the cargo space of a Boeing 727 aircraft. One end of posts 18 is attached to the perimeter shoe 12 of base 10 at opposite corners thereof by conventional means. A single aluminum sheet 19 is attached between posts 18 to form the outer skin on the top and one side of the overall container. The hood assembly 16 further comprises another pair of posts 20 (one post only is shown in the Figures) which are attached at the top end to posts 18 and at their bottom end to the perimeter shoe 12 of base 10. Posts 20 provide additional support to the structure and will act as a door jamb as hereinafter discussed. Two sheets of aluminum 22 is attached on either side of the container to complete the outer skin for the container on either side thereof.

The remaining sides of the container are completed by a third pair of posts 24 (one post only is shown in the Figures) which are attached at the opposing corners of base 10 to the perimeter shoe 12, at one end of the posts, with the other end of the posts being attached to the distal end of curved posts 18. The posts 24 each have a flange 25 which acts as a doorstop. A similar flange is attached to posts 20. An aluminum sheet 26 is attached to posts 24 by bolt means 27 to complete the outer skin of the container.

It will be noted that this assemblage leaves substantial openings fore and aft of the container through which cargo can be loaded and unloaded. To protect the cargo from theft or damage, those openings must be tightly sealed after the cargo is loaded. The doors of this device, generally designated 30, are exactly the same size, shape and construction, and are designed to be interchangeable, such that each door can fit either opening. To be able to do so, the doors are double sided, meaning that when viewed from the side opposite that shown in Figure 2, the door looks the same. The doors 30 comprise an exterior frame 32 to which an aluminum sheet 34 is attached. Along the sides, top and bottom of the door 30, a flange piece 36 extends outwardly. A rubber casket or other sealing material can be affixed to the front and back sides of flange piece 36 if a water tight seal is desired. Gussets 38 are attached to each corner of the door 30 for strength. A pair of canvas handles straps 40 are attached by conventional means 41 to each side of the door 30 for ease of insertion and removal.

The doors 30 are maintained in position by four locking mechanisms 50, which are shown in isolation in Figure 6. The locking mechanisms are preferably a simple spring loaded piston type device in which the piston 52 may be manually depressed to allow the door to be inserted. When released, the piston is extended and held in place there by a ball 54 which engages an appropriately sized groove 56 in the piston 52. A spring 58 biases the ball 54 into position within the groove 56. These four locking devices hold the door firmly and securely in place.

The container has hereinabove described can be used singly or in tandem. In tandem, when arranged in mirror image fashion, they are the equivalent in size and shape to the prior art containers and can just as efficiently utilize the available cargo space in the Boeing 727 aircraft as did those prior art containers which were designed specifically for that purpose. When used singly,

however, these containers can more efficiently utilize the available cargo space in larger aircraft, such as the Douglas DC10. As will be appreciated, this increased utilization of space in the larger aircraft is obtained without sacrificing interchangeability of the containers. The containers will not need to be opened to remove any of the cargo, can be moved directly from the smaller Boeing 727 aircraft to the larger Douglas DC10 aircraft, and vice versa, using the same handling equipment.

Claims

1. In a cargo container comprising a base section and a hood assembly attached thereto, the improvement comprising:

(a) said base section being rectilinear, and said hood assembly attached thereto having a substantially quarter-cylindrical shape, such that two of the resultant containers, when juxtaposed in mirror-image fashion thereby forming a substantially semi-cylindrical shape, occupy the cross-sectional cargo space typically reserved for cargo containers in the fuselage of a Boeing 727 aircraft, with each of the individual containers occupying approximately one-half of that space, and three of said containers abreast will substantially occupy the cross-sectional cargo space typically reserved for cargo containers in the fuselage of a Douglas DC10 aircraft;

(b) at least a pair of mirror image openings on either side of said hood assembly;

(c) at least a pair of doors sized and shaped so as to fit said openings sealably and interchangeably, said doors having handle means attached to both sides thereof; and

(d) door closure means for holding said doors within said openings.

2. The invention of claim 1 wherein said hood assembly comprises a first pair of vertical frame members attached to said base section at its corners on one side thereof, a second pair of curved frame members attached at one end to said base section at its corners on the second side thereof, and attached at their other end to a first frame member, a cross member between said first and second frame members at the junction thereof, and aluminum sheets attached thereto, the second end of said second frame members being at a ninety degree position relative to their first ends.

3. The invention of claim 1 wherein said base section is approximately sixty-two inches wide, and said hood assembly at its tallest point (as attached to said base section), is approximately seventy-nine inches high.

4. The invention of claim 1 wherein said door closure means comprises at least two spring-loaded piston-type locks on either side of said openings.

5. The invention of claim 2 wherein said openings are adjacent to said first frame member.

6. A cargo container comprising:

(a) a base section having a width slightly less than one half the width of the interior diameter of the fuselage of a conventional Boeing 727 aircraft;

(b) a first pair of vertical frame members attached to the corners of said base section of one side thereof, said first frame members having a height which is slightly less than the interior radius of the fuselage of a conventional Boeing 727 aircraft;

(c) a second pair of curved frame members, said second frame members attached at a first end to the corners of said base section on the other side thereof, said second frame members attached at their second end to said first frame members, said second frame members being curved through an arc which approximates the arc of one quardant of the interior cross-sectional configuration of a conventional Boeing 727 aircraft;

(d) aluminum sheeting material attached to said first and second frame members and to said base section to form the outer skin of the container;

(e) at least one opening in said container through which cargo may be loaded and unloaded; and

(f) door closure means for sealably closing said opening.

Fig. 2

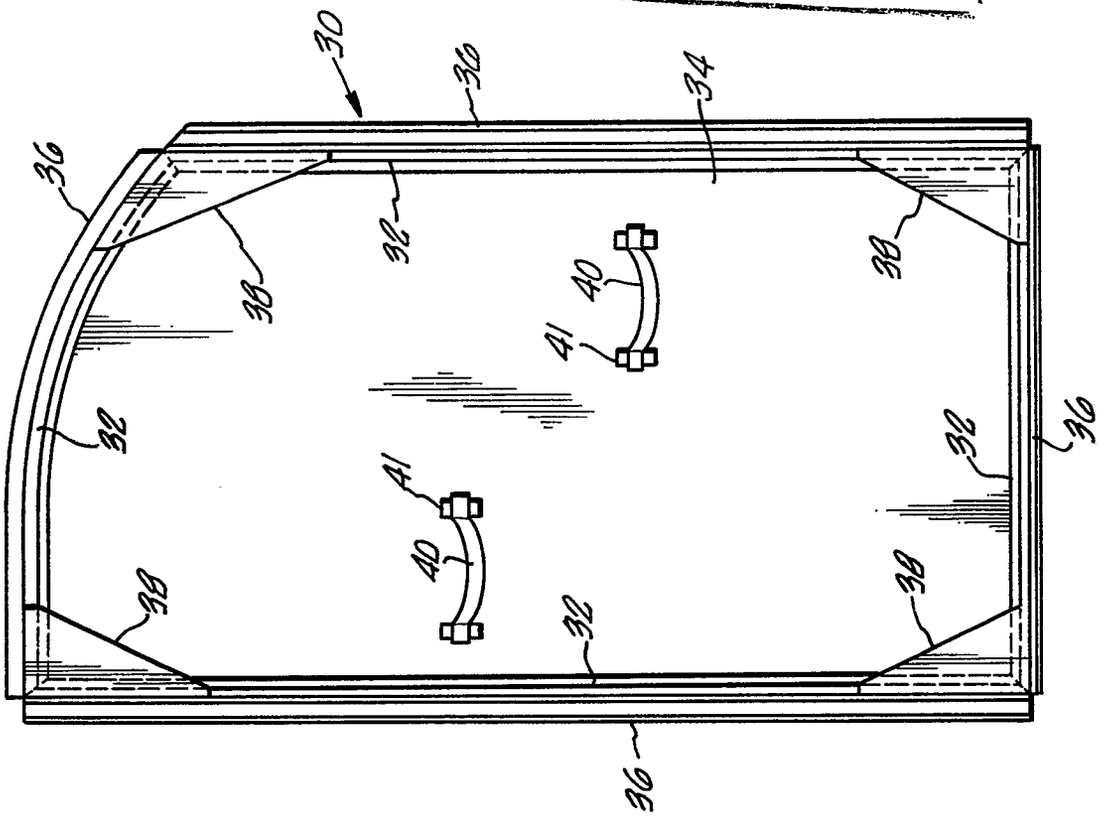
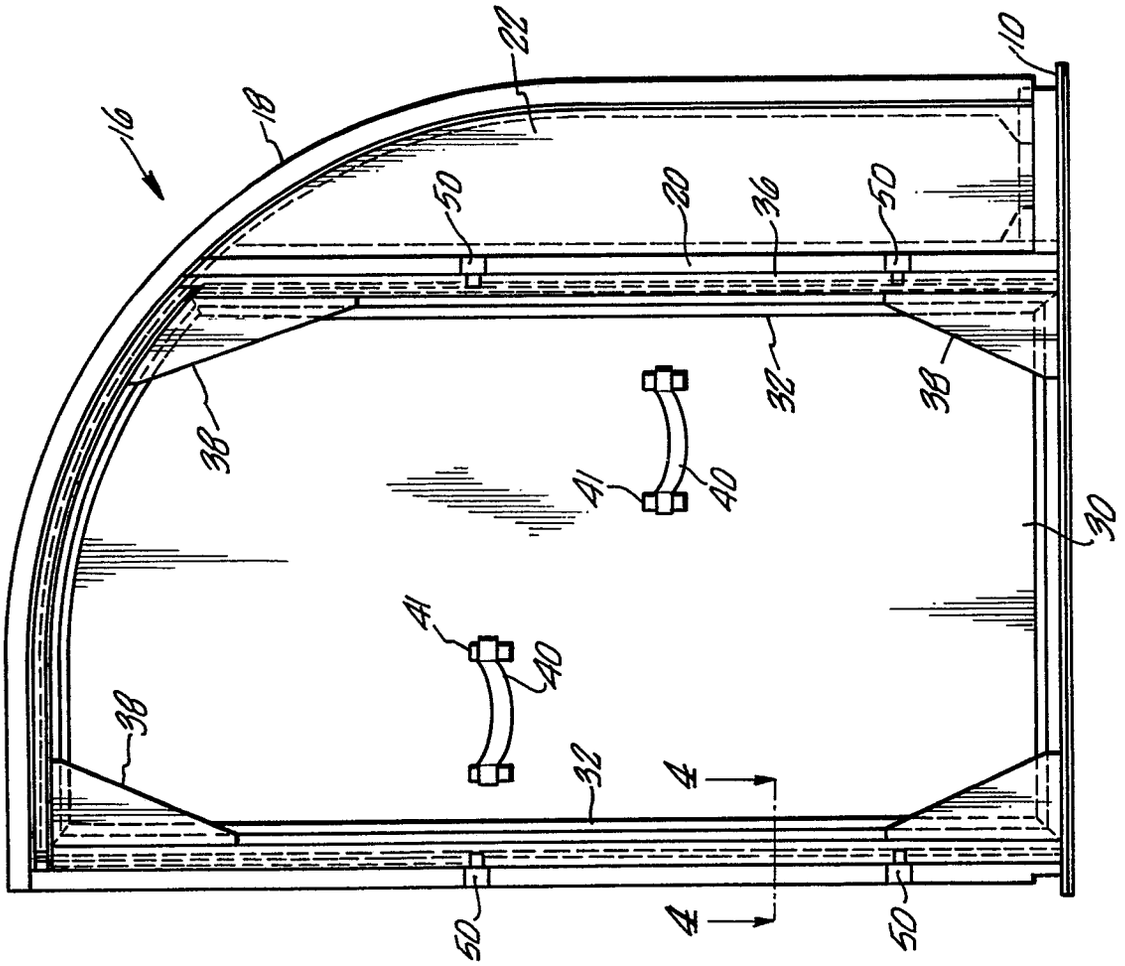


Fig. 1



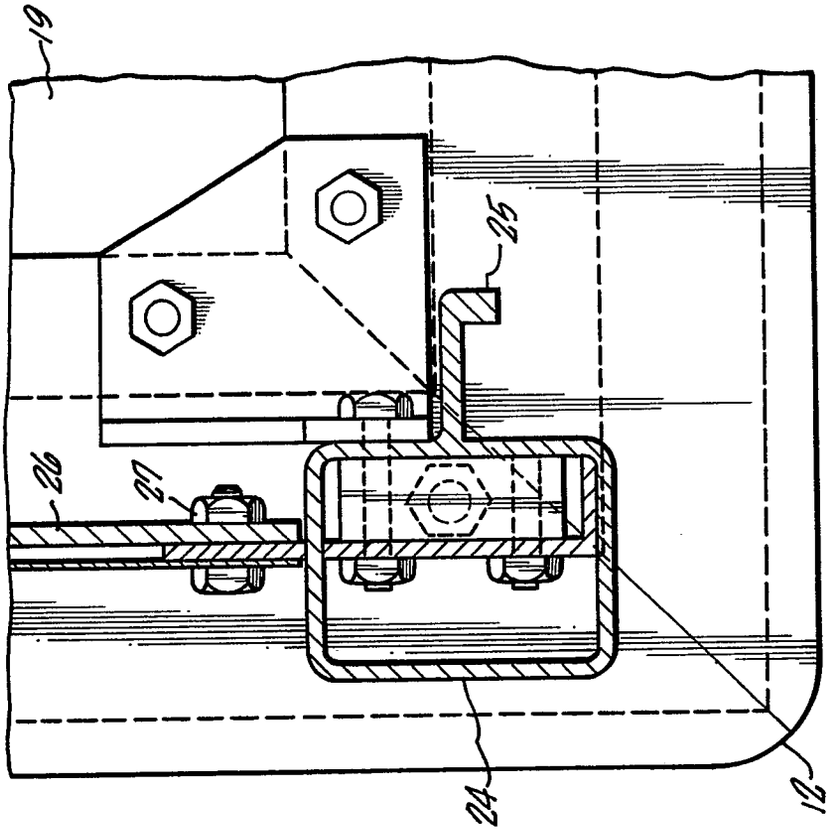


FIG. 4

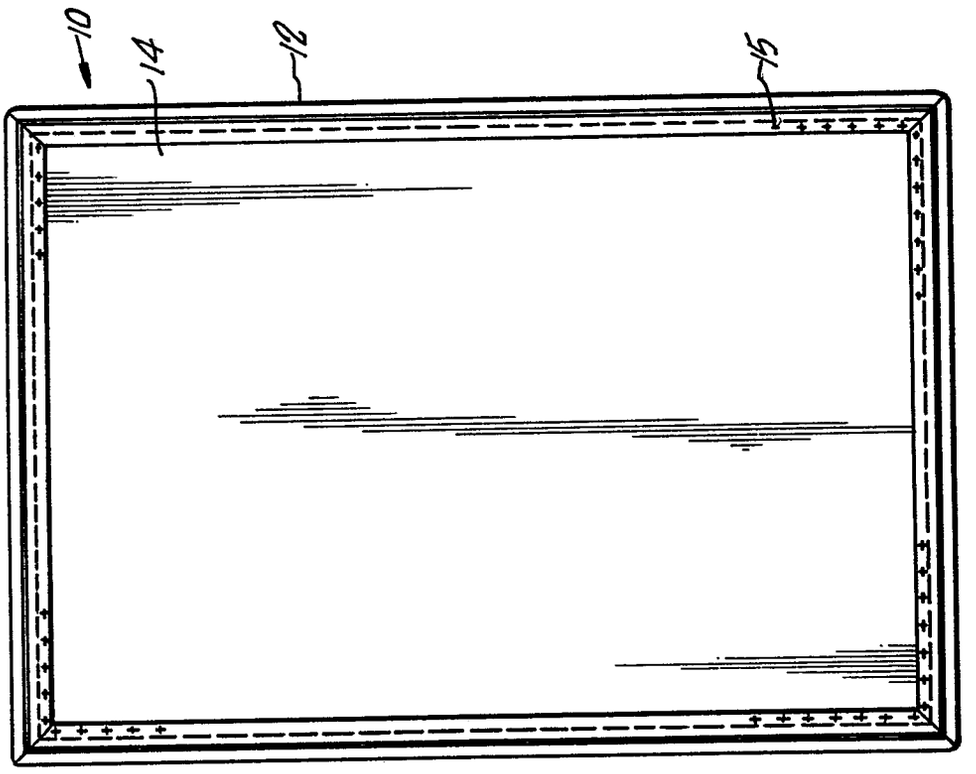


FIG. 3

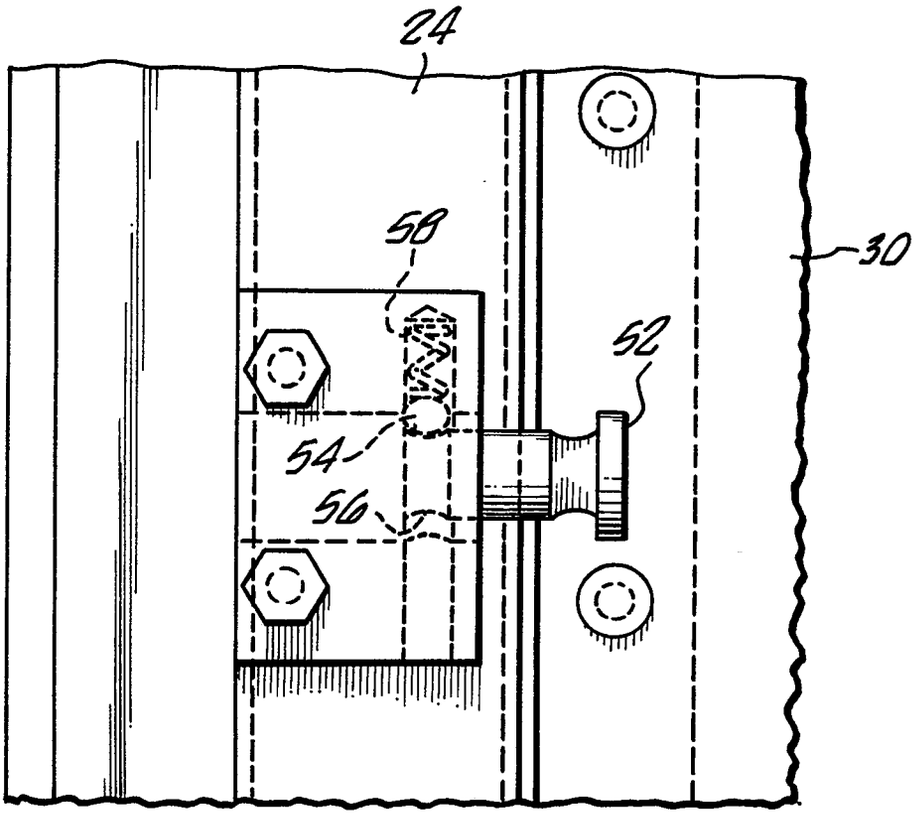


FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 7953

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	US-A-4 747 504 (WISEMAN) * Whole document * ---	1,2,6	B 65 D 88/14 B 65 D 90/00
Y	US-A-2 761 581 (COHEE) * Whole document * ---	1,2,6	
A	US-A-3 972 437 (LOVICH) * Whole document * -----	1,4	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 65 D
B 64 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19-02-1990	OSTYN T.J.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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